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International Nonproprietary Names (INN) for biological and biotechnological substances

(a review)

2022

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International Nonproprietary Names Programme and Classification of Medical Products

Health Products Policy and Standards (HPS)
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International Nonproprietary Names (INN) for biological and biotechnological substances

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INTRODUCTION

More than 50 years ago, WHO established the International Nonproprietary Name (INN) Expert Group/WHO Expert Committee on Specifications for Pharmaceutical Preparations, to assign nonproprietary names (INN) to medicinal substances, so that each substance would be recognized globally by a unique name. INN do not give proprietary rights, unlike a trade mark, and can be used freely as they are public property.

INN have been assigned also to biological substances since the early days of the INN Programme. In addition to names for individual substances, animal insulin preparations were given an INN in Recommended list 3 in 1959. In the period up to 1980, names were assigned to antibiotics, synthetic peptides, hormones and other proteins. For compounds that are related by structure and/or function, a specific string of letters, called stems, is included to aid recognition by health professionals. The suffix *-actid*e for synthetic polypeptides with a corticotrophin-like action is an early example.

In 1982, the name *insulin human* was proposed for the recombinant protein identical to natural human insulin, and since then names have been assigned to a growing number of recombinant substances. Within the INN Programme, names have not been assigned to natural human blood products or traditional vaccines that rely on inactivated or live-attenuated viruses. For those groups of biological products, the WHO Expert Committee on Biological Standardization (ECBS) has been adopting the scientific names of the biological products within the definitions of respective requirements.

Since the time when *insulin human* became the first recommended INN (rINN) for a recombinant substances, the range of biological/biotechnological substances has increased in size and complexity. For example, new stems have been introduced for fusion proteins with more than one pharmacologically active component (*-fusp*) among other groups. Recombinant glycosylated proteins with the same protein sequence but produced in different cell systems have been classified using Greek letters as indicators in the sequence of submission for an INN, for example erythropoietin gives *epoetin alfa*, *epoetin beta* and so on. In the 1990s, a systematic scheme for naming monoclonal antibodies was implemented, based on the stem *-mab*. For some time, the INN Programme received a great increase in INN requests for monoclonal antibodies, which was making the selection of distinguishable INN very difficult. To ease the situation, in 2021, the INN nomenclature scheme for monoclonal antibodies changed; the stem *-mab* was discontinued and replaced by four new stems (*-tug*, *-bart*, *-ment* and *-mig*)[15-16].

As a result of the scientific and technical developments over the past few years and continuing now, new substances of biotechnology and other biological substances have been developed and approved for clinical use and more substances can be expected for the treatment or prevention of disease. Examples include recombinant blood products, transgenic substances (human proteins expressed in animals or plants), substances for gene and cell therapy and novel vaccine substances.

As this area became more and more complex and challenging, the INN Expert Group requested the WHO-INN Secretariat to prepare a working document intended to summarize and review the past and present INN activities and policies in this field.

This document, first published on the website of the INN Programme in 2006, presents an inventory of the policy decisions taken by the INN Expert Group during these years of change, and of the names assigned to biological and biotechnological substances. Considering the potential for further developments in the field of biologicals, this review is intended to be a living document which will be updated regularly to include new policies and INN that have been assigned. The current version has been revised fully to reflect discussions and decisions taken by the INN Expert Group following a comprehensive review undertaken by many experts in the field, the INN Expert Group and INN Secretariat.

Comments and suggestions from all interested parties are always welcome and will be presented to the INN Expert Group for their consideration and for possible incorporation in future updates of this review.

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https://www.who.int/health-product-and-policy-standards/inn publications

1. CURRENT STATUS OF EXISTING STEMS OR SYSTEMS FOR BIOLOGICAL AND BIOTECHNOLOGICAL SUBSTANCES [1-6]

1.1. Groups with their stems

Name of the group	Stem
Antimicrobial, permeability-increasing peptides (see item 3.1)	*-ganan*
Antisense oligonucleotides (see item 3.2)	*-rsen*
Aptamers, classical and mirror ones (see item 3.4)	*-apt-*
Blood coagulation cascade inhibitors (see item 3.5)	*-cogin*
Blood coagulation factors (see item 3.6)	*-cog*
Colony stimulating factors (see item 3.12)	*-stim*
Engineered or synthetic scaffold proteins with non-immunoglobulin variable domain derived binding domains (see item 3.13)	*-bep*
Enkephalin, endorphin and dynorphin opioid δ, μ and κ receptor agonists (see item 3.14)	*-kef-*
Enzymes (see item 3.15)	*-ase*
Erythropoietin type blood factors (see item 3.16)	*-poetin*
Fusion proteins with more than one pharmacologically active component (see item 2.4.2 and 3.17)	*-fusp*
Gonadotropin-releasing hormone (GnRH) inhibiting peptides (see item 3.18)	*-relix*
Growth factors and tumour necrosis factors (TNF) (see item 3.19)	*-ermin*
Growth hormone (GH) derivatives (see item 3.20)	*som-*
Heparin derivatives including low molecular weight heparins (see item 3.22)	*-parin*
Hirudin derivatives (see item 3.23)	*-irudin*
Immunomodulators, both stimulant/suppressive and stimulant (see item 3.24)	*-imod*
Interleukin receptor antagonists (see item 3.27)	*-kinra*
Interleukin type substances (see item 3.28)	*-kin*
Messenger RNA (mRNA) molecules (see item 3.29)	*-meran*
Monoclonal antibodies (see items 2.10 and 3.29)	*-mab*
Oxytocin derivatives (see item 3.31)	*-tocin*
Peptides and glycopeptides (see item 3.32)	*-tide*
Pituitary hormone-release stimulating peptides (see item 3.33)	*-relin*

Receptor molecules, native or modified (see item 3.35)	*-cept*
Small interfering double-stranded RNA including siRNA, miRNA, piRNA (see item 3.36)	*-siran*
Substances for cell therapy (see items 2.7 and 3.8)	*-cel*
Substances for cell-based gene therapy (see items 2.8 and 3.9)	*-gene* & *-cel*
Substances for gene therapy (see items 2.6 and 3.7)	*-gene*
Substances for virus-based therapy (see items 2.9 and 3.10)	*-rev*
Vasoconstrictors, vasopressin derivatives (see item 3.39)	*-pressin*

1.2. Groups with INN nomenclature schemes

Name of the group
Fusion proteins with more than one pharmacological active component (see items 2.4 and 3.17)
Monoclonal antibodies (see items 2.10 and 3.29)
Substances for cell therapy (see items 2.7 and 3.8)
Substances for cell-based gene therapy (see items 2.8 and 3.9)
Substances for gene therapy (see items 2.6 and 3.7)
Substances for virus-based therapy (see items 2.9 and 3.10)
Engineered or synthetic scaffold proteins with non-immunoglobulin variable domain derived binding domains (see items 2.11 and 3.13)

1.3. Groups without stems / pre-stems

Name of the group
Antithrombins (see item 3.3)
Growth hormone (GH) antagonists (see item 3.21)
Insulins (see item 3.25)
Interferons (see item 3.26)
Pituitary / placental glycoprotein hormones (see item 3.33)
Thrombomodulins (see item 3.37)
Toxins (see item 3.38)
Various (see item 3.41)

2. GENERAL POLICIES FOR BIOLOGICAL AND BIOTECHNOLOGICAL SUBSTANCES

2.1. General policy for substances identified by their proper name

- For substances identified with their proper name (e.g. *insulin)* differences in the amino acid sequence are indicated by using a second word (e.g. *insulin argine (58)*).

- In case the substance is also glycosylated an additional word representing the Greek letter is added (e.g. *insulin efsitora alfa (122)*.

- For substances with specific linker components, those are indicated by using a second word (e.g. *hemoglobin raffimer (89)*.

- In the case of interferons (see item 3.26), pegylation is indicated by a prefix (e.g. *peginterferon alfa-2b* (84)) similar to other pegylated proteins or peptides. A different glycosylation pattern is indicated by a small letter. The Greek letter identifies the subgroup.

2.2. General policy for non-glycosylated substances [7]

- For groups of non-glycosylated substances identified with a stem (e.g. *-irudin* for hirudin analogues) differences in the amino acid sequence are indicated by using a random prefix (e.g. *bivalirudin (72)*).

2.3. General policy for glycosylated substances [7]

For groups of glycoproteins/glycopeptides identified with a stem (such as *-poetin* for erythropoetins, *-cog* for blood coagulation factors, *-ase* for enzymes…):

- differences in amino acid sequence are indicated by using a random prefix (e.g. *darbepoetin alfa (85), lonoctocog alfa (111)*, *bucelipase alfa (95)*).

- glycosylation is indicated by a Greek letter[1] spelt in full and added as a second word to the name. The Greek letters are used in the Greek alphabetical order starting from *"alfa"* (see ANNEX 4) (e.g. *epoetin alfa (66), eptacog alfa (activated), aglucosidase alfa (91), epoetin beta (62)*).

For *-mab* and *-cept*:
Although most monoclonal antibodies (see items 2.10 and 3.30) and receptor molecules (*-cept*) (see item 3.35) are glycosylated, the first INN application does not have the Greek letter (note however that it is considered *"alfa"*, despite not having *"alfa"* in its INN). This rule also applies to the new INN nomenclature scheme for monoclonal antibodies (*-tug, -bart, -ment* and *-mig*). If an INN application is received for an antibody or for a *-cept* with the same amino acid sequence as an existing one, but with differences in the glycosylation pattern

[1] The transliteration of Greek letters in English, French and Spanish is given in ANNEX 4.

requiring a new INN (eg. glycoengineering or having a cell-type glycosylation profile different from the existing application), the INN for the later application will be the existing INN, but with a terminal Greek letter, starting from "*beta*".

Exception interferons:
In the case of interferons (see item 3.26), a different glycosylation pattern is indicated by a small letter. The Greek letter identifies the subgroup and refers to interferons with different amino acid sequence.

2.4. General policies for fusion proteins [5]

Fusion proteins are those encoded from one nucleotide sequence generated from two or more genes - and possibly linkers - that originally encoded separate proteins.

2.4.1. Fusion proteins with one pharmacologically active component[2]

- If a stem exists for the pharmacologically active component, this stem should be brought into the name.
- It is considered unnecessary to indicate that the substance is a fusion protein within the name.
- The prefix ***alb-*** has been used to designate proteins fused with human serum albumin and from proposed INN List 109, the prefix ***ef-*** has been used to designate proteins fused with the constant fragment of an immunoglobulin molecule (Fc), except for the *-cept* group.

2.4.2. Fusion proteins with more than one pharmacologically active component [8]

- The stem ***-fusp*** is used to designate fusion proteins that contain more than one pharmacologically active components (e.g. action and targeting); no other stem is used.
- In addition to the stem ***-fusp***, a syllable formed from a one consonant and one vowel is added before the stem to indicate: (1) the pharmaceutical action (consonant); and (2) the targeting (vowel), when appropriate. The meanings of these infix letters are given in Table 1.
- The stem ***-fusp*** has been used from proposed INN List 118. This nomenclature scheme is not designed to provide comprehensive information about the substance in the name, but rather to indicate that it is a fusion protein with more than one pharmacologically active component and a general indication of its type. The description at the level of publication provides information about the content of the fusion protein.
- In a bifunctional fusion protein, if one component has a purely stabilizing function (e.g. to increase half-life), the stem ***-fusp*** will not be assigned. For instance, if the component is a

[2] The list of INN for fusion proteins with one pharmacologically active component is given in ANNEX 1.

stabilizing Fc fragment, the "***ef-***" prefix should be used, not the stem ***-fusp***.
In a fusion protein that contains one or more targeting components, one or more pharmacologically active components and also a stabilizing Fc fragment, both ***-fusp*** and ***-ef*** could be used.

- If both components of the fusion protein have a targeting action, and one of them is derived from a monoclonal antibody (mAb), when assigning the identifying infix letters, the "*-a-*" for *antibody* takes priority. For example, a fusion of a receptor with an antibody will be *-ra-* (where *r* stands for *receptor* and *a* for *antibody*), a fusion of a binding protein with an antibody will be *-ba-* (where *b* stands for *binding protein* and *a* for *antibody*).

- The infix letters will not distinguish between complete mAb or mAb fragments, in all cases the letter "*a*" will be selected.

- If the targeting component consists of a scaffold protein with engineered or synthetic non-immunoglobulin variable domain derived binding domains, the letter *-o-* for other should be used instead of the letter *-a-*.

- Bi- or multi-specific antibodies will be named using the new antibody nomenclature scheme, not the *-fusp* scheme.

- If more than two components are present, the two infix letters will still be used to represent the different action/targeting by class: e.g. if a fusion protein comprises two mAbs and one receptor, the INN will end in *-rafusp*.

Table 1: Infix letters and their meaning for the *-fusp* nomenclature scheme.

Action		**Targeting**	
-b-[(a)]	binding protein	*-a-*	antibody
-c-[(b)]	encapsulation protein	*-e-*	receptor
-f-	hormone	*-i-*	antigen
-g-	antigen	*-o-*[(d)]	other
-k-	cytokine	*-u-*[(e)]	untargeted
-m-	membrane protein		
-n-	enzyme		
-p-	apoptosis		
-r-	receptor		
-t-	T-cell receptor		
-v-[(c)]	multiple actions/proteins		
-x-	toxin		

[(a)] *-b-* will be used for protein-protein interactions, but also for protein-lipid, protein-sugar, or protein-inorganic ion interactions;
[(b)] *-c-* will be used for all kind of encapsulation, which includes viral capsid proteins or proteins that capture small molecules inside a cavity;
[(c)] *-v-* will be used when a multifunctional fusion protein has multiple and not related actions;
[(d)] *-o-* will be used when some other targeting protein (i.e. other than antibody, receptor or antigen) is used in a bifunctional fusion protein or in a multifunctional fusion protein with multiple unrelated targeting;
[(e)] *-u-* will be used when a fusion protein has multiple actions and no targeting;

2.5. General policy for pegylated substances [9]

Two different approaches have been used for pegylated substances (see ANNEX 3):

- a single-word scheme with the prefix *peg-* (e.g. *peginterferon alfa-2a (84), pegaldesleukin (74)*);
  In case the peg-linker itself is modified compared to an existing *peg-* INN, a fantasy prefix is added to accommodate the new INN. This has the effect of changing the *peg-* from a prefix to an infix (e.g. *peginterferon alfa-2b (84)* and *cepeginterferon alfa-2b (105); pegfilgrastim (86)* and *empegfilgrastim (107)*).
  For peptides, a single-word scheme with the prefix *peg-* (e.g. *pegloprastide* (120)) or the infix *-peg-* (e.g. *efinopegdutide (120)*) has been used.

- a two-word scheme with the first word representing the biological substance and the second word *pegol.* To avoid over-long INN, the two-word scheme has been preferred for names with long stems (e.g. *alacizumab pegol (98), calaspargase pegol (105)*). A random prefix on the second word *pegol* has been avoided.

Note: There is no implied difference relating to the use of the different schemes.

2.6. General policy for substances for gene therapy

In 2005, a two-word nomenclature scheme for substances for gene therapy was formally adopted by the members of the INN Expert Group. The 2016 updated scheme for gene therapy substances using vectors based on recombinant nucleic acid sequences (DNA vectors, e.g. plasmid DNA), genetically modified micro-organisms (bacterial vectors) or viruses (replication defective, replication competent or replication conditional viral vectors) is shown in Table 2. See section 2.8: *General policy for substances for cell-based gene therapy* for the nomenclature scheme for cell-based gene therapy substances, which is based on administration of genetically modified cells, for which typically a viral vector is used *ex vivo* or *in vitro* for manufacturing of those cells prior to administration.

Table 2: Two-word scheme for substances for gene therapy (plasmid-, viral vector- and bacterial-based).

	Prefix	**Infix**	**Suffix**
word 1 (gene component)	random, to contribute to euphonious and distinctive name	to identify the gene using, when available, existing infixes for biological substances, e.g.: *-beglo-* β-globin *-covto-* SARS CoV-2 *-distro-* muscular dystophies *-kin-* interleukin *-lim(o)-* immunomodulator *-naco-* coagulation factor IX *-pap(o)-* human papillomavirus *-reti-* retinal dystrophies *-tima-* thymidine kinase	-(vowel)*gene* e.g. *-(o)gene*

	Prefix	Infix	Suffix
		-tusu- tumour suppression	
word 2 (vector component)	random, to contribute to euphonious and distinctive name	to identify the viral vector type, e.g.: *-adeno-* adenovirus *-arna-* arenavirus *-cana-* canarypox virus *-foli-* fowlpox virus *-erpa-* herpes virus *-lenti-* lentivirus *-morbilli-* morbillivirus (*Paramyxoviridae*) *-parvo-* adeno-associated virus (*Parvoviridae*) *-pol-* poliovirus *-retro-* other retroviruses *-sax-* coxsackievirus *-vaci-* vaccinia virus	*-vec* (non-replicating viral vector) *-repvec* (replicating viral vector)
		to identify the bacterial vector type, e.g.: *-lis-* *Listeria monocytogenes* *-lacti-* lactic acid bacteria *-eco-* *Escherichia coli*	*-bac* (bacterial vector)
		(none)	*-plasmid* (plasmid vector)

In the case of substances for gene therapy based on plasmid DNA, there is at present no need for a word 2 infix in the name. The current list of word 1 gene infixes can be found in ANNEX 7.

2.7. General policy for substances for cell therapy

During the 63rd INN Consultation in 2016, an INN-USAN harmonized nomenclature scheme for substances for cell therapy was formally approved by the members of the INN Expert Group designated with the selection of international nonproprietary names[3].

Substances for cell therapy are given a one-word name. Table 3 shows the nomenclature scheme to name all non-genetically modified substances for cell therapy, with the exception of minimally manipulated hematopoietic elements and combinations of substances, which are not named. For genetically modified substances for cell therapy, please see section 2.8. Recent progress has been made by the INN Programme to define cell therapy substances, which encompassed a revision of the INN application form for cell-based substances [10-11].

Table 3: Nomenclature scheme for non-genetically modified substances for cell therapy.

Prefix	Infix: cell type	Suffix

[3] INN selected before the adoption of the present nomenclature scheme may have followed different rules.

random, to contribute to euphonious and distinctive name	to identify the primary cell type [(a)] using, when available, existing infixes for cell types [(b)]	*-cel* (cell)

In the case of manipulation such as cell expansion and cell activation (with cytokines/drug, etc.), there is no need for an infix; this kind of manipulation will be specified in the description.

[(a)] Residual cells not expected to contribute to the intended function, are not named.

[(b)]

-adstro-	adipose stromal cells	*-nepro-*	neural progenitor cells
-co(n)-	chondrocytes	*-nupu-*	nucleus pulposus cells
-defitem-	differentiation-restricted cells (oligopotent cells)	*-ova-*	ovary cells
-den-	dendritic cells	*-pla(c)-*	placental cells
		-ren-	renal cells
-end(o)-	endothelial cells	*-ret-*	retinal epithelial cells
-ep(a)-	hepatocytes	*-rom-*	cells with stem and stromal capacity
-fi(b)-	fibroblasts	*-tem-*	stem cells
-isle-	islet cells	*-tesi-*	testis cells
-ker(a)-	keratinocytes	*-tu-*	tumor cells
-leu-	lymphocytes/monocytes/APC (white cells)[(c)]	*-ubi-*	umbilical cord cells
-mestro-	mesenchymal stromal cells (MSC)	*-ur-*	urothelial cells
-mio(b)-	myocytes and myoblasts	*-vet-*	veterinary use

[(c)] The cell type infix *-leu-* is used to describe hematologic cell preparations that do not fit in a particular or specific cell type category. Such cell preparations may be comprised of a mixture of the various blood cell elements, a subset of blood elements such as T-, B- or NK-cells, or antigen-presenting cells (APCs) that do not fit in the definition of dendritic cells.

Note: Information concerning manipulation and/or modification, and the type of the cell-based therapy (i.e. allogeneic, autologous and xenogeneic), will be specified in the description of the substance.

2.8. General policy for substances for cell-based gene therapy

During the 63rd INN Consultation in 2016, an INN-USAN-harmonized nomenclature scheme for substances for cell-based gene therapy was formally approved by the members of the INN Expert Group designated with the selection of international nonproprietary names[4].

A two-word name is given to substances for cell-based gene therapy, in which the first word refers to the gene component and the second word refers to the cell component. The first word is named in the same way as the first word for substances for gene therapy (see Table 2).

[4] INN selected before the adoption of the present nomenclature scheme may have followed different rules.

During the 67th INN Consultation in 2018, an INN-FDA harmonised scheme for *autologous* substances for cell-based gene therapy was formally approved by the members of the INN Expert Group[4]. Recent progress has been made by the INN Programme to define cell-based substances, including cell-based gene therapy substances [10-11].

Table 4 shows the nomenclature scheme to name all genetically modified substances for cell-based gene therapy, with the exception of minimally manipulated hematopoietic elements and combinations of substances, which are not named.

Table 4: Nomenclature scheme for genetically modified substances for cell-based therapy.

	Prefix	**Infix**	**Suffix**
word 1 (gene component)	random to contribute to euphonious and distinctive name	to identify the gene using, when available, existing infixes for biological products or using similar infix as for the protein for which the gene codes, e.g.: *-ald-* adrenoleukodystrophy *-cabta-* cell expressed antibody and T cell activation *-beglo-* β-globin *-ema-* extracellular matrix *-kin-* interleukin *-lim(o)-* immunomodulator *-idu-* alpha-L-iduronidase *-tegra-* integrin superfamily *-tima-* thymidine kinase *-tres-* T cell receptor engineered for specificity	-(vowel)*gene* e.g. *-(o)gene*
word 2 (cell component)	autologous: *auto-* allogenic: *random*	to identify the primary cell type [(a)] using, when available, existing infixes for cell types [(b)]	*-cel* (cell)

See the notes [(a)], and [(b)] on the preceding page.

Note: Extensive information concerning manipulation and/or modification, and the type of the cell-based therapy (i.e. allogeneic, autologous and xenogeneic), is provided in the description of the substance.

2.9. General policy for substances for virus-based therapy

Substances for virus-based therapy are those for which the virus itself is acting as a therapeutic agent. This is distinct from virus-based gene therapy in which the virus is acting as a carrier of a therapeutic gene. In some cases, the virus may be genetically modified to enhance the therapeutic effect of the virus. To date, the only virus-based therapies that have been named are oncolytic viruses whereby the virus is used to target and destroy cancer cells.

In the event that a virus-based therapy such as an oncolytic virus is genetically modified to express a therapeutic gene, the virus-based gene therapy nomenclature scheme should be used.

Table 5 shows the nomenclature scheme for substances for virus-based therapy[5].

Table 5: Nomenclature scheme for substances for virus-based therapy.

Prefix	**Infix 1:** virus type	**Infix 2:**	**Suffix**
random, to contribute to euphonious and distinctive name.	*-adeno-* adenovirus *-arna-* arenavirus *-cana-* canarypox virus *-foli-* fowlpox virus *-erpa-* herpes virus *-lenti-* lentivirus *-morbilli-* Paramyxoviridae morbillivirus *-parvo-* adeno-associated virus (Parvoviridae) *-pol-* poliovirus *-retro-* other retrovirus *-sax-* Coxsackievirus *-vaci-* vaccinia virus	*-tu-* for oncolytic	*-rev* (therapeutic virus)

2.10. General policy for monoclonal antibodies [1, 12-15]

This monoclonal antibody nomenclature scheme is used for all substances that contain an immunoglobulin variable domain that binds to a defined target, and that is composed of only immunoglobulin-derived pharmacologically active components. The suffix is preceded by an infix that indicates the target class.

Immunoglobulin fusions are only included in this nomenclature scheme if both domains have immunoglobulin derived variable domains (*eg*. mAb fused with a cytokine is under the *-fusp* nomenclature scheme).

Up to the 72nd INN Consultation and Proposed INN List 126, the common stem for monoclonal antibodies was ***-mab,*** placed as a suffix. In 2021, the monoclonal antibody nomenclature scheme was revised and from 73rd INN Consultation and Proposed INN List 127, the new nomenclature scheme divides the substances that contain an immunoglobulin variable domain into four groups, there being three groups with three different stems (*-tug*, *-bart* and *-ment*) for monospecific immunoglobulins, and a fourth stem (*-mig*) for bi- and multi-specific immunoglobulins, independent of their type, shape and form [15-16].

Suffixes

-tug for ***unmodified immunoglobulins***

[5] INN selected before the adoption of the present nomenclature scheme may have followed different rules.

The suffix ***-tug*** is used for monospecific full-length immunoglobulins with unmodified constant regions and identical sets of CDRs that recognize the same epitope. This includes monospecific full-length immunoglobulins of any species and of any class (IgG, IgA, IgM, IgD, IgE), for which the amino acid sequence of the constant region of the heavy and light chains is encoded by a single naturally occurring allele. However, they may have engineered glycans and/or deleted C-terminal lysine codon (introduced for homogeneity since this is generally clipped *in vivo* and often during expression). Basically, this group includes all natural immunoglobulin molecules (which might occur as such in humoral responses of the immune system, including the Camelidae heavy-chain-only antibodies), as well as chimeric and humanized antibodies. It also includes immunoglobulins that use identical sets of CDRs to target multiple different epitopes or molecules.

-bart for ***art*ificial *i*mmunoglobulins**
The suffix ***-bart*** is used for monospecific full-length immunoglobulins with engineered amino acid changes in the constant regions and identical sets of CDRs that recognize the same epitope. This includes monospecific full-length immunoglobulins of any species and of any class (IgG, IgA, IgM, IgD, IgE) that contain any amino acid change introduced by engineering for any reason anywhere in the constant regions, including hinge (e.g., IGHG4 hinge with Serine>Proline amino acid change), new glycan attachment site, mixed allelic variants that would not occur in nature, altered complement binding, altered neonatal Fc receptor (FcRn) binding, altered fragment crystallizable (Fc)-gamma receptor binding, and stabilized IgA. It also includes immunoglobulins with attachments of further variable domains with identical CDRs and that recognize the same epitope.

-ment for ***i*mmunoglobulin *frag*ment*s***
The suffix ***-ment*** is used for monospecific fragments of any kind that do not fall under stem *-tug* or *-bart*, containing at least one immunoglobulin variable domain that contributes to binding, and feature a complete, partial, or absent constant region (e.g., monospecific immunoglobulin-derived constructs without an Fc domain, scFv-Fc constructs).

-mig for ***m*ulti-specific *i*mmuno*g*lobulins**
The suffix ***-mig*** is used for bispecific and multispecific immunoglobulins, regardless of the format (conventional or engineered), type (full-length or fragments) or shape (extensions or not). This group includes immunoglobulins with a bi- or multi-specificity conferred by different variable domains with different sets of CDRs. It does not include monoclonal antibodies that have multiple specificities through a single set of CDRs (cross-reactivity, e.g., *bimekizumab*).

Infixes

The mechanisms of monoclonal antibodies are complex, may be different for different indications and might not be completely understood during development. Therefore, the infix

is assigned according to the proposed known mode of action at the time of the INN request submittion.

Prefix	Infix for target class	Suffix
Random	*-ami-* serum amyloid protein (SAP)/amyloidosis *-ba-* bacterial *-ci-* cardiovascular *-de-* metabolic or endocrine pathways *-eni-* enzyme inhibition *-fung-* fungal *-gro-* growth factor and growth factor receptor *-ki-* cytokine and cytokine receptor *-ler-* allergen *-sto-* immunostimulatory *-pru-* immunosuppressive *-ne-* neural *-os-* bone *-ta-* tumour *-toxa-* toxin *-vet-* veterinary use *-vi-* viral	*-tug* *-bart* *-ment* *-mig*

Second word

If the monoclonal antibody is conjugated to another protein or to a chemical (e.g. chelator), identification of the conjugate is accomplished by use of a separate, second word or acceptable chemical designation. For mAbs conjugated to a toxin, the suffix *-tox* is used in the second word. Please also consult the document International nonproprietary names (INN) for pharmaceutical substances: names for radicals, groups & others (Comprehensive list)[32].

If the monoclonal antibody is radiolabelled, the radioisotope is listed first in the INN, e.g. *technetium (^{99m}Tc) nofetumomab merpentan (81).*

Pegylation

For pegylated monoclonal antibodies see item 2.5: General policy for pegylated substances.

Glycosylation

For glycosylated monoclonal antibodies see item 2.3: General policy for glycosylated substances.

2.11. General policy for engineered or synthetic scaffold proteins with non-immunoglobulin variable domain derived binding domains

- The stem ***-bep*** is used for all engineered or synthetic scaffold proteins with non-immunoglobulin variable domain derived binding domains. The scaffold domain (or framework) which supports the binding loops may be fibronectin F10 (FN), tenascin F3 (TNC), ankyrin repeats (ANK), three helical bundle (THB), lipocalin (LCN), constant immunoglobulin heavy chain (CH3) domains. These proteins do not have immunoglobulin-variable-domains and therefore are not mAbs, but they share the capacity to bind antigens and for this function are designated as 'alternative to antigen receptors' or 'alternatives to antibodies'. Although, they are also sometimes described as 'antibody mimetics', they share little, if any structural homology, with mAbs and the synthesis of their binding domains does not result from a V-D-J gene rearrangement.

- The infixes shown in Table 6 indicate the target class (molecule, cell and organ):

Table 6: Nomenclature scheme for engineered or synthetic protein scaffolds, non-immunoglobulin variable domain derived

Prefix:	**Infix:** target class	**Suffix:**
random	*-ami-* serum amyloid protein (SAP)/amyloidosis	*-bep*
	-ba- bacterial	
	-ci- cardiovascular	
	-de- metabolic or endocrine pathways	
	-eni- enzyme inhibition	
	-fung- fungal	
	-gro- growth factor and growth factor receptors	
	-ki- cytokine and cytokine receptor	
	-ler- allergen	
	-sto- immunostimulatory	
	-pru- immunosuppressive	
	-ne- neural	
	-os- bone	
	-ta- tumour	
	-toxa- toxin	
	-vet- veterinary use	
	-vi- viral	

2.12. General policy for blood products [5]

- INN are not assigned to natural human blood products and many natural blood components have well-established names.

- Recombinant versions can be assigned INN which should be distinctive and reflect as much as possible the established name for the natural product.

- It is essential to add "*activated*" to the name of the blood component when this is presented for therapeutic use in its activated form (e.g. *marzeptacog alfa (activated)* (113)).

2.13. General policy for immunoglobulins fractionated from plasma [19-23]

- INN are not assigned to immunoglobulins fractionated from plasma.

- The "systematic" or descriptive name is more appropriate since the prescriber must know all the information conveyed by it and there is no benefit in assigning an INN from which it will not be readily apparent.

2.14. General policy for skin substitutes [5]

INN are not assigned to skin substitutes both biological and synthetic. These substances are considered to be engineered tissue and thus fall outside the scope of the INN system.

2.15. General policy for transgenic substances [5]

- If an INN already exists, the same name should be used for the transgenic product, and indicate in some way that this substance is of transgenic origin.

- The source of the substance should be included in the definition of the INN (e.g. *antithrombin alfa (93)* (Rec. Glycoprotein (432aa) from transgenic goats)).

2.16. General policy for vaccines [5-6, 17-18]

- Vaccines are considered to contain medicinal substances used to stimulate an individual's immune system into providing protection against a particular infectious disease. Traditional vaccines include whole killed pathogens, live attenuated pathogens, subunits (antigens) derived from pathogens, or inactivated pathogenic toxins. They are not included within the INN system, with names being assigned through recommendations of the Expert Committee on Biological Standardization and through pharmacopoeial monographs.

- With the advent of recombinant DNA technology, novel approaches for the development of vaccines against infectious diseases were developed including those containing recombinant DNA expressed protein antigens, recombinant DNA derived virus-like particles, recombinant live vectors expressing heterologous antigens, and DNA/RNA substances. Since these substances are well-defined active ingredients, they fulfill the criteria to be assigned INN [19-20].

- Another approach in vaccine technology is the development of peptide vaccines[6] whose epitopes are involved in immune response formation (e.g. *-motide*). Since these peptides are chemically well-defined, they also fall within the INN naming system.

- In addition to vaccines against infectious diseases, the term vaccine is also being applied to other medicinal substances such as 'cancer vaccines' typically containing a tumour antigen with the intention of stimulating the immune system to attack and destroy the

[6] The definition of peptide vaccines is given in item 3.40.

tumour. Many so-called cancer vaccines consist of synthetic peptides that comprise all or part of a tumour antigen.

- During the INN Consultation in 1993, it was agreed that the prerequisite for an INN application for a recombinant vaccine[7] would be fulfilled if the manufacturer was able to provide all information outlined in the guidelines entitled Definition of INNs for Substances Prepared by Biotechnology (WHO/Pharm S/Nom 1348 [21]).

2.17. General policy for mRNA based substances

The stem -*meran* is used for all messenger RNA (mRNA) based substances. These substances use *in vivo* administration of *in vitro* transcribed mRNA to temporarily introduce gene expression (including antigen expression). mRNA molecules include those used for active immunization with the intend to provide a therapeutic effect (e.g *acavameran* (124)) or prophylactic effect (e.g. SARS-CoV-2 vaccine substances *tozinameran (124)*, *elasomeran (125)*). The INN consists of a random prefix followed by the stem -*meran*. In case the mRNA coding region contains autologous sequences, the word *autogene* is added as in *autogene cevumeran (122)*).

[7] The definition of recombinant vaccines is given in item 3.40.

3. SUMMARY OF INN ASSIGNED TO BIOLOGICAL AND BIOTECHNOLOGICAL SUBSTANCES [1,4,7,14-15,24-32]

3.1. Antimicrobials, permeability-increasing peptides

The stem for antimicrobials, permeability-increasing peptides is ***-ganan*.**

iseganan (85)[8]*, lefleuganan (127), omiganan (89), peceleganan (126), pexiganan (78), voxvoganan (126)*

3.2. Antisense oligonucleotides

The common stem for antisense oligonucleotides is ***-rsen***[9]:

aganirsen (103), alicaforsen (118), anivamersen (105), apatorsen (110), aprinocarsen (97), atesidorsen (116), beclanorsen (101), bezeparsen (127), cenersen (97) (antineoplastic), cimdelirsen (125), cobomarsen (117), cofirasersen (124), custirsen (99), danvatirsen (117), donidalorsen (124), eluforsen (119), eplontersen (123), evazarsen (127), fesomersen (124), frenlosirsen (125), gataparsen (103), inotersen (115), lademirsen (120), lufepirsen (125), mipomersen (100), mongersen (111), mulnitorsen (126), obeversen (126), oblimersen (97), olezarsen (125), pelacarsen (122), prexigebersen (114), remlarsen (117) (double-stranded microRNA mimetic)*, sapablursen (124), sepofarsen (121), tofersen (120), tonlamarsen (127), trabedersen (98), ultevursen (127), vesleteplirsen (125), volanesorsen (113), vupanorsen (121)*

The suffix ***-nersen*** designates *neurological functions* targeting antisense oligonucleotides:

lexanersen (125), movronersen (125), nusinersen (112), rovanersen (125), rugonersen (125), tadnersen (124), tominersen (121), ulefnersen (127), zilganersen (126), zorevunersen (125)

The suffix ***-dirsen*** designates *muscular dystrophies* targeting antisense oligonucleotides, including splice-switching oligonucleotides:

brogidirsen (127), golodirsen (115), renadirsen (120), suvodirsen (121)

Exceptions: (belong to this group, but the suffix *-dirsen* has not been used):

baliforsen (116), casimersen (115), dematirsen (116), drisapersen (106), eteplirsen (103), rimigorsen (116), varodarsen (116), viltolarsen (118).

The substem ***-virsen*** designates *antiviral* antisense oligonucleotides:

afovirsen (97), amlivirsen (119), bepirovirsen (124), fomivirsen (97), miravirsen (101), radavirsen (106), temavirsen (117), trecovirsen (97).

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[8] The numbers in parentheses indicate the Proposed list number.

[9] For small interfering RNA see item 3.36 and for various see item 3.41.

3.3. Antithrombins

antithrombin III (60), *antithrombin alfa (93)* (Rec. Glycoprotein, 432aa, from transgenic goats)*, antithrombin gamma (116)*

3.4. Aptamers, classical and mirror ones

The common stem for aptamers is ***-apt-***:

avacincaptad pegol (113), egaptivon pegol (111), emapticap pegol (108), lexaptepid pegol (108), olaptesed pegol (109), pegaptanib (88)

Exceptions: (belong to this group, but the preferred stem has not been used):

pegnivacogin (106), pegpleranib (112)

3.5. Blood coagulation cascade inhibitors

The common stem for blood coagulation cascade inhibitors is ***-cogin***.

anpocogin (127), drotrecogin alfa (activated) (86), pegnivacogin (106), taneptacogin alfa (90), tifacogin (78).

3.6. Blood coagulation factors

The common stem for blood coagulation factors is ***-cog*.**

The substems ***-eptacog***, ***-octocog***, ***-nonacog/-trenonacog*** and ***-tridecacog*** have been selected to date for recombinant blood coagulation factors.

- A prefix will be necessary if the amino acid sequence does not match that of the naturally occurring material.
- In accordance with the general policy, *alfa, beta,* etc, will be added for the glycoproteins (see item 2.3: General policy for glycosylated substances).
- When the additional statement "*activated*" is needed, e.g. for the blood coagulation factor VIIa, it should be spelt out in full and added in parentheses after the name.

-eptacog (factor VII):

eptacog alfa (activated) (77), eptacog alfa pegol (activated) (101), eptacog beta (activated) (112), marzeptacog alfa (activated) (113), oreptacog alfa (activated) (109), vatreptacog alfa (activated) (98)

-octocog (factor VIII):

beroctocog alfa (112), damoctocog alfa pegol (109), efanesoctocog alfa (122), efmoroctocog alfa (111), lonoctocog alfa (111), moroctocog alfa (72), octocog alfa (73),

omfiloctocog alfa (122), rurioctocog alfa pegol (111), simoctocog alfa (104), susoctocog alfa (112), turoctocog alfa (108), turoctocog alfa pegol (108)

-nonacog (factor IX with Ala at the position 148 (Ala-alloform)):

albutrepenonacog alfa (109), dalcinonacog alfa (118), nonacog alfa (77), nonacog beta pegol (104), nonacog gamma (108)

-trenonacog (factor IX with Thr at the position 148 (Thr-alloform)):

eftrenonacog alfa (109), trenonacog alfa (107)

-tridecacog (factor XIII):

catridecacog (99)

-vonicog (recombinant von Willebrand factor (vWF)):

vonicog alfa (120)

Exception: Reversal agent for Xa inhibitors (modified factor Xa protein):

andexanet alfa (110)

3.7. Substances for gene therapy

For the general policy for substances for gene therapy see item 2.6.

Viral vectors (non-replicating):

adlinacogene civaparvovec (123), aglatimagene besadenovec (113), aguracingene cadoparvovec (126), alferminogene tadenovec (95), alipogene tiparvovec (99), alnugranogene aldeparvovec (127), alvamemugene sulseparvovec (127), avalotcagene ontaparvovec (123), beremagene geperpavec (123), betibeglogene darolentivec (116), bevufenogene nofeparvovec (124), bidridistrogene xeboparvovec (125), bomtabegagene bavoparvovec (125), botaretigene sparoparvovec (126), cadalimogene ixalentivec (120), cevaretigene ritoparvovec (123), contusugene ladenovec (97), cotoretigene toliparvovec (123), crosigalcogene omlixparvovec (127), delandistrogene moxeparvovec (124), devafidugene civaparvovec (123), dirloctocogene samoparvovec (121), domofenogene zalfaparvovec (125), eladocagene exuparvovec (119), elivaldogene tavalentivec (115), encoberminogene rezmadenovec (124), enekinragene inzadenovec (127), engabexagene cincesparvovec (126), entacingene turiparvovec (123), eretidigene velentivec (115), etranacogene dezaparvovec (120), ezaladcigene resoparvovec (121), fidanacogene elaparvovec (118), fordadistrogene movaparvovec (123), giroctocogene fitelparvovec (123), golnerminogene pradenovec (101), ibacovavec (127), ifezuntirgene inilparvovec (125), igrelimogene litadenorepvec (127), inetagugene geperpavec (124), inlezifigene civaparvovec (123), isaralgagene civaparvovec (124), ixoberogene soroparvovec (127), lanacogene vosiparvovec (117), laruparetigene zovaparvovec (126), lenadogene nolparvovec (114), lixmabegagene relduparvovec (126), mesmulogene ancovacivec (114), nadofaragene firadenovec (117), ofranergene obadenovec (115), olenasufligene relduparvovec (124), onasemnogene abeparvovec (117), pariglasgene brecaparvovec

(123), patidistrogene bexoparvovec (125), peboctocogene camaparvovec (124), ranuzifigene civaparvovec (123), rebisufligene etisparvovec (118), resamirigene bilparvovec (120), rilimogene glafolivec (113), rivunatpagene miziparvovec (127), rovoctocogene durparvovec (120), seglebegagene dasniparvovec (127), sesiclenegene cosaparvovec (124), sirelretigene suboparvovec (125), sitimagene ceradenovec (97), taberminogene vadenovec (100), tefidsogene civaparvovec (123), tidagixagene derxeparvovec (127), timrepigene emparvovec (117), tipapkinogene sovacivec (102), valoctocogene roxaparvovec (116), vanglusagene ensiparvovec (124), verbrinacogene setparvovec (123), volrubigene ralaparvovec (120), voretigene neparvovec (115), zaftuclenegene piruparvovec (126), zildistrogene varoparvovec (123), zocaglusagene nuzaparvovec (127)

Viral vectors (replicating):

cretostimogene grenadenorepvec (127), delolimogene mupadenorepvec (118), esepapogene zalarnarepvec (127), ninsipapogene sibarnarepvec (127), olvimulogene nanivacirepvec (122), opilrelagene atradenorepvec (126), pexastimogene devacirepvec (108), raxorulimogene belzovacirepvec (127), rilimogene galvacirepvec (107), talimogene laherparepvec (104), tezemlimogene daxadenorepvec (127), vocimagene amiretrorepvec (107), vusolimogene oderparepvec (125)

Bacterial vectors:

axalimogene filolisbac (112), dapatifagene navolactibac (122), emilimogene sigulactibac (126), miralimogene ensolisbac (117), opolimogene capmilisbac (117), pemlimogene merolisbac (117)

Plasmids:

amolimogene bepiplasmid (98), beperminogene perplasmid (95), bizalimogene ralaplasmid (118), donaperminogene seltoplasmid (116), doruxapapogene ralaplasmid (125), inodiftagene vixteplasmid (120), lalikinogene sifuplasmid (125), linvekinogene treniplasmid (127), mavilimogene ralaplasmid (118), ozarlimogene inteplasmid (124), quaratusugene ozeplasmid (124), reluscovtogene ralaplasmid (124), riferminogene pecaplasmid (100), rocakinogene sifuplasmid (122), tavokinogene telseplasmid (118), tirvalimogene teraplasmid (117), velimogene aliplasmid (97), vixicovtogene oboplasmid (126)

3.8. Substances for cell therapy

For the General policy for substances for cell therapy see item 2.7.

adimlecleucel (117), atleradstrocel (121), audencel (115), avoplacel (121), baltaleucel (116), bemdaneprocel (127), cenplacel (115), cenzileucel (127), darvadstrocel (117), dilanubicel (119), elapomestrocel (126), eltrapuldencel (115), emiplacel (118), ersemadromcel (125), evencaleucel (126), famzeretcel (127), firzotemcel (121), garveleucel (123), ilixadencel (116), iltamiocel (124), inaleucel (127), invimestrocel (123), lenzumestrocel (119), lifileucel (118), lotazadromcel (125), mocemestrocel (120),

nadravaleucel (127), nafimestrocel (125), neltependocel (127), nivadstrocel (124), omidubicel (121), palucorcel (115), posoleucel (124), raguneprocel (126), rebonuputemcel (123), remestemcel (121), remumiocel (126), rildinadstrocel (127), rilparencel (127), rovaleucel (121), setamevetcel (121), sizavaleucel (123), spanlecortemlocel (115), stapuldencel (121), tabelecleucel (117), taniraleucel (123), tenvumestrocel (123), vandefitemcel (115), zedenoleucel (125)

3.9. Substances for cell-based gene therapy

For the General policy for substances for cell-based gene therapy see item 2.8.

acmucabtagene autoleucel (125), afamitresgene autoleucel (122), anbalcabtagene autoleucel (127), atidarsagene autotemcel (124), axicabtagene ciloleucel (117), azamidugene autotemcel (125), azercabtagene zapreleucel (124), betibeglogene autotemcel (125), brexucabtagene autoleucel (125), ciltacabtagene autoleucel (122), dabocemagene autoficel (125), dalucabtagene autoleucel (126), elivaldogene autotemcel (121), equecabtagene autoleucel (127), etuvetidigene autotemcel (125), evagenretcel (116), evoncabtagene pazurgedleucel (125), exagamglogene autotemcel (124), firolimogene autotemcel (125), gavocabtagene autoleucel (123), idecabtagene vicleucel (119), itezocabtagene autoleucel (125), lecilimogene autotemcel (126), letetresgene autoleucel (121), lisocabtagene maraleucel (119), lovotibeglogene autotemcel (125), marnetegragene autotemcel (125), mipetresgene autoleucel (121), motacabtagene lurevgedleucel (125), mozafancogene autotemcel (125), nalotimagene carmaleucel (118), nulabeglogene autogedtemcel (126), obecabtagene autoleucel (123), olitresgene autoleucel (121), orvacabtagene autoleucel (122), plixacabtagene autoleucel (126), pomlucabtagene autoleucel (127), prademagene zamikeracel (119), rapcabtagene autoleucel (126), relmacabtagene autoleucel (123), revakinagene taroretcel (123), rivogenlecleucel (117), satricabtagene autoleucel (127), simoladagene autotemcel (122), sitocabnagene loxiveleucel (125), tacatresgene autoleucel (124), tebrocabtagene autoleucel (121), tisagenlecleucel (117), tonogenconcel (115), torulimogene lonferencel (127), tremtelectogene empogeditemcel (127), umitrelimorgene autodencel (127), vadacabtagene leraleucel (117), varnimcabtagene autoleucel (127), vibapapogene autoleucel (123), volamcabtagene durzigedleucel (126), voxeralgagene autotemcel (124), zamtocabtagene autoleucel (124), zevorcabtagene autoleucel (125)

3.10. Substances for virus-based therapy

For the General policy for substances for virus-based therapy see item 2.9.

canerpaturev (117), enadenotucirev (111), gebasaxturev (126), lerapolturev (125), suratadenoturev (123), tasadenoturev (117), teserpaturev (119)

3.11. Ciclosporin derivatives

The common stem for ciclosporin derivatives is ***-closporin***.

ciclosporin (46), geclosporin (70), oxeclosporin (70), ruclosporin (114), voclosporin (97)

Exception:

alisporivir (100) (antiviral)

3.12. Colony stimulating factors (CSF)

The common stem for colony stimulating factors (CSF) is ***-stim***.

ancestim (79) (cell growth factor)
garnocestim (86) (immunomodulator)
pegacaristim (80) (megakaryocyte growth and development factor (MGDF))[10]
romiplostim (97) (platelet stimulating factor (through thrombopoietin receptor(Mpl)))[11]

-distim for combination of two different types of CSF:

leridistim (80), milodistim (75)

-gramostim for granulocyte macrophage (GM)-CSF type substances:

ecogramostim (62), molgramostim (64), regramostim (65), sargramostim (66)

-grastim for granulocyte (G)-CSF type substances:

balugrastim (107), efbemalenograstim alfa (124), eflapegrastim (112), eflenograstim alfa (117), empegfilgrastim (107), filgrastim (64), lenograstim (64), lipegfilgrastim (107), mecapegfilgrastim (113), nartograstim (66), pegbovigrastim (109), pegfilgrastim (86), pegnartograstim (80), pegteograstim (109), telpegfilgrastim (123)

-mostim for macrophage (M)-CSF type substances:

cilmostim (71), lanimostim (91), mirimostim (65)

-plestim for interleukin-3 analogues and derivatives (multi-CSF):

daniplestim (76), muplestim (74)

3.13. Engineered or synthetic scaffold proteins with non-immunoglobulin variable domain derived binding domains

The common stem for this group of antibody mimetics is ***-bep***. For the *-bep* nomenclature scheme and target class infixes see item 2.11.

dazodalibep (123), elarekibep (126), ensovibep (124), izokibep (122), lerodalcibep (123), palsucibep pegol (126), taldefgrobep alfa (121), tezatabep matraxetan (122), tifalibep (122)

Exceptions: (belong to this group, but the suffix ***-bep*** has not been used):

abicipar pegol (108), pegdinetanib (103)

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[10] Also known as thrombopoietin.
[11] A thrombopoietin mimetic.

3.14. Enkephalin, endorphin and dynorphin opioid δ, μ and κ receptor agonists

The common stem for this class of neuropeptides is ***-kef-***.

amdakefalin (122) (KOR agonist), casokefamide (65), difelikefalin (113)(KOR agonist), frakefamide (81), metenkefalin (97), metkefamide (44), riminkefon (126) (KOR agonist)

3.15. Enzymes

The common stem for enzymes, in general, is ***-ase***.
Enzymes are classified according to an enzyme classification (E.C.) number, i.e, the reaction they catalyse[12].
Substems are referring, in general, to the activity of the substances.

- ***-icase*** for uricase *(suffix)*

  EC 1.7.3.3 Factor independent urate hydroxylase (uricase):
  pegadricase (105), pegloticase (98), rasburicase (82)

- ***-dismase*** for dismutase (enzymes with superoxide dismutase activity)

  EC 1.15.1.1 Superoxide dismutase:
  ledismase (70), sudismase (58)

  Exceptions: (belong to this group, but the preferred stem has not been used)
  orgotein (31), pegorgotein (72)

- EC 2.4.2 Pentosyltransferases:
  praconase (118)

- ***-lipase*** for lipase:

  EC 3.1.1.3 Triacylglycerol lipase
  adrulipase alfa (125), burlulipase (107), rizolipase (22)

  EC 3.1.1.13 Sterol esterase
  bucelipase alfa (95), sebelipase alfa (107)

- EC 3.1.1.71 Acetylalkylglycerol acetylhydrolase
  epafipase (85)

- EC 3.1.3.1 Alkaline phosphatase
  asfotase alfa (104), ilofotase alfa (124)

- EC 3.1.4.12 Sphingomyelin phosphodiesterase
  olipudase alfa (111)

- ***-sulfase*** for sulfatases (*suffix*):

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[12] *For enzyme classification and nomenclature see:*
http://www.chem.qmul.ac.uk/iubmb/enzyme ; http://www.brenda-enzymes.org

EC 3.1.6.1 cerebroside-sulfatase
cebsulfase alfa (127)

EC 3.1.6.4 *N*-Acetylgalactosamine-6-sulfatase
elosulfase alfa (108)

EC 3.1.6.12 *N*-Acetylgalactosamine-4-sulfatase
galsulfase (92)

EC 3.1.6.13 Iduronate-2-sulfatase
idursulfase (90), idursulfase beta (106)

- ***-dornase*** for deoxyribonuclease (*suffix*)

  EC 3.1.21.1 Deoxyribonuclease I:
  alidornase alfa (115), dornase alfa (70), streptodornase (6)

- EC 3.1.27.5 Pancreatic ribonuclease
  ranpirnase (81)

- EC 3.2.1.17 Lysozyme (muramidase), bacteriolytic
  exebacase (117), tonabacase (115)

- EC 3.2.1.20 α-Glucosidase
  alglucosidase alfa (117), avalglucosidase alfa (121), cipaglucosidase alfa (123), reveglucosidase alfa (111)

- EC 3.2.1.22 α-Galactosidase
  agalsidase alfa (84), agalsidase beta (84), pegunigalsidase alfa (115)

- EC 3.2.1.23 β-Galactosidase
  tilactase (50)

- EC 3.2.1.24 α-Mannosidase
  velmanase alfa (113)

- EC 3.2.1.26 β-fructofuranosidase (β-fructosidase, invertase, saccharase)
  sacrosidase (112)

- EC 3.2.1.31 β-glucuronidase
  vestronidase alfa (115)

- EC 3.2.1.35 Hyaluronoglucosaminidase
  bovhyaluronidase azoximer (112), hyalosidase (50), hyaluronidase (1), pegvorhyaluronidase alfa (122), vorhyaluronidase alfa (111)

- ***-glucerase*** for glucosylceramidase *(suffix)*

  EC 3.2.1.45 Glucosylceramidase:
  alglucerase (68), imiglucerase (72), taliglucerase alfa (101), velaglucerase alfa (98)

- EC 3.2.1.50 α-*N*-Acetylglucosaminidase
  lesinidase alfa (116), tralesinidase alfa (117)

- EC 3.2.1.76 L-iduronidase
  laronidase (86)

- EC 3.4.14.9 Tripeptidyl-peptidase 1
  cerliponase alfa (111)

- EC 3.4.17.11 Glutamate carboxypeptidase
  glucarpidase (92)

- ***-acedase*** for angiotensin-converting enzyme 2 *(suffix)*

  EC 3.4.17.23 Angiotensin-converting enzyme 2
  alunacedase alfa (124), efrilacedase alfa (126)

- EC 3.4.21. Serine endopeptidases
  eufauserase (84), senrebotase (107), sfericase (40)

- EC 3.4.21.35 Tissue kallikrein
  kallidinogenase (22)

- EC 3.4.21.36 Pancreatic elastase
  vonapanitase (111)

- EC 3.4.21.63 Oryzin
  promelase (47)

- ***-teplase*** for tissue-type plasminogen activators

  EC 3.4.21.68 t-Plasminogen activator:
  alteplase (73), desmoteplase (80), duteplase (62), lanoteplase (76), monteplase (72), nateplase (73), pamiteplase (78), reteplase (69), silteplase (65), tenecteplase (79)

  Exception*:* streptokinase (activity related to this group), modified stem ***-streplase***
  anistreplase (59)

- ***-uplase*** for (urinary)-type plasminogen activators if consisting of a single-chain proenzyme precursor of urokinase (pro-urokinase)

  EC 3.4.21.73 u-Plasminogen activator:
  nasaruplase (76), nasaruplase beta (86), nasaruplase gamma (127), saruplase (76)

  if consisting of an A chain and a B chain linked by disulfide bonds:
  urokinase (48), urokinase alfa (77)

- ***-diplase*** for two plasminogen activators combined with another enzyme

  EC 3.4.21.68 / 3.4.21.73:
  amediplase (79)

- EC 3.4.21.B48 Kumamolysin
  zamaglutenase (126)

- EC 3.4.22.10 Streptopain (Streptococcal cysteine proteinase, Streptococcus peptidase A)
  imlifidase (117)

- EC 3.4.24.40 Serralysin (*Serratia marcescens* metalloproteinase)

serrapeptase (31)

- EC 3.4.24.72 Fibrolase
  alfimeprase (85), brinase (22), ocrase (28)

- ***-adamtase*** for ADAM-metalloproteases

  EC 3.4.24.87 ADAMTS13 endopeptidase
  apadamtase alfa (118), cinaxadamtase alfa (125)

- EC 3.5.1.1 L-Asparaginase
  calaspargase pegol (105), crisantaspase (111), pegaspargase (64), pegcrisantaspase (111)

- EC 3.5.2.6 β-Lactamase
  penicillinase (111), ribaxamase (116)

- EC 3.5.3.1 Arginine amidinase
  pegzilarginase (117)

- EC 3.5.3.6 Arginine deiminase
  pegargiminase (111)

- EC 3.5.4.4 Adenosine deaminase
  elapegademase (116), pegademase (63)

- ***-liase*** for lyase (decarboxylase) *(suffix):*

  EC 4.1.1.2 Oxalate decarboxylase
  reloxaliase (117)

  Exception: EC 4.2.1.22 Cystathionine beta-synthase
  pegtibatinase (123)

  EC 4.2.2.20 Chondroitin-sulfate-ABC endolyase
  condoliase (106)

  EC 4.3.1.24 Phenylalanine ammonia-lyase
  pegvaliase (111)

  EC 4.4.1.1 Cystathionine gamma-lyase
  pegtarviliase (127)

- Exceptions, without ***-ase*** stem:

  chymotrypsin (10) (EC 3.4.21.1), thrombin (60) (EC 3.4.21.5), thrombin alfa (97)(EC 3.4.21.5), fibrinolysin (human) (10) (EC 3.4.21.7), ocriplasmin (101) (EC 3.4.21.7), troplasminogen alfa (99), ancrod (23) (EC 3.4.21.74), batroxobin (29) (EC 3.4.21.74), chymopapain (26) (EC 3.4.22.6), bromelains (18) (EC 3.4.22.32 / EC 3.4.22.33), sutilains (18)(EC 3.4.21.62)

- Co-enzymes:

  cobamamide (15)(!), cocarboxylase (1), mecobalamin (26) (!), streptokinase (6), ubidecarenone (48)

3.16. Erythropoietin type blood factors

The common stem for erythropoietin type blood factors is ***-poetin***.

In the case of erythropoietins, it was decided to select *epoetin* together with a Greek letter to differentiate between substances of the same amino acid sequence as human erythropoietin which vary in the glycosylation pattern (see item 2.3: General policy for glycosylated substances).

Substances with different amino acid sequences will be named using the *-poetin* stem and unique random prefixes.

darbepoetin alfa (85), efepoetin alfa (117), epoetin alfa (66), epoetin beta (62), epoetin gamma (67), epoetin delta (85), epoetin epsilon (72), epoetin zeta (95), epoetin theta (95), epoetin kappa (97), epoetin omega (73), idestopoetin alfa (125), pegdarbepoetin beta (117)

3.17. Fusion proteins with more than one pharmacologically active component

The common stem for fusion proteins with more than one pharmacologically active component is ***-fusp***. For the *fusp* nomenclature scheme and infix letters see item 2.4.2.

bifikafusp alfa (118), bintrafusp alfa (121), bizaxofusp (127), cinrebafusp alfa (121), clervonafusp alfa (120), dalutrafusp alfa (125), eciskafusp alfa (127), efdamrofusp alfa (125), eflimrufusp alfa (124), eramkafusp alfa (124), latikafusp (126), lepunafusp alfa (125), lorukafusp alfa (120), lunaxafusp (127), modakafusp alfa (122), nanrilkefusp alfa (126), nomlabofusp (126), onfekafusp alfa (118), oplunofusp (123), pabinafusp alfa (120), retlirafusp alfa (124), rozibafusp alfa (120), simlukafusp alfa (121), tagraxofusp (118), tebentafusp (118), valanafusp alfa (118)

3.18. Gonadotropin-releasing hormone (GnRH) inhibiting peptides

The common stem for gonadotropin-releasing hormone (GnRH) inhibiting peptides is ***-relix***.

abarelix (78), cetrorelix (66), degarelix (86), detirelix (56), ganirelix (65), iturelix (79), ozarelix (94), prazarelix (81), ramorelix (69), teverelix (78).

3.19. Growth factors and tumour necrosis factors (TNF)

The common stem for growth factors and tumour necrosis factors (TNF) is ***-ermin***. Substems allow distinction between the various types of growth factors.

-bermin for vascular endothelial growth factors:

telbermin (85)

-clermin for ciliary neurotrophic factor:

dapiclermin (93)

-dermin for epidermal growth factors:

murodermin (63), nepidermin (97)

-fermin for fibroblast growth factors:

aldafermin (120), efruxifermin (124), ersofermin (66), palifermin (88), pegbelfermin (120), pegozafermin (127, repifermin (82), sprifermin (105), timufermin (125), trafermin (74), velafermin (94)

-filermin for leukemia-inhibiting factors:

emfilermin (82)

-glermin for glial growth factors:

cimaglermin alfa (110)

-negermin for nerve growth factors:

cenegermin (115)

-nermin for tumour necrosis factors:

ardenermin (88), dulanermin (99), efaprinermin alfa (120), efgivanermin (120), eftozanermin alfa (119), pegipanermin (125), plusonermin (73), rilunermin alfa (126), sonermin (68), tasonermin (78), tengonermin (118)

-permin for *hepatocyte growth factors:*

oremepermin alfa (124)

-plermin for platelet-derived growth factors:

becaplermin (74)

-sermin for insulin-like growth factors:

mecasermin (66), mecasermin rinfabate (92)

-termin for transforming growth factors:

cetermin (74), liatermin (81)

-otermin for bone morphogenetic proteins (BMPs): *avotermin (77), dibotermin alfa (89), eptotermin alfa (92), nebotermin (109), radotermin (92)*

3.20. Growth hormone (GH) derivatives

The common stem for growth hormone (GH) derivatives is ***som-***.

Human growth hormone derivatives:

albusomatropin (114), efpegsomatropin (115), eftansomatropin alfa (118), lonapegsomatropin (118), somapacitan (112), somatrem (54), somatrogon (115), somatropin (74), somatropin pegol (103), somavaratan (112)

For substances other than human, suffixes are added to indicate the species specificity of the structure.

-bove for bovine-type substances:

somagrebove (63), somavubove (63), sometribove (74), somidobove (58)

-por for porcine-type substances:

somalapor (62), somenopor (62), somfasepor (66), sometripor (75)

-salm for salmon-type substances:

somatosalm (69)

Others (growth hormone related peptides):

somatorelin (57) (pituitary hormone-release stimulating peptides, see item 3.34)
somatostatin (46) (growth hormone release inhibitor).

3.21. Growth factor and growth hormone (GH) antagonists

-somant for growth hormone antagonist:

pegvisomant (82)

-termant for transforming growth factor antagonist:

efmitermant alfa (121)

3.22. Heparin derivatives including low molecular weight heparins

The common stem for heparin derivatives including low molecular weight heparins is ***-parin***.

ardeparin sodium (68), adomiparin sodium (104), bemiparin sodium (75), certoparin sodium (70), dalteparin sodium (77), deligoparin sodium (89), enoxaparin sodium (77), heparin sodium (54), livaraparin calcium (86), minolteparin sodium (74), nadroparin calcium (78), parnaparin sodium (77), reviparin sodium (78), semuloparin sodium (99), sevuparin sodium (106), tafoxiparin sodium (102), tinzaparin sodium (77).

3.23. Hirudin derivatives

The common stem for hirudin derivatives is ***-irudin***.

bivalirudin (72), desirudin (76), lepirudin (76), pegmusirudin (77).

3.24. Immunomodulators, both stimulant/suppressive and stimulant

The common stem for immunomodulators, both stimulant/suppressive and stimulant, is ***-imod***.

-tol- (Toll-like receptors (TLR) agonists):

agatolimod (98), cavrotolimod (124), cobitolimod (113), entolimod (108), lefitolimod (113), pertuzumab zuvotolimod (126), rintatolimod (102), tilsotolimod (117), vidutolimod (123), xempritolimod (127)

Exceptions: (belong to this group, but the preferred substem has not been used):

litenimod (96) (TLR9 agonist, 26-mer modified oligodeoxynucleotides (ODN))

Others:

bevifimod (119) (staphylococcal protein A (SpA), purified from *Staphylococcus aureus* strain A676 culture medium)

blisibimod (107) (B-cell activating factor (BAFF)-binding peptide fragment/human IgG1 Fc fusion protein)

cupabimod (115) (decoy oligodeoxynucleotide for transcription factor-kappa B)

efgartigimod alfa (116) (mutated human immunoglobulin G1 Fc fragment, covalent dimer)

efizonerimod alfa (117) (modified human immunoglobulin G4 Fc fragment fused to TNF receptor-associated factor TRAF2 (human C-C domain fragment) and to CD252 antigen (human extracellular domain fragment), hexamer)

efprezimod alfa (125) (human signal transducer CD24 (small cell lung carcinoma cluster 4 antigen) fragment (1-30), fused to a human immunoglobulin Fc fragment (31-261), dimer)

eftilagimod alfa (116) (human lymphocyte activation gene 3 protein extracellular domains fused to human immunoglobulin G1 Fc fragment through a linker peptide, covalent dimer)

efzofitimod (125) (human l-methionyl immunoglobulin G1 Fc fragment (1-228) fused to human histidine tRNA synthetase fragment (2-60, 229-287 in the current sequence), dimer)

forigerimod (104) $O^{3,140}$-phosphono(human U1 small nuclear ribonucleoprotein 70 kDa (snRNP70))-(131-151)-peptide

reltecimod (115) (T-cell-specific surface glycoprotein CD28 (8-15)-peptide)

3.25. Insulins

Up to now, insulin derivatives have been named using a two-word approach. The substances named represent a structure with an additional amino acid, such as *insulin argine (58)*, or represent modifications of the amino acid sequence, i.e. *insulin aspart (76)*.

biphasic insulin injection (16), compound insulin zinc suspension (6), dalanated insulin (104), globin zinc insulin injection (6), insulin argine (58), insulin aspart (76), insulin

defalan (37), insulin degludec (101), insulin detemir (80), insulin efsitora alfa (122), insulin glargine (76), insulin glulisine (84), insulin human (48), insulin icodec (123), insulin lispro (72), insulin peglispro (107), insulin sudelidec (125), insulin tregopil (103), insulin zinc suspension (amorphous) (4), insulin zinc suspension (crystalline) (4), isophane insulin (4), neutral insulin injection (15), protamine zinc insulin injection (6)

argine: B30-yl-L-arginyl-L-arginine

aspart: [B28-L-aspartic acid]

dalanated: des-B30-alanine

defalan: des-B1-phenylalanine

degludec: $N^{6.B29}$-[*N*-(15-carboxypentadecanoyl)-L-γ-glutamyl]-des-30B-L-threonine

detemir: $N^{6.B29}$-tetradecanoyl-des-B30-L-threonine

efsitora: human insulin B-chain (1-30) variant (Y^{16}>E, F^{25}>H, T^{27}>G, P^{28}>G, K^{29}>G, T^{30}>G) fused via a G_2SG_4 peptide linker (31-37) to human insulin A-chain (38-58) variant (I^{10}>T^{47}, Y^{14}>D^{51}, N^{21}>G^{58}) and via a $(G_4Q)_3G_5$ peptide linker (59-78) to a human immunoglobulin G2 C-terminal K>del Fc fragment (79-299), dimer (80-80':83-83')-bisdisulfide

glargine: [A21-glycine], B30-yl-L-arginyl-L-arginine

glulisine: [B3-lysine, B29-glutamic acid]

icodec: $N^{6.29B}$-[(22*S*)-22,42-dicarboxy-10,19,24-trioxo-3,6,12,15-tetraoxa-9,18,23-triazadotetracontan-1-oyl]-[$Tyr14^{A}$>Glu, $Tyr16^{B}$>His, $Phe25^{B}$>His]-des-$Thr30^{B}$-human insulin

lispro: [B28-L-lysine, B29-L-proline]

sudelidec: $N^{6.B29}$-{4-[N^{2}-(15-carboxypentadecanoyl)-L-lysin-N^{6}-yl]-4-oxobutanoyl}-B30-des-L-threonine

tregopil: $N^{6.B29}$-(4,7,10,13-tetraoxatetradecanoyl).

3.26. Interferons

Interferon was published as an INN in 1962 with a general definition based on the origin and activity, e.g. "a protein formed by the interaction of animal cells with viruses capable of conferring on animal cells resistance to virus infection".

The name was revised in the 1980s when human interferon and its variations *alfa*, *beta* and *gamma* were produced by recombinant biotechnology. The INN Expert Group would have preferred to replace the old INN interferon by alfaferon, betaferon and gammaferon; however, this approach could not be adopted as these names had already been registered as trade marks. The system adopted was thus to take interferon alfa, interferon beta and interferon gamma,

and to provide, when necessary, for further distinction by additional numbers. Thus Arabic numbers are used to distinguish subspecies which differ significantly in primary amino acid sequence, but are still considered to belong to one of the primary groups e.g. interferon alfa-1, interferon alfa-2. Small (lower case) letters are used to subdivide such groups further on the basis of less significant differences like one, two or three amino acid differences or post translational modifications, including glycosylation e.g. interferon alfa-2a, interferon alfa-2b, interferon beta-1a, interferon beta-1b.

Note: In interferon nomenclature, the alfa, beta, gamma,… designation refer to interferons with different amino acid sequences, while in INN of other substances the Greek letters refer to differential glycosylation.

albinterferon alfa-2b (99), cepeginterferon alfa-2b (105), interferon alfa (73), interferon alfacon-1 (77), interferon beta (73), interferon gamma (73), mipeginterferon alfa-2b (114), peginterferon alfa-2a (84), peginterferon alfa-2b (84), peginterferon alfacon-2 (116), peginterferon beta-1a (108), peginterferon lambda-1a (105), ropeginterferon alfa-2b (109), sampeginterferon beta-1a (116)

3.27. Interleukin receptor antagonists

The common stem for interleukin receptor antagonists is ***-kinra***.

-nakinra for interleukin-1 (IL-1) receptor antagonists:
anakinra (72), isunakinra (113)

-trakinra for interleukin-4 (IL-4) receptor antagonists:
pitrakinra (87)

-epdekinra for interleukin-17 (IL-17) receptor antagonists:
erepdekinra (127)

3.28. Interleukin type substances

The common stem for interleukin type substances is ***-kin***.

For glycosylated interleukin type substances see item 2.3: General policies for glycosylated substances.

-nakin for interleukin-1 (IL-1) analogues and derivatives:

-onakin for interleukin-1α analogues and derivatives:

pifonakin (77)

-benakin for interleukin-1β analogues and derivatives:

mobenakin (72)

-leukin for interleukin-2 (IL-2) analogues and derivatives:

adargileukin alfa (89), aldesleukin (63), bempegaldesleukin (119), celmoleukin (65), cergutuzumab amunaleukin (113), denileukin diftitox (122), efavaleukin alfa (118), melredableukin alfa (126), nemvaleukin alfa (123), pegaldesleukin (74), pegenzileukin (126), rezpegaldesleukin (127), teceleukin (67), tucotuzumab celmoleukin (95)

For interleukin-3 (IL-3) analogues and derivatives (***-plestim***, see item 3.12).

-trakin for interleukin-4 (IL-4) analogues and derivatives:

binetrakin (82)

-exakin for interleukin-6 (IL-6) analogues and derivatives:

atexakin alfa (72)

-eptakin for interleukin-7 (IL-7) analogues and derivatives:

efineptakin alfa (118)

-octakin for interleukin-8 (IL-8) analogues and derivatives:

canoctakin (110), emoctakin (74), pimroctakin (bovine) (127)

-decakin for interleukin-10 (IL-10) analogues and derivatives:

ilodecakin (81), pegilodecakin (117)

-elvekin for interleukin-11 (IL-11) analogues and derivatives:

oprelvekin (76)

-dodekin for interleukin-12 (IL-12) analogues and derivatives:

edodekin alfa (79)

-tredekin for interleukin-13 (IL-13) analogues and derivatives:

cintredekin besudotox (92)

-pendekin for interleukin-15 (IL-15) analogues and derivatives:

avipendekin pegol (123), nogapendekin alfa (121)

-octadekin for interleukin-18 (IL-18) analogues and derivatives:

iboctadekin (92)

-enicokin for interleukin-21 (IL-21) analogues and derivatives:

denenicokin (99)

-docokin for interleukin-22 (IL-22) analogues and derivatives:

eflepedocokin alfa (124), efmarodocokin alfa (122)

Exceptions (interleukin type substances in which the preferred stem has not been used):

-plestim for interleukin-3 (IL-3) analogues and derivatives (see item 3.12).

-neurin for neurotrophins (interleukin-78, brain-derived neurotrophic factor)

abrineurin (84)

3.29. Messenger RNAs

The common stem for messenger RNAs is ***-meran***.

For the General policy for messenger RNA substances see item 2.17.

abdavomeran (124), acavameran (124), autogene cevumeran (122), elasomeran (125), enomimeran (123), fazulemeran (125), ganulameran (124), gindameran (123), imelasomeran (127), nadorameran (113), ontasameran (123), pidacmeran (124), pomulmeran (123), riltozinameran (126), secelasomeran (128), tozinameran (124), ufrenmeran (127), vibosameran (123), zapomeran (127), ziclumeran (127), zeldesmeran (127), zorecimeran (124)

3.30. Monoclonal antibodies

For the General policy for monoclonal antibodies see item 2.10.

For glycosylated monoclonal antibodies see item 2.3: General policy for glycosylated substances.

3.30.1. Monoclonal antibodies with the stems *-tug, -bart, -ment* and *-mig*:

INN for monoclonal antibodies alphabetically ordered by suffix and infix:

The stem ***-tug*** is for **unmodified immunoglobulins**.

-ba- for **bacterial**:

calpurbatug (127)

-ki- for **cytokine and cytokine receptor**:

casdozokitug (127), nisevokitug (127), vilamakitug (127)

-ne- for **neural**:

devextinetug (127)

*-**pru-*** for **immunosuppressive**:

eglatoprutug (127)

-sto- for **immunostimulatory**:

belrestotug (127), danburstotug (127), dargistotug (127), ralzapastotug (127)

-ta- for **tumour**:

becotatug (127), raludotatug (127), raludotatug deruxtecan (127)

-vi- for **viral**:

gorivitug (127)

The stem ***-bart*** is for **artificial immunoglobulins**.

-ci- for **cardiovascular**:

delpacibart (127), delpacibart etedesiran (127)

-ki- for **cytokine and cytokine receptor**:

bempikibart (127), evunzekibart (127), exlinkibart (127), linavonkibart (127), tulisokibart (127), varokibart (127), zigakibart (127)

-ler- for **allergen**:

atisnolerbart (127), bremzalerbart (127), freneslerbart (127), mevonlerbart (127), umesolerbart (127),

-ne- for **neural**:

fepixnebart (127)

-os- for **bone**:

narlumosbart (127), prafnosbart (127), resugosbart (127)

-pru- for **immunosuppressive**:

empasiprubart (127), paridiprubart (126), ulviprubart (127)

-sto- for **immunostimulatory**:

anzurstobart (127), dalnistobart (127), epacmarstobart (127), lipustobart (127), perenostobart (127), polzastobart (127), porustobart (127), pradustobart (127), tuparstobart (127)

-ta- for **tumour**:

anvatabart opadotin (127), anvatabart pactil (127), izeltabart (127), izeltabart tapatansine (127),

-vet- for **veterinary use**:

riltovetbart (127)

-***vi-*** for **viral**:

crexavibart (126), masavibart (126), nepuvibart (126), nisfevitug (127), ogalvibart (126), simaravibart (127), tobevibart (127)

The stem ***-ment*** is for **immunoglobulin fragments**.

The stem ***-mig*** is for **multi-specific immunoglobulins**.

-ci- for **cardiovascular**:

denecimig (127), zifibancimig (127)

-***pru-*** for **immunosuppressive**:

tarperprumig (127)

-sto- for **immunostimulatory**:

danvilostomig (127), lomvastomig (127), rilvegostomig (127), tobemstomig (127), volrustomig (127)

-ta- for **tumour**:

ciduvectamig (127), forimtamig (127), umizortamig (127), xaluritamig (127), zeripatamig (127),

3.30.2. Monoclonal antibodies with the stem *-mab*:

INN for monoclonal antibodies alphabetically ordered by infix:

-ami- for **serum amyloid protein (SAP)/amyloidosis** (previously as *-am(i)-*):

anselamimab (126), birtamimab (119)

Under the previous naming scheme:

humanized: *-zumab*

dezamizumab (115)

-ba- for **bacterial** (previously as *-b(a)-, -ba(c)-*):

gremubamab (121)[13]*, omodenbamab (123)*

Under the previous naming scheme:

mouse: *-omab*

edobacomab (80)

chimeric: *-ximab*

pagibaximab (93)

humanized: *-zumab*

rivabazumab (114), rivabazumab pegol (113), tefibazumab (92)

human: *-umab*

nebacumab (66), panobacumab (100), raxibacumab (92)

-ci- for **cardiovascular** (previously as *-c(i)-*, *-ci(r)-*):

abelacimab (119), befovacimab (121), bentracimab (123), dilpacimab (121), ebronucimab (123), enibarcimab (123), faricimab (118) frovocimab (119), garadacimab (120), glenzocimab (120), golocdacimab (126), ivonescimab (125), marstacimab (119), nimacimab (120), olinvacimab (119), ongericimab (122), osocimab (119), pulocimab (125), recaticimab (123), tafolecimab (121), tarcocimab (125), tarcocimab tedromer (126), vulinacimab (122), zansecimab (124),

Under the previous naming scheme:

mouse: *-omab*

biciromab (66), imciromab (66)

chimeric: *-ximab*

abciximab (80), volociximab (93)

chimeric-humanized/human: *-xizumab*

navicixizumab (114)[13]

humanized: *-zumab*

alacizumab pegol (98), bevacizumab (86), bevacizumab beta (114), bococizumab (110), brolucizumab (112), caplacizumab (106), concizumab(108), demcizumab (107), emicizumab (113), etaracizumab (99), idarucizumab (115), lodelcizumab (108), ralpancizumab (110), tadocizumab (94), vanucizumab (113)

human: *-umab*

alirocumab (107), ascrinvacumab (113), enoticumab (107), evinacumab (112), evolocumab (108), icrucumab (104), inclacumab (106), nesvacumab (108), orticumab (107), ramucirumab (110), rinucumab (113), varisacumab (116), vesencumab (104)

[13] bi-specific or multi-specific monoclonal antibody.

-de- for **metabolic or endocrine pathways**:

fazpilodemab (126), mibavademab (124), volagidemab (120)

Under the previous naming scheme:

human: *-umab*

crotedumab (114)

-eni- for **enzyme inhibition**:

galegenimab (125)

-fung- for **fungal** (previously as *-f(u)-*):

Under the previous naming scheme:

human: *-umab*

efungumab (95)

-gro- for **skeletal muscle mass related growth factors and receptors** (pre-substem, previously as *-gr(o)-*):

apitegromab (123), ponsegromab (124), visugromab (126)

Under the previous naming scheme:

humanized: *-zumab*

domagrozumab (114), landogrozumab (113)

human: *-umab*

bimagrumab (111), trevogrumab (113)

-ki- for **interleukin** (previously as *-k(i)-*, *-ki(n)-*):

abrezekimab (118), avizakimab (121), bermekimab (120), camoteskimab (126), cendakimab (120), depemokimab (123), ebdarokimab (124), eblasakimab (125), etokimab (120), gumokimab (125), itepekimab (122), lusvertikimab (124), manfidokimab (125), netakimab (118), ordesekimab (124), pivekimab (125), pivekimab sunirine (125), romilkimab (118), sonelokimab (121), torudokimab (124), tozorakimab (124), xeligekimab (125), ziltivekimab (121)

Under the previous naming scheme:

humanized: *-zumab*

anrukinzumab (98), bimekizumab (110), clazakizumab (107), enokizumab (104), gevokizumab (104), ixekizumab (105), lebrikizumab (101), lutikizumab (115), mirikizumab (117), olokizumab (103), perakizumab (108), risankizumab (113), tildrakizumab (108), vunakizumab (115)

human: *-umab*

afasevikumab (113), brazikumab(115), briakinumab (101), canakinumab (97), dectrekumab (112), fezakinumab (101), fletikumab (110), guselkumab (109), secukinumab (102), sirukumab (105), tralokinumab (102), ustekinumab (99)

-li- for **immunomodulating** (previously as *-l(i)-*,*-li(m)-*):

acasunlimab (124), acrixolimab (126), adebrelimab (122), alomfilimab (124), alsevalimab (122), amlitelimab (124), anumigilimab (125), astegolimab (121), atibuclimab (124), avdoralimab (121), axatilimab (121), balstilimab (122), bapotulimab (123), barzolvolimab (125), batoclimab (121), bavunalimab (125), bersanlimab (118), betifisolimab (126), bexmarilimab (122), boserolimab (127), botensilimab (124), briquilimab (126), budigalimab (119), burfiralimab (126), cadonilimab (124), cemiplimab (119), cetrelimab (118), cifurtilimab (126), cobolimab (120), cosibelimab (121), crefmirlimab (126), crovalimab (119), cudarolimab (122), dafsolimab (123), dafsolimab setaritox (123), daxdilimab (123), divozilimab (123), domvanalimab (124), dostarlimab (119), dresbuxelimab (125),ecleralimab (125), encelimab (121), envafolimab (120), erfonrilimab (124), etigilimab (118), ezabenlimab (122), favezelimab (123), feladilimab (122), fianlimab (121), finotonlimab (124), frexalimab (126), garivulimab (123), gatralimab (121), gefurulimab (126), geptanolimab (123), giloralimab (122), grisnilimab (123), grisnilimab setaritox (123), ieramilimab (120), imaprelimab (118), imsidolimab (124), iparomlimab (125), iscalimab (118), ivuxolimab (121), izuralimab (123), lemzoparlimab (124), leronlimab (118), lesabelimab (126), letaplimab (123), levilimab (120), licaminlimab (124), ligufalimab (125), lirentelimab (124), litifilimab (126), livmoniplimab (125), lodapolimab (121), lorigerlimab (125), magrolimab (120), manelimab (121), melrilimab (123), miptenalimab (122), mitazalimab (119), mupadolimab (125), nadunolimab (122), narsoplimab (124), nipocalimab (122), nofazinlimab (125), nurulimab (121), obexelimab (119), ociperlimab (123), ontamalimab (119), onvatilimab (118), opucolimab (122), orilanolimab (119), otilimab (119), pacmilimab (121), penpulimab (123), peresolimab (126), pimivalimab (123), plonmarlimab (124), pozelimab (120), prolgolimab (119), pucotenlimab (124), quavonlimab (122), quetmolimab (120), quisovalimab (125), ragifilimab (122), ravagalimab (118), relatlimab (119), reozalimab (126), retifanlimab (121), revdofilimab (122), rocatinlimab (125), rosnilimab (126), rulonilimab (125), sabatolimab (122), sasanlimab (121), semzuvolimab (126), serplulimab (121), sibeprenlimab (124), simridarlimab (125), sintilimab (119), socazolimab (125), sotigalimab (123), spesolimab (119), suciraslimab (125), sudubrilimab (124), sugemalimab (122), surzebiclimab (124), sutimlimab (118), tagitanlimab (125), tamgiblimab (125), tavolimab (118), tecaginlimab (125), telazorlimab (122), temelimab (119), tesnatilimab (122), tifcemalimab (124), tinurilimab (121), tomaralimab (120), toripalimab (119), trinbelimab (125), tuvonralimab (125), uliledlimab (124), urabrelimab (122), vibostolimab (121), vilobelimab (122), vixarelimab (123), vopratelimab (118), vudalimab (123), zalifrelimab (122), zalifrelimab (122), zampilimab (119), zeluvalimab (124), zimberelimab (123), zirconium (^{89}Zr) crefmirlimab berdoxam (127)

Under the previous naming scheme:

mouse: *-omab*

afelimomab (80), begelomab (111), dorlimomab aritox (66), elsilimomab (89), enlimomab (80), enlimomab pegol (77), faralimomab (81), gavilimomab (84), inolimomab (80), maslimomab (66), nerelimomab (81), odulimomab (81), telimomab aritox (66), vepalimomab (80), zolimomab aritox (80)

chimeric: *-ximab*

andecaliximab (115), basiliximab (81), clenoliximab (77), galiximab (89), infliximab (77), keliximab (81), lumiliximab (90), priliximab (80), teneliximab (87), vapaliximab (87)

chimeric-humanized/human: *-xizumab*

otelixizumab (99), rozanolixizumab (115)

humanized: *-zumab*

apolizumab (87), aselizumab (88), atezolizumab (112), benralizumab (102), cabiralizumab(114), camrelizumab (115), cedelizumab (81), certolizumab pegol (97), crizanlizumab (115), daclizumab (78), daclizumab beta (114), dapirolizumab pegol (110), eculizumab (87), efalizumab (85), erlizumab (84), etrolizumab (104), fontolizumab (87), ibalizumab (97), inebilizumab (113), itolizumab (103), lampalizumab (107), letolizumab (116), ligelizumab (107), lulizumab pegol (111), mepolizumab (81), mogamulizumab (104), monalizumab (113), natalizumab (79), nemolizumab (112), ocrelizumab (95), olendalizumab (116), omalizumab (84), ozoralizumab (105), pascolizumab (87), pateclizumab (105), pembrolizumab (110), pexelizumab (86), pidilizumab (108), plozalizumab (113), quilizumab (106), ravulizumab (117), reslizumab (85), rontalizumab (101), rovelizumab (81), ruplizumab (83), samalizumab (105), satralizumab (116), siplizumab (87), spartalizumab (117), talizumab (89), teplizumab (97), tibulizumab (117), tislelizumab (117), tocilizumab (90), toralizumab (87), tregalizumab (104), vatelizumab (105), vedolizumab (100), visilizumab (84), vobarilizumab (114), vonlerolizumab (116)

human: *-umab*

abrilumab (111), adalimumab (85), adalimumab beta (118), adalimumab fosimdesonide (127), anifrolumab (109), atorolimumab (80), avelumab (113), belimumab (89), bertilimumab (88), bleselumab (113), brodalumab (105), camidanlumab (117), camidanlumab tesirine (117), carlumab (104), dupilumab (108), durvalumab (112), eldelumab (109), emapalumab (116), foralumab (103), fresolimumab (101), gimsilumab (117), golimumab (91), ianalumab (123), imalumab (111), ipilimumab (94), lanadelumab (114), lenzilumab (111), lerdelimumab (86), lirilumab (107), mavrilimumab (102), metelimumab (88), morolimumab (79), namilumab (104), nivolumab (111), oleclumab (116), oxelumab (105), pamrevlumab (113), placulumab (107), prezalumab (114), remtolumab (115), sarilumab (106), selicrelumab (116), sifalimumab (104), tabalumab (105), tesidolumab (112), tezepelumab (113), timolumab (114), tiragolumab (117), tremelimumab (97), ulocuplumab (110), urelumab (104), utomilumab (115), varlilumab (111), zanolimumab (92), ziralimumab (84)

-ne- for **neural** (previously as *-n(e)-*, *-ne(r)-*):

bepranemab (122), cinpanemab (120), donanemab (120), exidavnemab (125), gosuranemab (119), latozinemab (124), lecanemab (122), nadecnemab (124), pepinemab (120), posdinemab (126), semorinemab (120), tilavonemab (120), trontinemab (126), unasnemab (124), zagotenemab (125), zelminemab (121)

Under the previous naming scheme:

humanized: *-zumab*

bapineuzumab (93), crenezumab (105), eptinezumab (115), fremanezumab (115), galcanezumab(114), ozanezumab (108), ponezumab (104), prasinezumab (117), refanezumab (114), solanezumab (107), tanezumab (99)

human: *-umab*

aducanumab (110), atinumab (104), elezanumab (115), erenumab (115), fasinumab (107), fulranumab (104), gantenerumab (108), opicinumab (113)

-os- for **bone** (previously as *-s(o)-*):

garetosmab (120), isecarosmab (122)

Under the previous naming scheme:

humanized: *-zumab*

blosozumab (105), romosozumab (106)

human: *-umab*

burosumab (115), denosumab (94), setrusumab (117)

-ta- for tumour (previous as *-t(u)-, -tu(m)- ; -co(l)- ; -go(t)- ; -go(v)- ; -ma(r)- ; -me(l)- ; pr(o)-*):

acapatamab (124), *alnuctamab (123)*, *amivantamab (121)*, *anbenitamab (124), bafisontamab (125), barecetamab (123), belantamab (118), belantamab mafodotin (118), benufutamab (121), cevostamab (122)*, *cibisatamab (118)*, *coprelotamab (123), datopotamab (123), datopotamab deruxtecan (123), demupitamab (122), disitamab (120), disitamab vedotin (120), elranatamab (125), eluvixtamab (123)*, *emerfetamab (123)*, *emfizatamab (126), emirodatamab (126), enapotamab (118), enapotamab vedotin (118), epcoritamab (123)*, *etevritamab (123)*, *felzartamab (122), fidasimtamab (125), gancotamab (119), ginisortamab (125), glofitamab (121)*, *gresonitamab (125), idactamab (123), ifinatamab (126), ifinatamab deruxtecan (126), imvotamab (126), inezetamab (126), iodine (^{131}I) apamistamab (119), ispectamab debotansine (126), ispectamab tazide (127), ivicentamab (125), izalontamab (126), lacutamab (120), linvoseltamab (126), lonigutamab (124), lonigutamab ugodotin (124),luveltamab tazevibulin (126), luveltamab tazide (126), mecbotamab (126), mecbotamab vedotin (126), mezagitamab (121), mipasetamab (123), mipasetamab uzoptirine (123), mirzotamab (121), mirzotamab clezutoclax (121),*

murlentamab (119), naxitamab (120), nivatrotamab (124), obrindatamab (123), odronextamab (121), omburtamab (119), osemitamab (126), ozuriftamab (126), ozuriftamab vedotin (126), pacanalotamab (123), pavurutamab (123), pelgifatamab (126), pelgifatamab corixetan (124), petosemtamab (121), pimurutamab (122), plamotamab (120), praluzatamab (121), praluzatamab ravtansine (121), ripertamab (122), rolinsatamab (119), rolinsatamab talirine (119), rosopatamab (122), rosopatamab tetraxetan (122), runimotamab (124), samrotamab (118), samrotamab vedotin (118), serclutamab (120), serclutamab talirine (120), sirexatamab (125), sotevtamab (125), tafasitamab (119), talquetamab (121), tamrintamab (120), tamrintamab pamozirine (120), tarlatamab (123), teclistamab (120), tepoditamab (118), tidutamab (120), tilogotamab (122), tilvestamab (121), tusamitamab (123), tusamitamab ravtansine (123), ubamatamab (125), ulenistamab (125), upifitamab (122), upifitamab rilsodotin (123), vepsitamab (125), vibecotamab (120), vixtimotamab (124), vobramitamab (126), vobramitamab duocarmazine (126), vofatamab (120), voxalatamab (125), zanidatamab (121), zanidatamab zovodotin (126), zilovertamab (124), zilovertamab vedotin (124), zuberitamab (122),

Under the previous naming scheme:

<u>mouse</u>: *-omab*

abagovomab (95), altumomab (80), anatumomab mafenatox (86), arcitumomab (74), bectumomab (81), blinatumomab (100), capromab (80), detumomab (80), edrecolomab (74), epitumomab (97), epitumomab cituxetan (89), ibritumomab tiuxetan (86), igovomab (86), lilotomab (112), lutetium (^{177}Lu) lilotomab satetraxetan (112), minretumomab (80), mitumomab (82), moxetumomab pasudotox (102), nacolomab tafenatox (80), naptumomab estafenatox (96), oregovomab (86), racotumomab (100), satumomab (81), solitomab (106), taplitumomab paptox (84), technetium (^{99m}Tc) nofetumomab merpentan (81), technetium (^{99m}Tc) pintumomab (86), tenatumomab (99), tositumomab (80)

<u>chimeric</u>: *-ximab*

amatuximab (104), bavituximab (95), brentuximab vedotin (103), carotuximab (114), cetuximab (82), cetuximab sarotalocan (120), coltuximab ravtansine (109), dinutuximab (109), dinutuximab beta (113), ecromeximab (87), ensituximab (103), futuximab (107), girentuximab (101), indatuximab ravtansine (105), iodine (^{131}I) derlotuximab biotin (113), iodine (^{124}I) girentuximab (101), isatuximab (112), laprituximab (114), laprituximab emtansine (114), margetuximab (109), mirvetuximab (114), mirvetuximab soravtansine (113), modotuximab (110), naratuximab (114), naratuximab emtansine (114), rituximab (77), siltuximab (100), tabituximab (119), tabituximab barzuxetan (119), tomuzotuximab (118), ublituximab (104), vadastuximab (114), vadastuximab talirine (113)

<u>chimeric-humanized/human</u>: *-xizumab*

azintuxizumab (116), azintuxizumab vedotin (116), depatuxizumab (115), depatuxizumab mafodotin (115), duvortuxizumab (116), losatuxizumab (116), losatuxizumab vedotin (116), ontuxizumab (109), pasotuxizumab (111),

<u>humanized</u>: *-zumab*

abituzumab (109), actinium (^{225}Ac) lintuzumab satetraxetan (121), alemtuzumab (83), bemarituzumab (117), bivatuzumab (86), brontictuzumab (111), cantuzumab mertansine (105), cantuzumab ravtansine (105), cergutuzumab amunaleukin (113), citatuzumab bogatox (99), clivatuzumab tetraxetan (113), codrituzumab (109), cofetuzumab (117),

cofetuzumab pelidotin (117), cusatuzumab (118), dacetuzumab (98), dalotuzumab (107), denintuzumab mafodotin (111), duligotuzumab (110), elotuzumab (100), emactuzumab (111), emibetuzumab (111), enavatuzumab (104), enoblituzumab (116), epratuzumab (82), farletuzumab (100), farletuzumab ecteribulin (125), ficlatuzumab (105), flotetuzumab (118), gatipotuzumab (118), gemtuzumab (83), gemtuzumab ozogamicin(115), ifabotuzumab (115), iladatuzumab (117), iladatuzumab vedotin (117), imgatuzumab (107), inotuzumab ozogamicin (92), labetuzumab (85), labetuzumab govitecan (113), lacnotuzumab (116), ladiratuzumab (117), ladiratuzumab vedotin (117), lifastuzumab vedotin (110), lintuzumab (86), lorvotuzumab mertansine (103), lumretuzumab (111), matuzumab (88), milatuzumab (98), mosunetuzumab (117), nimotuzumab (94), obinutuzumab (109), ocaratuzumab (107), onartuzumab (104), oportuzumab monatox (100), otlertuzumab (110), parsatuzumab (107), pertuzumab (89), pertuzumab zuvotolimod (126), pinatuzumab vedotin (108), polatuzumab vedotin (110), rosmantuzumab (115), rovalpituzumab (113), rovalpituzumab tesirine (113), sacituzumab (115), sacituzumab govitecan (113), sibrotuzumab (86), simtuzumab (107), sofituzumab vedotin (110), sontuzumab (94), talacotuzumab (117), telisotuzumab (115), telisotuzumab vedotin (115), tigatuzumab (98), timigutuzumab (118), trastuzumab (78), trastuzumab beta (118), trastuzumab corixetan (126), trastuzumab deruxtecan (116), trastuzumab duocarmazine (115), trastuzumab emtansine (103), trastuzumab imbotolimod (127), trastuzumab rezetecan (127), tucotuzumab celmoleukin (95), vandortuzumab vedotin (112), veltuzumab (98), vorsetuzumab (107), vorsetuzumab mafodotin (107), xentuzumab (114), yttrium (^{90}Y) clivatuzumab tetraxetan (102), yttrium ^{90}Y tacatuzumab tetraxetan (93), zenocutuzumab (118)

human: *-umab*

adecatumumab (90), anetumab corixetan (121), anetumab ravtansine (109), aprutumab (115), aprutumab ixadotin (115), cixutumumab (100), conatumumab (99), daratumumab (101), drozitumab (103), dusigitumab (108), elgemtumab (112), enfortumab vedotin (109), figitumumab (100), flanvotumab (106), ganitumab (103), glembatumumab (102), glembatumumab vedotin (113), indusatumab (112), indusatumab vedotin (112), intetumumab (101), iratumumab (94), istiratumab (117), lexatumumab (95), loncastuximab (117), loncastuximab tesirine (117), lucatumumab (98), lupartumab (115), lupartumab amadotin (115), mapatumumab (93), narnatumab (105), necitumumab (100), ofatumumab (93), olaratumab (103), panitumumab (96), patritumab (106), patritumab deruxtecan (121), pritumumab (89), radretumab (104), rilotumumab (101), robatumumab (100), seribantumab (108), sirtratumab (117), sirtratumab vedotin (117), tarextumab (109), teprotumumab (108), tisotumab (113), tisotumab vedotin (113), tovetumab (109), vantictumab (109), votumumab (80), zalutumumab (93), zolbetuximab (117)

-toxa- for **toxin** (previously as *-tox(a)-*):

Under the previous naming scheme:

chimeric: *-ximab*

obiltoxaximab (113), pritoxaximab (108), setoxaximab (108)

humanized: *-zumab*

urtoxazumab (90)

human: *-umab*

actoxumab (111), atidortoxumab (117), berlimatoxumab (117), bezlotoxumab (107), suvratoxumab (116), tosatoxumab (109)

-vetmab for **veterinary use**:

anivovetmab (126), bedinvetmab (121), blontuvetmab (124), cirevetmab (126), dovanvetmab (121), frunevetmab (116), gilvetmab (116), izenivetmab (126), lokivetmab (112), ranevetmab (124), relfovetmab (120), tamtuvetmab (124), tirnovetmab (124)

-vi- for **viral** (previously as *-v(i)-, -vi(r)-*):

adintrevimab (125), amubarvimab (125), ansuvimab (124), atoltivimab (120), bamlanivimab (124), bebtelovimab (126), beludavimab (125), casirivimab (124), cilgavimab (124), clesrovimab (126), docaravimab (122), elipovimab (120), enuzovimab (125), etesevimab (124), fiztasovimab (126), gontivimab (121), imdevimab (124), lenvervimab (118), lomtegovimab (125), maftivimab (120), mazorelvimab (125), miromavimab (122), nirsevimab (119), odesivimab (121),ormutivimab (125), plutavimab (126), regdanvimab (124), rimteravimab (125), romlusevimab (125), sotrovimab (124), teropavimab (125), tixagevimab (124), upanovimab (125), zamerovimab (125), zinlirvimab (126),

Under the previous naming scheme:

chimeric: *-ximab*

cosfroviximab (116), larcaviximab (116), porgaviximab (116)

humanized: *-zumab*

felvizumab (77), motavizumab (95), palivizumab (79), suvizumab (102)

human: *-umab*

diridavumab (111), exbivirumab (91), firivumab (111), foravirumab (100), gedivumab(117), lesofavumab (117), libivirumab (91), navivumab (113), rafivirumab (100), regavirumab (80), sevirumab (66), suptavumab (115), tuvirumab (66)

Others:

under***-le(s)-*** for **inflammatory lesions** (infix no longer formally acknowledged under the current scheme):

mouse (under the previous naming scheme ***-omab***):

besilesomab (92), lemalesomab (86), sulesomab (86), technetium (^{99m}Tc) fanolesomab (86)

humanized (under the previous naming scheme ***-zumab***):

ranibizumab (90) (treatment of patients with the exudative (wet or neovascular) form of age-related macular degeneration (AMD))

rat-murine hybrid (under the previous naming scheme ***-axomab***):

catumaxomab (93), ertumaxomab (93)

human (under the previous naming scheme ***-umab***):

roledumab (103), (treatment of RhD(+) incompatible transfusions)

muromonab-CD3 (59) (the first monoclonal antibody to which an INN was assigned belongs to this group but it was named before the stem was established)

stamulumab (95) (anti-human MSTN (myostatin, growth differentiation factor 8, GDF8, GDF-8))

3.31. Oxytocin derivatives

The common stem for oxytocin derivatives is ***-tocin***.

argiprestocin (13), aspartocin (11), carbetocin (45), cargutocin (35), demoxytocin (22), merotocin (111), nacartocin (51), oxytocin (13).

3.32. Peptides and Glycopeptides

The common stem for peptides and glycopeptides is ***-tide***.

For special groups of peptides see ***-closporin*** (Ciclosporin derivatives, see item 3.11), ***-ganan*** (Antimicrobials, permeability-increasing peptides, item item 3.1), ***-kef-*** (Enkephalin, endorphin and dynorphin opioid δ, μ and κ receptor agonists, item 3.14), ***-pressin*** (Vasopressin analogues, item 3.39), ***-relin*** (Pituitary hormone-release stimulating peptides, item 3.34), ***-relix*** (Gonadotropin-releasing hormone (GnRH) inhibiting peptides, item 3.18), ***-tocin*** (Oxytocin derivatives, item 3.31)

Peptides and glycopeptides are organized by the mode of action or by therapeutic use. Substems and pre-stems exist for some categories.

-actide for polypeptides with a corticotropin-like action:

alsactide (45), codactide (24), ebiratide (56), giractide (29), norleusactide (18), seractide (31), tetracosactide (18), tosactide (24), tricosactide (44), tridecactide (97)

-dutide for oxyntomodulin analogs and other dual agonists of glucagon-like peptide 1 receptor (GLP-1R) and glucagon receptor (GCGR)

bamadutide (119), cotadutide (119), efinopegdutide (120), mazdutide (126), pegapamodutide (116), pemvidutide (126), tirzepatide (119)

-enatide glucagon-like peptide-1 receptor (GLP1R) agonists, exenatide (exendin-4) and analogues

albenatide (114), avexitide (120), efpeglenatide (111), exenatide (89), lixisenatide (99), pegloxenatide (125), pegsebrenatide (127), vurolenatide (126)

-glutide for glucagon-like peptide (GLP) analogues and agonists:

albiglutide (97), apraglutide (120), beinaglutide (117), dapiglutide (123), dulaglutide (103), ecnoglutide (126), elsiglutide (104), froniglutide (127), glepaglutide (116), liraglutide (87), semaglutide (101), taspoglutide (99), teduglutide (90), utreglutide (126)

-lintide for amylin derivatives and analogues

amlintide (76), cagrilintide (123), davalintide (101), pramlintide (74)

-melanotide for melanocortin receptor agonists

afamelanotide (99), bremelanotide (95), modimelanotide (111), setmelanotide (112)

-motide for peptides used for active immunization:

abecomotide (109), adegramotide (115), alicdamotide (109), alrefimotide (125), amilomotide (105), asudemotide (107), baloramotide (120), disomotide (94), elpamotide (103), graunimotide (113), latromotide (107), nelatimotide (115), onilcamotide (124), ovemotide (94), pradimotide (107), riletamotide (125), sultimotide alfa (117), tanurmotide (109), tapderimotide (125), tecemotide (108), tertomotide (98), tiplimotide (82), trempamotide (107), zastumotide (110)

-paratide for parathyroid hormone analogues:

abaloparatide (109), eneboparatide (127), palopegteriparatide (124), semparatide (80), teriparatide (50)

-pultide for peptides and proteins used in pulmonary surfactants:

elopultide (121), lusupultide (80), redipultide (119), sinapultide (78), zelpultide alfa (126)

-reotide for somatostatin receptor agonists/antagonists:

depreotide (80), edotreotide (84), ilatreotide (68), lanreotide (64), lutetium (^{177}Lu) oxodotreotide (116), nendratareotide (124), nendratareotide uzatansine (124), octreotide (52), pasireotide (90), pentetreotide (66), satoreotide (115), satoreotide tetraxetan (118), satoreotide trizoxetan (114), seglitide (57), vapreotide (62), veldoreotide (117)

-ritide for natriuretic peptides:

anaritide (57), carperitide (65), cenderitide (105), navepegritide (127), nesiritide (80), ularitide (69), vosoritide (112)

Others:

analgesic, conotoxin-derived peptides: *leconotide (86), ziconotide (78)*

angiogenesis inhibitor: *cilengitide (81), gersizangitide (126)*

antianaemic: *peginesatide (108), pegmolesatide (125), rusfertide (125)*

antifungal: *pezadeftide (126)*

anti-inflammatory: *brimapitide (114)*, *dusquetide (113), icrocaptide (89), rimtoregtide (126)*

anti-ischemic: *eptifibatide (78) platelet aggregation inhibitor GPIIb/IIIa receptor antagonist), odatroltide (125) (thrombolytic)*

antimicrobial: *lancovutide (99), nosiheptide (35), ropocamptide (121), teicoplanin (48)*

antiviral: *bulevirtide (118), enfuvirtide (85), labuvirtide (124), tifuvirtide (91)*

autoimmune disorders: *dalazatide (111), dirucotide (100), edratide (89)*

calcium sensing receptor agonist: *etelcalcetide (112)*

cardiovascular indications: *elamipretide (113)(cardiolipin peroxidase inhibitor), mibenratide (111)(β1-adrenergic receptor analogue), milpocitide (127) (PCSK9 inhibitor), teprotide (36)(ACE inhibitor)*

chemokine CXCR4 antagonists: *balixafortide (112), gallium (68Ga) boclatixafortide (126), motixafortide (120), yttrium (90Y) anditixafortide (126)*

diagnostic/radiolabeled peptides: *betiatide (58), bibapcitide (78), ceruletide (34), depreotide (80), flotegatide (^{18}F) (108), fluciclatide (^{18}F) (103), gallium (^{68}Ga) gozetotide (123), iodine (^{124}I) evuzamitide (125), lutetium (^{177}Lu) vipivotide tetraxetan (123), lutetium (^{177}Lu) zadavotide guraxetan (125), maraciclatide (103), mertiatide (60), pegloprastide (120), pendetide (70), technetium (^{99m}Tc) apcitide (86), technetium (^{99m}Tc) etarfolatide (107), tozuleristide (115), vipivotide tetraxetan (120)*

endothelin receptor agonist: *sovateltide (121)*

gap junction modulators, antiarrhythmics: *danegaptide (101), rotigaptide (94)*

gastrointestinal functions: *dolcanatide (114), lagatide (75) (antidiarrhoeal), larazotide (99) (zonulin antagonist, celiac disease), linaclotide (97), livoletide (118) (ghrelin analogue), ociltide (52) (gut motility increasing), plecanatide (104), recanaclotide (115), sulglicotide (29) (antiulcer), triletide (50) (antiulcer)*

high mobility group (HMG) protein B1 analogue: *redasemtide (117)*

immunological agents and antineoplastics: *almurtide (74), brimatide (114), delmitide (92), fexapotide (114), goralatide (72), mifamurtide (95), murabutide (49), paclitaxel trevatide (109), pentigetide (60), pimelautide (53), prezatide copper acetate (67), rolipoltide (94), romurtide (61), ruxotemitide (119), tabilautide (60), temurtide (60), tigapotide (95)*

kallikrein inhibitor: *ecallantide (93)*

neurological indications: *alirinetide (117), cibinetide (114), davunetide (100), doreptide (59), nemifitide (87), nerinetide (119), obinepitide (96), orenetide (125, pareptide (38), trofinetide (112), vanutide cridificar (100)*

neuropilin-1 binding peptide: *certepetide (127)*

promotion of dentin production: *selcopintide (126)*

sedative: *emideltide (70)*

sodium channel activator: *solnatide (113)*

sortilin binding peptide: *sudocetaxel zendusortide (126), zendusortide (126)*

thymosin β4 analogue: *fequesetide (127)*

transforming growth factor-beta 1 inhibitor: *disitertide (99)*

TREM-1 activation inhibitor: *nangibotide (117)*

triple agonists of GIP, glucagon and GLP-1 receptors: *efocipegtrutide (126)*

tuftsin-related peptide: *dazdotuftide (127)*

urokinase plasminogen activator receptor (uPAR) inhibitor: *cenupatide (119)*

wound healing, anti-scarring: *aclerastide (110), ensereptide (107), rusalatide (96)*

3.33. Pituitary / Placental glycoprotein hormones

The names selected by the International Union of Pure and Applied Chemistry-International Union of Biochemistry (IUPAC-IUB) have, to date, been chosen for compounds with an amino acid sequence identical to that of the naturally occurring human hormones. Addition of a Greek letter as the second part of the name will allow differentiation of different glycosylation patterns for compounds produced by biotechnology (see item 2.3: General policy for glycosylated substances).

(-)follitropin (follicle-stimulating hormones (FSH)):

corifollitropin alfa (80), follitropin alfa (71), follitropin beta (75), follitropin gamma (106), follitropin delta (112), follitropin epsilon (115), ripafollitropin alfa (bovine) (122), urofollitropin (57), varfollitropin alfa (101)

-gonadotropin (gonadotropin):

chorionic gonadotrophin (1), choriogonadotropin alfa (76), choriogonadotropin beta (120), serum gonadotrophin (1)

(-)lutropin (luteinizing hormones (LH)):

lutropin alfa (71)

3.34. Pituitary hormone-release stimulating peptides

The common stem for pituitary hormone-release stimulating peptides is ***-relin***.

luteinizing hormone–releasing hormone (LHRH)-release-stimulating peptides:

avorelin (74), buserelin (36), deslorelin (61), fertirelin (42), gonadorelin (32), goserelin (55), histrelin (53), leuprorelin (47), lutrelin (51), nafarelin (50), peforelin (93), triptorelin (58), zoptarelin doxorubicin (107)

-morelin for growth hormone (GH) release-stimulating peptides:

anamorelin (97), capromorelin (83), dumorelin (59), examorelin (72), ipamorelin (78), lenomorelin (106), macimorelin (100), pralmorelin (77), rismorelin (74), sermorelin (56), somatorelin (57), tabimorelin (86), tesamorelin (96), ulimorelin (103)

-tirelin for thyrotropin releasing hormone analogues:

azetirelin (60), montirelin (58), orotirelin (58), posatirelin (60), protirelin (31), taltirelin (75)

Exception:

thyrotropin alfa (78) (thyrotropin releasing hormone (TRH) analog, belongs to this group but the preferred stem has not been used)

Others:

corticorelin (66) (diagnostic agent)

3.35. Receptor molecules or membrane ligands, native or modified

The stem for receptor molecules or membrane ligands, native or modified is ***-cept***.

A preceding infix should designate the receptor type.

For glycosylated receptor molecules or membrane ligands, native or modified see item 2.3: General policy for glycosylated substances.

-ba- (B-cell activating factor receptors):

briobacept (98)[14]

-ber- (vascular endothelial growth factor (VEGF) receptors):

aflibercept (96)[14]*, conbercept (105)*[14]*, sozinibercept (126)*[14]

-co- (complement receptors):

mirococept (91)

-far- (interferon alpha/beta receptor):

bifarcept (86)

-fri- (frizzled family receptors):

ipafricept (109)[14]

-ki- (interleukin receptors):

goflikicept (124)[14]*, inbakicept (120)*[14]*, olamkicept (116)*[14]

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[14] Fc-fusion receptor molecules or membrane ligands, native or modified.

-lefa- (lymphocyte function-associated antigen 3 (LFA-3) receptors):

alefacept (84)[14]

-na- (interleukin-1 receptors):

rilonacept (95)[14]

-ner- (tumour necrosis factor (TNF) receptors):

asunercept (114)[14]*, baminercept (99)*[14]*, etanercept (81)*[14]*, lenercept (72)*[14]*, onercept (86), opinercept (118)*[14]*, pegsunercept (95), tanfanercept (120), tulinercept (116)*[14]

-rpa- (signal-regulatory potein alpha (SIRPα) receptors):

evorpacept (126)[14]*, maplirpacept (127)*[14]*, ontorpacept (122)*[14]

-ta- (cytotoxic T-lymphocyte associated protein 4 (CTLA4) receptors):

abatacept (91)[14]*, belatacept (93)*[14]

-taci- (transmembrane activator and CAML interactor (TACI) receptors):

atacicept (95)[14]*, povetacicept (127)*[14]*, telitacicept (120)*[14]

-ter- (transforming growth factor receptors):

dalantercept (105)[14]*, luspatercept (110)*[14]*, ramatercept (108)*[14]*, sotatercept (104)*[14]

-vir- (antiviral receptors):

alvircept sudotox (69)

Others:

acazicolcept (124)[14] (inducible T-cell co-stimulator ligand (ICOSL))
batiraxcept (123)[14] (AXL receptor tyrosine kinase (AXL))
davoceticept (125)[14] (T-lymphocyte activation antigen CD80)
recifercept (122) (fibroblast gowth factor receptor (FGFR)
valziflocept (117) (low affinity IgG Fc region receptor II-b)

3.36. Small interfering double-stranded RNA including siRNA, miRNA, piRNA[15]

The common stem for small interfering double-stranded RNA is ***-siran***.

asvasiran (111), bamosiran (106), belcesiran (125), bevasiranib (108), cemdisiran (114), cosdosiran (116), daplusiran (124), eldocasiran (127), elebsiran (127), fazirsiran (126), fitusiran (113), givosiran (126), inclisiran (115), lixadesiran (125), lumasiran (117), manusiran (127), nedosiran (124), olpasiran (122), patisiran, (118), pixofisiran (125), revusiran (111), teprasiran (116), tivanisiran (117), tomligisiran (124), vutrisiran (123), xalnesiran (126), zerlasiran (127), zifcasiran (127), zilebesiran (126)

[15] For antisense oligonucleotides see item 3.2 and for various see item 3.41.

Exceptions (belong to this group, but the preferred stem has not been used):

remlarsen (117) (double-stranded microRNA mimetic)

3.37. Thrombomodulins

sothrombomodulin alfa (101), thrombomodulin alfa (94)

3.38. Toxins

aviscumine (86) (toxin ML-1 (mistletoe lectin I) *(Viscum album*))

3.39. Vasopressin analogues

The common stem for vasopressin analogues is ***-pressin***.

argipressin (13), desmopressin (33), felypressin (13), lypressin (13), ornipressin (22), selepressin (105), terlipressin (46), vasopressin injection (16), velmupressin (122)

3.40. Vaccines and vaccine-like active substances (eg. DNA, RNA, peptide, recombinant vaccines)

Definition of peptide vaccines: vaccine in which antigens are produced from synthetic peptides, in order to stimulate an immune response.

Definition of recombinant vaccines: vaccine in which the antigen is derived by recombinant DNA technology. This may involve the isolation of a gene for a protein antigen and its expression to produce large quantities of the antigen (recombinant protein vaccine), or it may involve the construction of a genetically modified micro-organism (recombinant viral/bacterial vaccine).

- Peptides used for active immunization: ***-motide*** (see item 3.32).
- Recombinant proteins for active immunization:

  Therapeutic vaccine substance:
  verpasep caltespen (95) (heat-shock protein HSP 65 (Mycobacterium bovis strain BCG) fusion protein with transcription factor E7 (human papilloma virus 16))

  The suffix ***-tespen*** is used as indicator of the heat shock protein (HSP).

  Prophylactic vaccine substance:
  carocovatein (127)

  The suffix ***-covatein*** is used with ***-vatein*** for protein vaccine substance and ***-co-*** for corona virus

- messenger RNA (mRNA) vaccines including those used for active immunization (see items 2.17 and 3.29).

- DNA vaccines (plasmid DNA):

  The suffix ***-covtogene*** is used as indicator of the SARS-CoV-2 spike (S) glycoprotein (e.g. *reluscovtogene ralaplasmid (124)*, *vixicovtogene oboplasmid (126)*, see items 2.6 and 3.7).

- Virus vector vaccines
  ibacovavec (127)

  The suffix ***-covavec*** is used with ***-vavec*** for vectored vaccine substance and ***-co-*** for corona virus.

3.41. Various[16]

Albumin-based substances:

iodinated (^{125}I) human serum albumin (24) (human serum albumin iodinated with radioactive iodine (^{125}I))

iodinated (^{131}I) human serum albumin (24) (human serum albumin iodinated with radioactive iodine (^{131}I))

macrosalb (^{131}I) (33) (macroaggregated iodinated (^{131}I) human albumin)

macrosalb (^{99m}Tc)(33) (technetium (^{99m}Tc) labelled macroaggregated human serum albumin)

ovandrotone albumin (52) (3-[(3,17-dioxoandrost-4-en-7α-yl)thio]propionic acid, serum albumin conjugate)

Hemoglobin-based substances:

hemoglobin betafumaril (bovine) (115) ($S^{3.\beta92}$,$S^{3.\beta'92}$-bis(2-amino-2-oxoethyl)-$N^{6.\beta81}$,$N^{6.\beta'81}$-[(2*E*)-(but-2-enedioyl)]bovine hemoglobin ($\alpha_2\beta_2$ tetramer))

hemoglobin crosfumaril (76) (hemoglobin A_0 (human $\alpha_2\beta_2$ tetrameric subunit), α-chain 99,99'-diamide with fumaric acid)

hemoglobin crosfumaril (bovine) (108) ($S^{3}.^{\beta92}$,$S^{3}.^{\beta'92}$-bis(2-amino-2-oxoethyl)-$N^{6.\alpha99}$,$N^{6}.^{\alpha'99}$-(but-2-enedioyl)bovine hemoglobulin ($\alpha_2\beta_2$ tetramer))

hemoglobin glutamer (80) (the species specificity should be indicated in brackets behind the name, "(bovine)"; the average mass of the polymer is given as e.g. hemoglobin glutamer-250 for 250kD)

hemoglobin raffimer (89) (The polyaldehyde [(2*R*,4*S*,6*R*,8*R*,11*S*,13*R*)-1,14-dihydroxy-4-hydroxymethyl-3,5,7,10,12-pentaoxatetradecane-2,4,6,8,11,13-hexacarbaldehyde] derived from raffinose [β-D-fructofuranosyl α-D-galactopyranosyl-(1→6)-α-D-glucopyranoside] by treatment with sodium periodate is reacted with human hemoglobin A_0 at the 2,3-DPG binding pocket)

hemoglobin sucistil (bovine) (126) ($N^{\beta1}$,$N^{6.\beta'81}$-, $N^{6.\beta81}$,$N^{\beta'1}$- and $N^{6.\beta81}$,$N^{6.\beta'81}$-[(2*RS*)-2-(l-cystein-*S*-yl)butanedioyl]hemoglobin (*Bos taurus*, $\alpha_2\beta_2$ tetramer))

Hormone-based substances:

adrenomedullin pegol (126) ($O^{4.1}$-{[(3*S*)-3-amino-4-{[(2*R*)-1-amino-3-{[(3*RS*)-1-{3-[α-methylpoly(oxyethylene)-ω-amino]-3-oxopropyl}-2,5-dioxopyrrolidin-3-yl]sulfanyl}-1-oxopropan-2-yl]amino}-4-oxobutyl]carbamoyl}adrenomedullin (human))

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[16] The descriptions following the INN names may not be the complete definitions as shown in the publications of INN Lists.

calcitonin (80) (a polypeptide hormone that lowers the calcium concentration in blood (the species specificity should be indicated in brackets behind the name))

dasiglucagon (117) (mutated human glucagon analogue: [16-(2-methylalanine)(S>X),17-L-alanine(R>A),20-L-α-glutamyl(Q>E),21-L-α-glutamyl(D>E),24-L-lysyl(Q>K),27-L-α-glutamyl(M>E),28-L-serine(N>S)]human glucagon

hepcidin (123) (hepcidin (human) (hepatical bactericidal protein, hepcidin-25, liver-expressed antimicrobial peptide 1, LEAP-1, hepatic antimicrobial peptide, HAMP, ferroportin regulator protein))

parathyroid hormone (90) (non glycosylated human parathyroid hormone, the origin should be indicated between brackets after the INN, for example (r. *E. coli*) for recombinant produced by *Escherichia coli*)

secretin (01) (hormone of the duodenal mucosa which activates the pancreatic secretion and lowers the blood-sugar level)

secretin human (106) (human peptide hormone secretin)

serelaxin (105) (human relaxin 2 (relaxin H2))

thymalfasin (77) (synthetic thymosin alpha 1)

Nucleotide-based substances[17]**:**

bazlitoranum (114) (DNA oligonucleotide that targets toll-like receptors; *-toran* USAN stem for TLR antagonists)

brivoligide (117) (23 bp decoy DNA; *-oligide* suffix for "OLIGonucleotIDE")

defibrotide (44) (polydeoxyribonucleotides derived from mammalian lung with molecular weights ranging between 45.000 and 55.000 Da)

edifoligide (89) (14 bp decoy DNA; *-oligide* suffix for "OLIGonucleotIDE")

etidaligide (119) (*all-P-ambo*-5'-*O*-{(4*RS*)-1-[5'-*O*-{19-[(cholest-5-en-3β-yl)oxy]-1-hydroxy-1,19-dioxo-2,5,8,11,14-pentaoxa-18-aza-1λ^5-phosphanonadecan-1-yl}deoxy([1,2,3]tri-*P*-thio)(5'-GCTGTGCCCA CAACCCAGCA AACAAGCCTA GA-3')-3'-*O*-yl]-1,4,23-trihydroxy-1,11,23-trioxo-2,6,22-trioxa-10-aza-1λ^5,23λ^5-diphosphatricosan-23-yl}deoxy([29,30,31]tri-*P*-thio)(5'-TCTAGGCTTG TTTGCTGGGT TGTGGGCACA GC-3'))

imetelstat (101) (oligonucleotide telomerase inhibitor; *-stat* stem for enzyme inhibitors)

nexiguran (127) (synthetic chemically-modified single guide RNA (sgRNA) targeting the human transthyretin (TTR) gene)

[17] For antisence oligonucleotides see item 3.2, for aptamers see item 3.4 and for small interfering RNA see item 3.36.

rosomidnar (115) (DNA oligonucleotide sequence that is complementary to a region upstream of the B-cell lymphoma (BCL-2) gene)

Protein or peptide-based substances:

alisporivir (100) ([8-(*N*-methyl-D-alanine),9-(*N*-ethyl-L-valine)]cyclosporine)

andexanet alfa (110) (factor Xa inhibitors neutralizing agent; des-(6-39)-human blood-coagulation factor X light chain (98-108')-disulfide with [185'-alanine (S>A)]human activated factor Xa heavy chain, produced in Chinese hamster ovary (CHO) cells (glycoform alfa))

angiotensin II (65) (5-L-isoleucine angiotensin II (the source of the material should be indicated))

angiotensinamide (12) (*N*-{1-{*N*-{*N*-{*N*-[*N*-(N^2-asparaginylarginyl)valyl]tyrosyl}valyl} histidyl}prolyl}-3-phenylalanine)

belzupacap sarotalocan (122) (a modified human papillomavirus (HPV) type 16-derived empty nanoparticle, 55 nm in diameter conjugated to approximately 200 molecules of a phthalocyanine-based photosensitizer (*sarotalocan* group). Each nanoparticle is comprised of 72 capsomeres, made of 5 molecules of modified viral capsid protein L1 [P^{78}>R, T^{176}>N, D^{273}>T, N^{285}>T, S^{288}>N, T^{353}>P, T^{389}>S] and one molecule of viral capsid protein L2; human papilloma virus type 16 (HPV16) capsid, a spherical shell of 72 self-assembling pentagonal $(L1)_5(L2)_1$ capsomere units comprising the recombinant viral capsid proteins L1 ([P^{78}>R, T^{176}>N, D^{273}>T, N^{285}>T, S^{288}>N, T^{353}>P, T^{389}>S]-modified) and L2, conjugated to approximately 200 *sarotalocan* groups (near infrared absorbing dye) at N^6 of lysine residues, produced by human embryonic kidney 293 (HEK293) cells)

conendostatin (122) (L-methionyl-human endostatin [human collagen type XVIII α-1 (COL18A1) C-terminal (1572-1754)-fragment (1-183)], canonical D^{104}, R^{110}, S^{150} form, produced in *Escherichia coli*)

conestat alfa (107) (human plasma protease C1 inhibitor (C1 esterase inhibitor) (*N*,*O*-glycosylated recombinant protein expressed in the mammary gland of transgenic rabbits), glycoform α) (-*stat* stem for enzyme inhibitors)

delcasertib (105) (human immunodeficiency virus 1 protein Tat-(46-57)-peptide (1→1')-disulfide with L-cysteinyl-[mouse protein kinase C delta type-(8-17)-peptide]) (-*sertib* stem for serine/threonine kinase inhibitor)

depelestat (92) (human recombinant neutrophil elastase inhibitor, bovine pancreatic trypsin inhibitor (BPTI) homologue) (-*stat* stem for enzyme inhibitors)

dianexin (109) (recombinant DNA derived annexin A5 dimer covalently linked by a 14 residues peptide linker, produced in *Escherichia coli* (nonglycosylated))

iroplact (74) (*N*-L-methionyl blood platelet factor 4 (human subunit))

ismomultin alfa (91) (47-261-Glycoprotein gp 39 (human clone CDM8-gp39 reduced))

ledelabricin alfa (124) (proteoglycan 4 (lubricin) derivative)

lonodelestat (121) (elastase inhibitor: 1,13-anhydro[L-alanyl-L-seryl-L-isoleucyl-L-prolyl-L-prolyl-L-glutaminyl- L-lysyl-L-tyrosyl-D-prolyl-L-prolyl-(2S)-2-aminodecanoyl-L-α-glutamyl-L-threonine])

lusacomfar alfa (127) (human complement factor H (CFH, H factor 1), produced in human embryonic kidney cells (HEK293), glycoform alfa)

metreleptin (82) (*N*-methionylleptin (human))

mirostipen (85) ([23-methionine] human myeloid progenitor inhibitory factor 1-(23-99)-peptide)

murepavadin (113) (macrocyclic peptidomimetic, synthetic antibiotic)

nagrestipen (76) (macrophage inflammatory 1-alfa; 26-L-alaninelymphokine MIP 1α (human clone pAT464 macrophage inflammatory))

nomacopan (119) (complement inhibitor from *Ornithodoros moubata* (soft tick or Argasid tick), produced in *Escherichia coli* (complement factor C5 inhibitor))
(-*copan* for complement receptor antagonists)

opebacan (83) (132-L-alanine-1-193-bactericidal / permeability-increasing protein (human))

pemziviptadil (124) (fusion protein comprising l-methionyl (1)-vasoactive intestinal polypeptide (human VIP) (2-29) and an elastin-like artificial polymer (30-629) of 120 alternating pentapeptides of three types VPGVG, VPGGG, and VPGAG, and a C-terminal pentapeptide VPGWP (630-634))

sulanemadlin (123) ($C^{2.11}$,$C^{2.4}$-[(4*E*)-undec-4-ene-1,11-diyl](*N*-acetyl-L-leucyl-L-threonyl-L-phenylalanyl-L-alanyl-L-α-glutamyl-L-tyrosyl-L-tryptophyl-L-alanyl-L-glutaminyl- L-leucyl-D-alanyl-L-alanyl-L-alanyl-L-alanyl-L-alanyl-L-alanyl-D-alaninamide))
(-*madlin* for E3 ubiquitin-protein ligase Mdm2 (Hdm2) inhibitors)

tadekinig alfa (90) (interleukin-18 binding protein (human gene IL 18BP isoform a precursor))

talactoferrin alfa (93) (recombinant human lactoferrin**)**

teicoplanin (48) glycopeptide (an antibiotic obtained from cultures of *Actinoplanes teichomyceticus*, or the same substance produced by any other means)

timbetasin (118) (thymosin β4 analogue)

tiprelestat (103) (human elafin (elastase-specific inhibitor, skin-derived antileukoproteinase, peptidase inhibitor 3)) (-*stat* stem for enzyme inhibitors)

topsalysin (111) (recombinant DNA derived proaerolysin, pore-forming protein, from *Aeromonas hydrophila,* with the furin site substituted with a prostate specific

antigen (PSA) cleavage site, fusion protein with 6 histidines, produced in *Escherichia coli* (nonglycosylated))

torapsel (91) (42-89-glycoprotein (human clone PMT21:PL85 P-selectin glycoprotein ligand 1) fusion protein with immunoglobulin (human constant region))

trebananib (106) (immunoglobulin G1 Fc fragment fused with two synthetic polypeptides that bind *Homo sapiens* ANGPT2 (angiopoietin 2)) (-*anib* stem for angiogenesis inhibitor)

tremacamra (78) (1-453-glycoprotein ICAM-I (human reduced))

votucalis (96) (methionyl[145-leucine]FS-HBP2 (*Rhipicephalus appendiculatus* (Brown ear tick) Female-Specific Histamine-Binding Protein 2))

zilucoplan (118) *N2*-acetyl-L-lysyl-L-valyl-L-α-glutamyl-L-arginyl-L-phenylalanyl-L-α-aspartyl-*N*-methyl-L-α-aspartyl-3-methyl-L-valyl-L-tyrosyl-3-(1*H*-pyrrolo[2,3-*b*]pyridin-3-yl)-L-alanyl-L-α-glutamyl-L-tyrosyl-L-prolyl-(2*S*)-2-cyclohexylglycyl-N^6-(3-{ω-[(*N*-hexadecanoyl-L-γ-glutamyl)amino]tetracosakis(oxyethylene)-α-yl}propanoyl)-L-lysine (6→1^6)-lactam (complement C5 inhibitor))

zinpentraxin alfa (125) (serum amyloid P component (APCS, SAP, pentraxin 2, pentaxin 2, PTX2, 9.5S α-1 glycoprotein), non-covalent cyclic homopentamer)

CURRENT CHALLENGES

The challenges currently faced by the INN Expert Group include:

- The use of a Biological Qualifier separate from the INN scheme to identify the source of a biological substance to enable substances to be traced in different licensing systems, whether classified as ‘similar biological substances’ or not.
- Policies for naming proteins under the stem *-tide* versus creating a new suffix for proteins with its own definition.
- Various aspects of nomenclature of monoclonal antibodies (mAbs):
    - Policy for a scheme for nomenclature of glycosylated mAbs.
- The benefit of extending the INN system to mixtures and less well defined biological substances and therefore modifying the General Principles for biologicals.
- Development of a nomenclature scheme to clarify vaccines containing viruses and bacteria that could be assigned INN, including prophylactic vaccines that are currently assigned INN.
- If appropriate, extending the INN scheme to nomenclature of peptide mixtures used for immunotherapy and harmonizing to the extent possible with existing nomenclature systems for these products.

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** These documents are available on the INN Programme Website at: http://www.who.int/medicines/services/inn/en/.*

[#] Those documents are a summary of deliberations of the INN Expert Group. They are not public but can be made available upon request.

ANNEX 1 .

List of INN for fusion proteins with one pharmacologically active component [18, 19]

(this list excludes the INN ending with *-fusp*)

classified by groups

alb- *(human serum albumin)*

alb- & -cog

albutrepenonacog alfa (109)
human coagulation factor IX (EC 3.4.21.22, Christmas factor, plasma thromboplastin component) 148-threonine variant fusion protein with prolyl(human coagulation factor IX 148-threonine variant-(137-153)-peptide) fusion protein with human serum albumin, produced in CHO cells (alfa glycoform)

alb- & -interferon

albinterferon alfa-2b (99)
human serum albumin (585 residues) fusion protein with human interferon α-2b (165 residues)

alb- & -tide

albenatide (111)
S$^{3.34}$-{1-[(23*S*)-23-{[exendin-4 *Heloderma suspectum* precursor-(48-86)-peptidyl (exenatidyl)]amino}-3,12,24-trioxo-7,10-dioxa-4,13,18,25-tetraazapentacosyl]-2,5-dioxopyrrolidin-3-yl}human serum albumin.
Peptide is synthetic, and human serum albumin is produced in *Saccharomyces cerevisiae*.

albiglutide (97)
[8-glycine]human glucagon-like peptide 1-(7-36)-peptidyl)([8-glycine]human glucagon-like peptide 1-(7-36)-peptidyl)(human serum albumin (585 residues)

alb- & -som-

albusomatropin (114)
human serum albumin (residues 1-585) fusion protein with human somatotropin (growth hormone) (residues 586-776), produced in yeast cells (*Saccharomyces cerevisiae*)
growth hormone derivative

[18] A protein encoded from one nucleotide sequence generated from two or more genes - and possibly linkers - that originally encoded separate proteins.
[19] It should be noted that this list may not be comprehensive. The descriptions under the names are the published ones.

Others:

-al- & -grastim

balugrastim (107)
human serum albumin (585 residues) fusion protein with des-(1-alanine,37-valine,38-serine,39-glutamic acid)-human granulocyte colony-stimulating factor (pluripoietin)

-ase

asfotase alfa (104)[20]
tissue-nonspecific alkaline phosphatase- IgG_1 fusion protein;human tissue-nonspecific isozyme alkaline phosphatase (AP-TNAP, EC 3.1.3.1) fusion protein with leucyl-lysyl-human immunoglobulin G1 Fc region {(6-15)-H-CH2-CH3 of IGHG1*03} fusion protein with aspartyl-isoleucyl-deca(aspartic acid), dimer (493-493':496-496')-bisdisulfide

efrilacedase alfa (126)
human angiotensin-converting enzyme 2 (ACE2, angiotensin-converting enzyme homolog, ACEH, ACE-related carboxypeptidase, metalloprotease MPROT15, EC:3.4.17.23), [PPNQPPVS (716-723)>del]-soluble extracellular domains (1-715), fused with a C-terminal Fc fragment (229-peptide) of *Homo sapiens* immunoglobulin G4 [*Homo sapiens* IGHG4*01 (hinge S^{725}>P (716-727), CH2 (728-837), CH3 (838-942), CHS (943-944))](716-944), dimer (723-723':726-726')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

reveglucosidase alfa (111)
des-(2-7)-human insulin-like growth factor II fusion protein with glycyl-L-alanyl-L-prolyl-human lysosomal alpha-glucosidase (acid maltase, aglucosidase alfa) produced in Chinese hamster ovary (CHO) cells, glycoform alfa

senrebotase (107)
L-methionylglycyl-L-seryl-des-(445-glycine,446-L-tyrosine)-[2-L-glutamic acid,432,442,444,447-tetra-L-aspartic acid]botulinum neurotoxin A precursor 27-L-alanine variant light chain (433-41')-disulfide with [14-L-arginine,15-L-lysine]human nociceptin fusion protein with L-alanyl-L-leucyl-L-alanyltris(tetraglycyl-L-seryl)-[3-L-valine,4-L-leucine,5-L-glutamine-418-L-leucine,419-L-aspartic acid]botulinum neurotoxin A heavy chain-(1-419)-peptide

tralesinidase alfa (117)
human α-*N*-acetylglucosaminidase fused to truncated human insulin-like growth factor II (IGF2) via a peptide linker, produced in Chinese hamster ovary (CHO) cells, glycoform alfa;
human α-*N*-acetylglucosaminidase (NAG, EC 3.2.1.50) (1-720) fusion protein with glycyl-L-alanyl-L-prolyltriglycyl-L-seryl-bis(L-prolyl-L-alanyl-L-prolyl-L-alanyl-L-prolyl-L-threonyl)-bis(L-prolyl-L-alanyl)-triglycyl-L-prolyl-L-serylglycyl-L-alanyl-L-prolyl-[37-L-alanine(R^{37}>$A_{(781)}$)]human insulin-like growth factor II (somatomedin-A, T3M-11-derived growth factor, IGF-II) (8-67)-peptide (752-811), produced in Chinese hamster ovary (CHO) cells, glycoform alfa

-bep

dazodalibep (123)
[tenascin (785-869)-peptide (1-85) (containing a third fibronectin type III domain), engineered for binding to the CD40 ligand (CD40L)]-[G_{15} linker (86-100)]-[tenascin (780-869)-peptide (101-190) (containing a third fibronectin type III domain), engineered for binding to the CD40

[20] INN selected before the implementation of the *ef-* suffix.

ligand (CD40L)]-[G_{10} linker (91-100)]-[(C^{34}>S)-human serum albumin (HSA)] fusion protein, produced in *Escherichia coli*

ensovibep (124)

^{127}GSPTPTPTTPTPTPTTPTPTPT^{148} to 149-274), fused via peptidyl linker ^{275}GSPTPTPTTPTPTPTTPTPTPT^{296} to three engineered ankyrin repeats-containing binding protein domains anti-(three different epitopes of the SARS-CoV-2 spike glycoprotein) (297-455 fused via peptidyl linker ^{456}GSPTPTPTTPTPTPTTPTPTPT^{477} to 478-636 in turn fused via peptidyl linker ^{637}GSPTPTPTTPTPTPTTPTPTPT^{658} to 659-817), produced in *Escherichia coli;* fusion protein comprising five engineered protein-binding ankyrin repeat protein domains: two identical human serum albumin (HSA)-binding 126-peptides 1-126 and 149-274 plus three different 159-peptides 297-455, 478-636 and 659-817 that bind to three different epitopes of the spike glycoprotein (S protein, S1S2 protein) of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), connected by four GS$(PT)_3$T$(PT)_3$T$(PT)_3$ 22-peptide linkers 127-148, 275-296, 456-477 and 637-658, produced in *Escherichia coli*

lerodalcibep (123)

human fibronectin tenth type III domain variant anti-[human PCSK9 (pro-protein convertase subtilisin/kexin type 9, neural apoptosis-regulated convertase 1, NARC-1, proprotein convertase 9, PC9)] (1-96) fused via a $(GS)_3$ peptide linker (97-102) with [Cys^{34}>Ala (136)]-human serum albumin (HSA) (103-687), produced in Chinese hamster ovary (CHO) cells, non-glycosylated

taldefgrobep alfa (121)

human immunoglobulin G1 Fc fragment (1-225) fused via a peptidyl linker (226-243) to a human fibronectin tenth type III domain variant anti-[human myostatin (MSTN, growth differentiation factor 8, GDF8)](244-340), dimer, produced in Chinese hamster ovary (CHO) cells, glycoform alfa; gamma1 chain H-CH2-CH3 fragment [*Homo sapiens* IGHG1*01 (CH2 (11-120), CH3 (121-225))] (1-225); dimer (6-6':9-9')-bisdisulfide-linker (226-243)-human fibronectin tenth type III domain fibronectin variant anti-[human myostatin (MSTN, growth differentiation factor 8, GDF8)] (244-340), produced in Chinese hamster ovary (CHO) cells, glycoform alfa

-cept

abatacept (91)

1-25-oncostatin M (human precursor) fusion protein with CTLA-4 (antigen) (human) fusion protein with immunoglobulin G1 (human heavy chain fragment), bimolecular (146→146')-disulfide

acazicolcept (124)

[N^{52}>H, N^{57}>Y, Q^{100}>R] human inducible T-cell co-stimulator ligand (ICOS ligand, ICOSL, CD275) N-terminal fragment (1-122) fused via a $(G_4S)_2$ linker (123-132) to a human immunoglobulin G1 C-terminal K>del Fc fragment (133-363) [*Homo sapiens* IGHG1*01; hinge 133-147; CH2 148-257 (L151A, L152E, G154A); CH3 258-362; CHS 363], dimer (143-143':146-146')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

aflibercept (96)

des-432-lysine-[human vascular endothelial growth factor receptor 1-(103-204)-peptide (containing Ig like C2 type 2 domain) fusion protein with human vascular endothelial growth factor receptor 2-(206-308)-peptide (containing Ig like C2 type 3 domain fragment) fusion protein with human immunoglobulin G1-(227 *C*-terminal residues)-peptide (Fc fragment)], (211-211':214-214')-bisdisulfide dimer

alefacept (84)

1-92-antigen LFA-3 (human) fusion protein with human immunoglobulin G1 (hinge-C_H2-C_H3 γ1-chain), dimer

asunercept (114)

fusion protein for immune applications (FPIA) comprising the *Homo sapiens* FAS (Fas cell surface death receptor, TNFRSF6, tumor necrosis factor receptor (TNFR) superfamily member 6, FAS1, APO-1, CD95) extracellular domain, fused with Homo sapiens immunoglobulin G1 Fc fragment;
Homo sapiens FAS precursor fragment 26-172 (1-147) -gamma1 chain H-CH2-CH3 fragment [Homo sapiens IGHG1*03 (hinge 5-15 (148-158), CH2 (159-268), CH3 (269-373), CHS (374-375))] (148-375); dimer (148-148':154-154':157-157')-trisdisulfide

atacicept (95)

[86-serine,101-glutamic acid,196-serine,197-serine,222-aspartic acid,224-leucine][human tumor necrosis factor receptor superfamily member 13B-(30-110)-peptide (TACI fragment containing TNFR-Cys 1 and TNFR-Cys 2) fusion protein with human immunogobulin G1-(232 *C*-terminal residues)-peptide (γ1-chain Fc fragment), (92-92':95-95')-bisdisulfide dimer

baminercept (99)

human tumor necrosis factor receptor superfamily member 3 (lymphotoxin-β receptor, TNF C receptor)-(2-195)-peptide (fragment of extracellular domain) fusion protein with human immunoglobulin heavy constant γ1 chain Fc fragment [227 residues, hinge (195-205) des-(1-4),C5>V, CH2 (206-315), CH3 (316-421) des-K^{107}]

batiraxcept (123)

[G^{14}>S(7), A^{54}>V(47), D^{69}>G(62), V^{74}>A(67), G^{109}>R(102)] human AXL receptor tyrosine kinase (AXL oncogene, tyrosine-protein kinase receptor UFO) (8-202)-peptide (1-195), fused via a G_4S linker (196-200) to a human immunoglobulin G1 C-terminal K>del Fc fragment (201-426), dimer (206-206':209-209')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

belatacept (93)

[Tyr^{29},Glu^{104},Gln^{125},Ser^{130},Ser^{136},Ser^{139},Ser^{148}](antigen CTLA-4 human-3-126]-peptide (fragment containing the human extracellular domain) fusion protein with immunoglobulin G1-[233 amino acids from the C-terminal of the heavy chain]-peptide (fragment containing the human monoclonal Fc domain), bimolecular (120→120')-disulfide

briobacept (98)

aspartyl[1-valine,20-asparagine,27-proline](human tumor necrosis factor receptor superfamily member 13C (BAFF receptor, BlyS receptor 3 or CD268 antigen)-(1-71)-peptidyl (part of the extracellular domain))valyl(human immunoglobulin G1 Fc fragment, *Homo sapiens* IGHG1-(104-329)-peptide) (79-79':82-82')-bisdisulfide dimer

conbercept (105)

fusion protein for immune applications (FPIA) comprising *Homo sapiens* FLT1 (fms-related tyrosine kinase 1, vascular endothelial growth factor receptor 1, VEGFR1, vascular permeability factor receptor, tyrosine-protein kinase FRT) fragment, fused with *Homo sapiens* KDR (kinase insert domain receptor, vascular endothelial growth factor receptor 2, VEGFR2, protein-tyrosine kinase receptor FLK1, CD309) fragment, fused with *Homo sapiens* immunoglobulin G1 Fc fragment;
FLT1, 132-232 precursor fragment (1-101)-KDR, 227-421 precursor fragment (102-296) -glycyl-prolyl-glycyl (297-299) -gamma1 chain H-CH2-CH3 fragment (300-526) [*Homo sapiens* IGHG1*03 hinge 6-15 P13>L (307) (300-309), CH2 (310-419), CH3-CH-S (420-526)]; (305-305':308-308')-bisdisulfide dimer

dalantercept (105)

fusion protein for immune applications (FPIA) comprising *Homo sapiens* ACVRL1 (activin A receptor type II-like 1, activin receptor-like kinase 1, ALK1, ALK-1, serine/threonine-protein kinase receptor R3, SKR3, transforming growth factor-beta superfamily receptor type I, TGF-B superfamily receptor type I, TSR-I, HHT2, ORW2) fragment, fused with *Homo sapiens* immunoglobulin G1 Fc fragment;

ACVR2L1, 22-120 precursor fragment (1-99) -threonyl-triglycyl (100-103) -gamma1 chain H-CH2-CH3 fragment (104-328) [*Homo sapiens* IGHG1*03 hinge 8-15 (104-111), CH2 L1.3>A (115), G1>A (118), A115>V (211) (112-221), CH3 S85.3>P (284) (222-328)]; (107-107':110-110')-bisdisulfide dimer

davoceticept (125)

Homo sapiens T-lymphocyte activation antigen CD80 [CD80, activation B7-1 antigen, CTLA-4 (cytotoxic T-lymphocyte antigen 4) counter-receptor B7.1, B7, BB1] (1-107)-fragment [H^{18}>Y, A^{26}>E, E^{35}>D, M^{47}>L, V^{68}>M, A^{71}>G, D^{90}>G]-variant, fused via a GSG_4S peptide linker (108-114) to a human immunoglobulin G1 heavy chain constant fragment (Fc) (115-345) [*Homo sapiens* IGHG1*01; hinge: 115-129 (C^{119}>S); CH2: 130-239 (L^{133}>A, L^{134}>E, G^{136}>A); CH3: 240-344; CHS: 345-345 (K346del)]; dimer (125-125:128-128')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

etanercept (81)

1-235-tumor necrosis factor receptor (human) fusion protein with 236-467-immunoglobulin G1 (human γ1-chain Fc fragment), dimer

evorpacept (126)

human signal-regulatory protein alpha (SIRPα, tyrosine-protein phosphatase non-receptor type substrate 1, inhibitory receptor SHPS-1) [V^{6}>I, A^{27}>I, I^{31}>F, K^{53}>R, H^{56}>P, L^{66}>T, N^{80}>A]-mutant, N-terminal (1-119)-fragment [binding domain for CD47 (inhibitor of phagocytosis by macrophages)], fused to a human immunoglobulin G1 C-terminal Fc fragment (CH2-CH3-CHS domains) [*Homo sapiens* IGHG1*03 (hinge (120-129, N-terminal hinge residues EPKSC deleted), CH2 L^{133}>A, L^{134}>A, G^{136}>A, N^{196}>A (130-239), CH3 (240-344), CHS K^{346}>del (345))] (120-345), dimer (125-125':128-128')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

goflikicept (124)

fusion protein comprising the (1-338)-fragment of the human interleukin 1 receptor accessory protein (IL1RAP, IL-1RAcP, interleukin-1 receptor 3, IL1R3), a GSGGG linker (339-343), and the (S>C^{477}, T>W^{489}, K>A^{532}) variant of the C-terminal 227-peptide (Fc fragment) of human immunoglobulin G1 (344-570), (349-324':352-327':477-447')-trisdisulfide with a fusion protein comprising the (21-333)-fragment of the precursor of human interleukin 1 receptor type 1 (IL1R1, IL1Rα, IL1R type I, p80, CD121a) (1-313), a GSGGG linker (314-318), and the (Y>C^{447}, T>S^{464}, L>A^{466}, F>K^{503}, Y>V^{505}) variant of the C-terminal 227-peptide (Fc fragment) of human immunoglobulin G1 (319-545), produced in Chinese hamster ovary (CHO) cells, glycoform alfa

inbakicept (120)

interleukin 15 receptor subunit alpha (human IL15Rα) (1-65)-peptide (sushi domain-containing) fusion protein with human immunoglobulin G1 Fc fragment (232 C-terminal residues) (66-297) [*Homo sapiens* IGHG1*01, hinge (71-80), CH2 (81-190), CH3 (191-295), CHS (296-297)], (76-76':79-79')-bisdisulfide dimer, produced in Chinese hamster ovary (CHO) cells

ipafricept (109)

fusion protein for immune applications (FPIA) comprising *Homo sapiens* FZD8 (frizzled family receptor 8, Frizzled-8) extracellular domain, fused with *Homo sapiens* immunoglobulin G1 Fc fragment;

Homo sapiens FZD8 precursor fragment 28-158 (1-131) -*Homo sapiens* IGHG1*01 H-CH2-CH3 fragment (hinge 1-15 C5>S (136) (132-146), CH2 (147-256), CH3 (257-361), CHS (362-363)) (132-363); dimer (142-142':145-145')-bisdisulfide

lenercept (72)

1-182-tumor necrosis factor receptor (human reduced), (182→104')-protein with 104-330-immunoglobulin G1 (human clone pTJ5 Cγ 1 reduced)

luspatercept (110)

fusion protein for immune applications (FPIA) comprising the *Homo sapiens* ACVR2B (activin receptor type 2B, activin A receptor type IIB, activin receptor type IIB, ACTR-IIB, ActR-IIB) extracellular domain, fused with *Homo sapiens* immunoglobulin G1 Fc fragment;
Homo sapiens ACVR2B precursor fragment 25-131 L79>D (55) (1-107) -linker triglycyl (108-110) -gamma1 chain H-CH2-CH3 fragment [*Homo sapiens* IGHG1*03 (hinge 8-15 (111-118), CH2 (119-228), CH3 (229-333), CHS (334-335))] (111-335); dimer (114-114':117-117')-bisdisulfide

maplirpacept (127)

human signal-regulatory protein alpha (SIRPα, tyrosine-protein phosphatase non-receptor type substrate 1, inhibitory receptor SHPS-1), natural [L^{14}>S, T^{20}>S, T^{22}>I, R^{24}>H, A^{27}>V, G^{45}>A, D^{65}>E, L^{66}>S, N^{70}>E, R^{77}>S, G^{79}>S, D^{101}>del, V^{102}>T^{101}]-variant, N-terminal (1-118)-fragment [binding domain for CD47 (inhibitor of phagocytosis by macrophages)], fused to a C-terminal Fc fragment of human immunoglobulin G4 (119-347), IGHG4*01; hinge 119-130 [S^{128}>P]-variant; CH2 131-240; CH3 241-345; CHS 346-347; dimer (126-126':129-129')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

olamkicept (116)

extracellular domains of glycoprotein 130 (gp130) fused to human immunoglobulin G1 Fc fragment, covalent dimer, produced in Chinese hamster ovary (CHO) cells;
human interleukin-6 receptor subunit beta (IL-6RB, interleukin-6 signal transducer, membrane glycoprotein 130, CD130 antigen) precursor-(23-617)-peptide fusion protein with [19-L-alanine(L>A(609)),20-L-α-glutamic acid(L>E(610)),22-L-alanine(G>A(612))]human immunoglobulin G1*03 Fc fragment-(6-232)-peptide, dimer (601-601':604-604')-bisdisulfide

opinercept (118)

human tumor necrosis factor receptor-2 extracellular domain (1-235) fused to a fragment of immunoglobulin G1 consisting of the Fc portion and hinge region (236-467), dimer, produced in Chinese hamster ovary (CHO) cells, glycosylated

povetacicept (127)

human TACI (transmembrane activator and CAML interactor, tumor necrosis factor receptor superfamily member 13B, TNFRSF13B, CD267) receptor domain 68-110 fragment (K^{77}>E^{10}, F^{78}>Y^{11}, Y^{102}>D^{35})-mutant (1-43), fused via a GSG_4S peptide linker (44-50) with 232 C-terminal residues of a mutated human immunoglobulin G1 gamma1 heavy chain (51-281) [Homo sapiens IGHG1*01, hinge C^{55}>S (51-65), CH2 L^{69}>A, L^{70}>E, G^{72}>A (66-175), CH3 (176-280), CHS K^{282}>del (281)], (61-61':64-64')-bisdisulfide dimer, produced in Chinese hamster ovary (CHO)-K1 GS cells, glycoform alfa

ramatercept (108)

fusion protein for immune applications (FPIA) comprising *Homo sapiens* ACVR2B (activin A receptor type IIB, ActR-IIB) fragment, fused with *Homo sapiens* immunoglobulin G1 Fc fragment;
Homo sapiens ACVR2B precursor fragment 20-134 (1-115) –triglycyl (116-118) -*Homo sapiens* IGHG1*03 H-CH2-CH3 fragment (hinge 8-15 (119-126), CH2 A115>V (226) (127-236), CH3 (237-341), CHS (342-343)) (119-343); dimer (122-122':125-125')-bisdisulfide

rilonacept (95)

[653-glycine][human interleukin-1 receptor accessory protein-(1-339)-peptide (extracellular domain fragment) fusion protein with human type 1 interleukin-1 receptor-(5-316)-peptide (extracellular domain fragment) fusion protein with human immunoglobulin G1-(229 *C*-terminal residues)-peptide (Fc fragment)], (659-659':662-662')-bisdisulfide dimer

sotatercept (104)

fusion protein for immune applications (FPIA) comprising *Homo sapiens* ACVR2A (activin receptor type 2A, activin receptor type IIA) fragment fused with *Homo sapiens* immunoglobulin G1 Fc fragment;

Homo sapiens ACVR2A, 21-135 precursor fragment (1-115) -threonyl-triglycyl linker (116-119) -gamma1 chain H-CH2-CH3 fragment (120-344) [*Homo sapiens* IGHG1*03 hinge (120-127), CH2, A115>V (227) (128-237), CH3 (238- 344)]; (123-123':126-126')-bisdisulfide dimer

sozinibercept (126)

[N^{80}>Q]-human vascular endothelial growth factor receptor 3 (VEGFR3, Fms-like tyrosine kinase 4, FLT-4, tyrosine-protein kinase receptor FLT4, EC:2.7.10.1) (1-305)-peptide fragment (containing the immunoglobulin-like C2-type domains 1, 2 and 3), fused with a human immunoglobulin G1 C-terminal 232-peptide Fc fragment (CH2-CH3-CHS domains) [*Homo sapiens* IGHG1*01 (hinge (306-320), CH2 (321-430), CH3 (431-535), CHS (536-537))] (306-537), dimer (310-310':316-316':319-319')-trisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

telitacicept (120)

[L^{120}>A,L^{121}>E,G^{123}>A,A^{216}>S,P^{217}>S]-TACI (transmembrane activator and CAML interactor, tumor necrosis factor receptor superfamily protein TNFRSF13B) human extracellular domain fragment (13-118)-peptide (1-106) fusion protein with human immunoglobulin G1-(227 C-terminal residues)-peptide (γ1-chain Fc fragment) (107-333) [*Homo sapiens* IGHG1*01, hinge (107-116), CH2 L^{120}>A, L^{121}>E, G^{123}>A, A^{216}>S, P^{217}>S (117-226), CH3 (227-331), CHS (332-333)], (112-112':115-115')-bisdisulfide dimer, produced in Chinese hamster ovary (CHO) cells

tulinercept (116)

human tumor necrosis factor receptor superfamily member 1B (TNF receptor 2, TNF receptor II, p75, p80 TNF-alpha receptor, CD120b antigen)-(1-235)-peptide (extracellular domain), fusion protein with heavy chain constant region of the human immunoglobulin gamma1*03-(99-330)-peptide (Fc fragment) (236-467), fusion protein with C-terminal endoplasmic reticulum hexapeptide Ser-Glu-Lys-Asp-Glu-Leu; dimer (240-240':246-246':249-249')-trisdisulfide, produced in *Nicotiana tabacum* Bright Yellow-2 cells

-cept & -tox[21] *(-tox is for active toxins)*

alvircept sudotox (69)

N[2]-L-methionyl-1-178-antigen CD4 (human clone pT4B protein moiety reduced)(178→248')-protein with 248-L-histidine-249- L-methionine-250- L-alanine-251- L-glutamic acid-248-613-exotoxin A(*Pseudomonas aeruginosa* reduced)

-cog

efanesoctocog alfa (122)

human coagulation factor VIII (FVIII, antihemophilic factor, AHF, procoagulant component) with replaced B-domain (746-1648)-sequence [FVIII domains A1-a1-A2-a2 (1-740) and N-terminal B-domain fragment (741-745), fused via a synthetic 291-peptide linker of 24 repeating 12-peptides (4 types) (746-1033) plus tripeptide ASS (1034-1036) to the FVIII C-terminal (1649-2332)-domains a3-A3-C1-C2 (1037-1720)], fused to a human immunoglobulin G1 C-terminal K>del Fc fragment (1721-1946), (1726-663':1729-666')-bisdisulfide with the TIL3-D3-TIL4 domain-containing fragment 742-1218 of the human von Willebrand factor (1'-477') [(C1077>A336',C1120>A379')-mutant] fused via a synthetic 148-peptide linker of 12 repeating 12-peptides (4 types) plus tetrapeptide GASS (478'-625') to a thrombin cleavable FVIII fragment 712-743 (626'-657') [thrombin-cleavable acidic region 2 plus B3 domain (1-3)-peptide] fused to a human immunoglobulin G1 C-terminal K>del Fc fragment (658'-883'), produced in human embryonic kidney 293 (HEK293) cells, glycoform alfa

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[21] The names and the descriptions of toxins are published in Annex 4.1 of "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".

efmoroctocog alfa (111)

recombinant DNA derived (1-742)-(1637-2332)-human blood coagulation factor VIII fusion protein with immunoglobulin G1 Fc domain fragment, produced in HEK293H cells, glycoform alfa:
des-(743-1636)-human blood coagulation factor VIII (antihemophilic factor, procoagulant component) fusion protein with human immunoglobulin G1 Fc fragment (IGHG1*01 H-CH2-CH3)-(6-231)-peptide (1444-6':1447-9')-bisdisulfide with human immunoglobulin G1 Fc fragment (IGHG1*01 H-CH2-CH3)-(6-231)-peptide

eftrenonacog alfa (109)

recombinant DNA derived human blood coagulation factor IX fusion protein with one Fc fragment of the human immunoglobulin G1 Fc fragment dimer, produced in HEK293H cells (glycoform alfa):
human blood coagulation factor IX (EC 3.4.21.22, Christmas factor, plasma thromboplastin component) variant 148-T, fusion protein with human immunoglobulin G1 Fc fragment (IGHG1*01 H-CH2-CH3)-(6-231)-peptide (421-6':424-9')-bisdisulfide with human immunoglobulin G1 Fc fragment (IGHG1*01 H-CH2-CH3)-(6-231)-peptide

-ermin

efaprinermin alfa (120)

tumor necrosis factor ligand superfamily protein TNFSF18 (human) extracellular (71-199)-peptide trimer [three fused copies (1-129, 130-258, 259-387)] fusion protein with immunoglobulin G1 (human) Fc fragment (227 C-terminal residues) (388-614), natural [D^{523}>E,L^{525}>M] variant [*Homo sapiens* IGHG1*03, hinge (388-397), CH2 (398-507), CH3 (508-612), CHS (613-614)], (393-393',396-396')-bisdisulfide dimer, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

efgivanermin (120)

immunoglobulin γ1 chain Fc fragment [*Homo sapiens* IGHG1*03 {hinge 1,4-del, C^{5}>L(1), CH2 (12-121), CH3 (122-226), CHS (227-228)}-(1-228)] fusion protein with pentakis(tetraglycyl-L-seryl)[*Homo sapiens* coronin-1A precursor (tryptophan aspartate-containing coat protein, TACO) fragment 430-461 (254-285)]-(229-285) fusion protein with tetraglycyl[*Homo sapiens* tumor necrosis factor ligand superfamily member 18 (glucocorticoid-induced TNF-related ligand) [183-Asn(D>N)]precursor fragment 72-199 (289-417)]-(286-417); hexamer stabilized with hexakisdisulfide bridges between 12 cysteines at position 7 and 10; produced in Chinese hamster ovary (CHO) cells, glycoform alfa

efruxifermin (124)

L-methionyl-immunoglobulin G1 (*Homo sapiens*) γ1-chain C-terminal 227-peptide Fc fragment (1-228) [*Homo sapiens* IGHG1*1; hinge 1-11; CH2 12-121; CH3 122-226; CHS 227-228] fused with the peptide linker $(G_4S)_3$ (229-243) and [L^{98}>R^{341}, P^{171}>G^{414}, A^{180}>E^{423}]-fibroblast growth factor 21 (*Homo sapiens* FGF-21) (244-424), dimer (7-7':10-10')-bisdisulfide, non-glycosylated, produced in *Escherichia coli*

rilunermin alfa (126)

human tumor necrosis factor ligand superfamily member 10 (TNFSF10, TNF-related apoptosis-inducing ligand, TRAIL, apo-2 ligand, apo-2L, CD253), extracellular (111-281)-peptide (1-171), [S^{111}>L^{1}, P^{112}>K^{2}]-variant, fused via a glycylseryl dipeptide linker (172-173) with the C-terminal (1156-1464)-peptide (174-482) [D^{1219}>N^{237}]-variant of the human collagen α-1(I) chain (α-1 type I collagen, COL1A1), trimer (283-300':283'-300":283"-300)-trisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

tengonermin (118)

human tumor necrosis factor (7-163) fused at the N-terminus to a peptide (1-6) ligand of the human CD13 antigen, trimer, produced in *Escherichia coli*;
l-cysteinyl-L-asparaginylglycyl-L-arginyl-L-cysteinylglycyl (1-6, CNGRCG, ligand of the human CD13 antigen)-human tumor necrosis factor soluble form (7-163), non-covalent trimer, produced in *Escherichia coli*

-imod

blisibimod (107)[22]

B-cell activating factor (BAFF)-binding peptide fragment/human IgG1 Fc fusion protein; glycyl-L-cysteinyl-L-lysyl-L-tryptophyl-{[29-isoleucine(V>I),30-lysine(R>K),31-glutamine(H>Q)]human tumor necrosis factor receptor superfamily member 13C (BAFF receptor, CD268)-(26-31)-peptidyl}-L-tryptophyl-L-valyl-L-cysteinyl-L-aspartyl-L-prolyl-L-leucylglycyl-L-serylglycyl-L-seryl-L-alanyl-L-threonylglycylglycyl-L-serylglycyl-L-seryl-L-threonyl-L-alanyl-L-seryl-L-serylglycyl-L-serylglycyl-L-seryl-L-alanyl-L-threonyl-L-histidyl-L-methionyl-L-leucyl-L-prolylglycyl-L-cysteinyl-L-lysyl-L-tryptophyl-{[29-isoleucine(V>I),30-lysine(R>K),31-glutamine(H>Q)]human tumor necrosis factor receptor superfamily member 13C (BAFF receptor, CD268)-(26-31)-peptidyl}-L-tryptophyl-L-valyl-L-cysteinyl-L-aspartyl-L-prolyl-L-leucylpentaglycyl-L-valyl-(human immunoglobulin heavy constant gamma 1 Fc-(6-232)-peptide) dimer (69-69':72-72')-bisdisulfide

efizonerimod alfa (117)

modified human immunoglobulin G4 Fc fragment fused to tumor necrosis factor receptor-associated factor TRAF2 (human C-C domain fragment) and to the CD252 antigen (human extracellular domain fragment), hexamer, produced in Chinese hamster ovary (CHO) cells, glycoform alfa;
modified human immunoglobulin G4 Fc fragment (1-229) [*Homo sapiens* IGHG4*01 del-CH1, [10-proline (S>P)]hinge] fusion protein with human TNF receptor-associated factor2 (TRAF2)-(310-349)-peptide (230-269) fusion protein with des-(1-50)-human tumor necrosis factor ligand superfamily member4 (TNFSF4, also known as CD252 or OX40L) (270-402), produced in Chinese hamster ovary (CHO) cells, non-covalent trimer of (8-8',11-11')-bisdisulfide dimers, glycoform alfa

efprezimod alfa (125)

human signal transducer CD24 (CD24, CD24A, heat stable antigen CD24, small cell lung carcinoma cluster 4 antigen) (1-30)-peptide fused with a human immunoglobulin G1 C-terminal Fc (heavy chain constant fragment) (31-261) [*Homo sapiens* IGHG1*01; hinge: 31-44 (E30del); CH2: 45-154; CH3: 155-259; CHS: 260-261]; dimer (40-40':43-43')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

eftilagimod alfa (116)

human lymphocyte activation gene 3 protein extracellular domains fused to human immunoglobulin G1 Fc fragment through a linker peptide, covalent dimer, produced in Chinese hamster ovary (CHO) cells, glycoform alfa;
human lymphocyte activation gene 3 protein (LAG-3, protein FDC, CD223 antigen) precursor-(23-434)-peptidyltetrakis(l-α-aspartyl)-L-lysylbis(glycyl-L-seryl)glycylFc fragment of human immunoglobulin heavy constant G1*01, dimer (427-427':433-433':436-436')-trisdisulfide

efzofitimod (125)

L-methionyl human immunoglobulin G1 Fc (1-228) fused to the (2-60)-peptide of human histidine–tRNA ligase, dimer: L-methionyl-immunoglobulin G1 (*Homo sapiens*) γ1-chain C-

[22] INN selected before the implementation of the *ef-* suffix.

terminal 227-peptide Fc fragment (1-228) [*Homo sapiens* IGHG1*01; hinge: 1-11; CH2: 12-121; CH3: 122-226; CHS: 227-228] fused with the (2-60)-peptide (neuropilin-2-binding domain, HARS iMod domain, WHEP-TRS domain) (229-287) of human cytoplasmic histidine–tRNA ligase (histidyl-tRNA synthetase, HisRS, HRS, HARS1, HARS, EC:6.1.1.21), dimer (7-7':10-10')-bisdisulfide, non-glycosylated, produced in *Escherichia coli*

-kin

efavaleukin alfa (118)
immunoglobulin G1 γ1-chain C-terminal constant region fragment (Fc) (1-226 without C-terminal Lys, N77G,D136E,L138M variant)-G4S linker (227-231)-human interleukin 2 (232-364, V322K,C356A variant) fusion protein, dimer disulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

efineptakin alfa (118)
Met-Gly-Met (1-3)-human interleukin 7 (4-155) fused to an antibody hybrid fragment (hyFc) consisting of human immunoglobulin D (IgD) hinge and N-terminal CH2 regions (156-193) and human immunoglobulin G4 (IgG4) C-terminal CH2 and complete CH3 regions (194-400), dimer disulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

eflepedocokin alfa (124)
human interleukin 22 (IL22, cytokine Zcyto18, IL10-related T-cell-derived inducible factor, IL-TIF) (1-146), fused via a GSG3S(G4S)2 peptide linker (147-162) to a human immunoglobulin G2 C-terminal Fc fragment (163-385), P269>S-mutant S316>A-variant, dimer (165-165':168-168')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

efmarodocokin alfa (122)
human interleukin 22 (IL22, cytokine Zcyto18, IL10-related T-cell-derived inducible factor, IL-TIF) (1-146), fused to a human immunoglobulin G4 C-terminal Fc fragment (147-377), S^{158}>P, N^{227}>G-mutant; dimer (156-156':159-159')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

melredableukin alfa (126)
human immunoglobulin G1 non-binding variant (heavy chain 1-444, L^{232}>A, L^{233}>A, P^{327}>G) fused at the C-terminus of the heavy chain via peptidyl linker ^{445}GGGGSGGGGSGGGGS^{459} to human interleukin 2 (1-**133**, 460-592 in the current sequence) variant (T^{3}>A^{462}, N^{88}>D^{547}, C^{125}>A^{584}), dimer, produced in Chinese hamster ovary (CHO) cells, glycoform alfa;
human non-binding immunoglobulin G1 kappa (IgG1-κ) fused via a peptide linker to a mutated human interleukin 2 (IL2 mutein): fusion protein combining a gamma1 heavy chain (1-444) [*Homo sapiens* IGHV3-23*01; *Homo sapiens* IGHJ4*01; *Homo sapiens* IGHG1*01; VH: 1-115; CH1: 116-213; hinge: 214-228; CH2: 229-338 (L^{232}>A, L^{233}>A, P^{327}>G); CH3: 339-443; CHS: 444-444 (K445del); CDR Kabat H1: SYAMS (31-35); CDR Kabat H2: AISGSGGSTYYADSVKG (50-66); CDR Kabat H3: GSGFDY (99-104)], a $(G_4S)_3$ peptide linker (445-459), and *Homo sapiens* interleukin 2 (460-592) [T^{3}>A^{462}, N^{88}>D^{547}, C^{125}>A^{584}]-variant, (218-215')-disulfide with kappa light chain (1'-215') [*Homo sapiens* IGKV3-20*01; *Homo sapiens* IGKJ1*01; *Homo sapiens* IGKC*01; VL: 1-108; CL: 109-215; CDR Kabat L1: RASQSVSSSYLA (24-35); CDR Kabat L2: GASSRAT (51-57); CDR Kabat L3: QQYGSSPLT (90-98)]; dimer (224-224":227-227")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

nemvaleukin alfa (123)
human interleukin 2 (IL-2) (75-133)-peptide [$Cys^{125(51)}$>Ser]-mutant (1-59), fused via a G_2 peptide linker (60-61) to human interleukin 2 (IL-2) (4-74)-peptide (62-132) and via a GSG_3S peptide linker (133-138) to human interleukin 2 receptor α-chain (IL2R subunit alpha, IL2Rα, IL2RA) (1-165)-peptide (139-303), produced in Chinese hamster ovary (CHO) cells, glycoform alfa

-kin & -tox[23]

cintredekin besudotox (92)
toxin hIL13-PE38QQR (plasmid phuIL13-Tx)

denileukin diftitox (122)
N-L-methionyl-387-L-histidine-388-L-alanine-1-388-toxin (*Corynebacterium diphtheriae* strain C7) (388→2')-protein with 2-133-interleukin 2 (human clone pTlL2-21a)

-mab & -kin

cergutuzumab amunaleukin (113)
immunoglobulin G1-kappa fused to IL2 (interleukin 2), anti-[*Homo sapiens* CEACAM5 (carcinoembryonic antigen-related cell adhesion molecule 5, CEA, CD66e)], humanized monoclonal antibody fused to IL2;
gamma1 heavy chain (1-451) [humanized VH (*Homo sapiens* IGHV1-18*01 (82.70%) -(IGHD)-IGHJ6*01) [8.8.14] (1-121) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 (122-219), hinge (220-234), CH2 L1.3>A (238), L1.2>A (239), P114>G (333) (235-344), CH3 Y5>C (353), T22>S (370), L24>A (372), Y86>V (411) (345-449), CHS (450-451)) (122-451)], (224-215')-disulfide with kappa light chain (1'-215') [humanized V-KAPPA (*Homo sapiens* IGKV1-16*01 (82.10%) -IGKJ2*01) [6.3.10] (1'-108') -*Homo sapiens* IGKC*01, Km3 (109'-215')];
gamma1 heavy chain fused to IL2 (1"-598") [humanized VH (*Homo sapiens* IGHV1-18*01 (82.70%) -(IGHD)-IGHJ6*01) [8.8.14] (1"-121") -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 (122"-219"), hinge (220"-234"), CH2 L1.3>A (238"), L1.2>A (239"), P114>G (333") (235"-344"), CH3 S10>C (358"), T22>W (370"), (345"-449"), CHS K2>del (450")) (122"-450") -15-mer (tris(tetraglycyl-seryl)) linker (451"-465") -*Homo sapiens* IL2 (Pr21-153) T23>A (468"), F62>A (507"), Y65>A (510"), L92>G (547"), C145>A (590") (466"-598")], (224"-215'")-disulfide with kappa light chain (1'"-215'") [humanized V-KAPPA (*Homo sapiens* IGKV1-16*01 (82.10%) -IGKJ2*01) [6.3.10] (1'"-108'") -*Homo sapiens* IGKC*01, Km3 (109'"-215'")];
dimer (230-230":233-233")-bisdisulfide

amunaleukin
tris[(tetraglycyl)seryl]-[3-alanine(T>A18),42-alanine(F>A57),45-alanine(Y>A60),72-glycine(L>G87),125-alanine(C>A140)]human interleukin-2 (IL-2, T-cell growth factor, TCGF)

tucotuzumab celmoleukin (95)
immunoglobulin G1, anti-(tumor associated calcium signal transducer 1 (KS 1/4 antigen)) (human-mouse monoclonal huKS-IL2 heavy chain) fusion protein with interleukin 2 (human), disulfide with human-mouse monoclonal huKS-IL2 light chain, dimer

celmoleukin (65)
interleukin 2 (human clone pTlL2-21a, protein moiety)

-mab & -tox[24] *(-tox is for toxins (active or inactived proteins))*

anatumomab mafenatox (86)

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[23] The names and the descriptions of toxins are published in Annex 4.1 of "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".
[24] The names and the descriptions of toxins are published in Annex 4.1 of "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".

immunoglobulin G 1, anti-(human tumor-associated glycoprotein 72) (human-mouse clone pMB125 Fab fragment γ1-chain) fusion protein with enterotoxin A (227-alanine) (*Staphylococcus aureus*) complex with mouse clone pMB125 κ-chain)

citatuzumab bogatox (99)

immunoglobulin Fab fusion protein, anti-[*Homo sapiens* tumor-associated calcium signal transducer 1 (TACSTD1, gastrointestinal tumor-associated protein 2, GA733-2, epithelial glycoprotein 2, EGP-2, epithelial cell adhesion molecule Ep-CAM, KSA, KS1/4 antigen, M4S, tumor antigen 17-1A, CD326)], humanized Fab fused with *Bougainvillea spectabilis Willd* rRNA N-glycosidase [type I ribosome inactivating protein (RIP), bouganin], VB6-845; gamma1 heavy chain fragment (1-225) [hexahistidyl (1-6) -humanized VH from 4D5MOC-B (*Homo sapiens* FR/*Mus musculus* CDR, *Homo sapiens* IGHJ4*01, V124>L) [8.8.9] (7-122) -*Homo sapiens* IGHG1*01 CH1-hinge fragment EPKSC (123-225)], (225-219')-disulfide with kappa fusion chain (1'-481') [humanized V-KAPPA from clone 4D5MOC-B (*Homo sapiens* FR/*Mus musculus* CDR, *Homo sapiens* IGKJ1*01, I126>L) [11.3.9] (1'-112') -*Homo sapiens* IGKC*01 (113'-219') -12-mer furin linker (proteolytic cleavage spacer from Pseudomonas exotoxin A) (220'-231') -*Bougainvillea spectabilis Willd* bouganin fragment (27-276 from precursor, V354'>A, D358'>A, Y364'>N, I383'>A) (232'-481')]

dorlimomab aritox (66)

ricin A chain-antibody ST 1 F(ab')2 fragment immunotoxin

moxetumomab pasudotox (102)

immunoglobulin Fv fragment fused to *Pseudomonas* toxin, anti-[*Homo sapiens* CD22 (sialic acid-binding Ig-like lectin 2, Siglec-2, SIGLEC2, Leu-14, B-lymphocyte cell adhesion molecule, BL-CAM)], *Mus musculus* monoclonal antibody disulfide stabilized Fv fragment with the variable heavy VH domain fused with the truncated form PE38 of *Pseudomonas aeruginosa* exotoxin A (VH-PE38), disulfide linked with the variable kappa domain (V-KAPPA)];
VH-PE38 (1-476) comprising the VH domain (1-123) [methionyl -*Mus musculus* VH [(IGHV5-12-1*01 -(IGHD)-IGHJ3*01) [8.8.16] (2-123)] fused with a 7-mer linker (124-130) and with the *Pseudomonas aeruginosa* exotoxin A (ETA) PE38 fragment (131-476) [277-638 precursor fragment with del 389-405>N (131-476), containing domain II (131-243) with furin proteolytic cleavage site (152-164), domain Ib (244-267), domain III (268-476)], (45-101')-disulfide with V-KAPPA (1'-108') [methionyl -*Mus musculus* V-KAPPA [(IGHKV10-96*01 -IGKJ1*01) [6.3.9] (2'-108')]

nacolomab tafenatox (80)

immunoglobulin G1, anti-(human colorectal tumor antigen C242) Fab fragment (mouse monoclonal r-C242Fab-SEA clone pkP941 γ1-chain) fusion protein with enterotoxin A (*Staphylococcus aureus*), disulfide with mouse monoclonal r-C242Fab-SEA clone pkP941 κ-chain

naptumomab estafenatox (96)

immunoglobulin fragment, anti-[trophoblast glycoprotein (TPBG, 5T4)] monoclonal 5T4 gamma1 heavy chain fragment fusion protein [*Mus musculus* VH (5T4V14: H41>P, S44>G, I69>T, V113>G)-IGHG1_CH1)] - [Glycyl-Glycyl-Prolyl] - superantigen SEA/E-120 (synthetic), non-disulfide linked with monoclonal 5T4 kappa light chain [*Mus musculus* V-KAPPA (5T4V18: F10>S, T45>K, I63>S, F73>L, T77>S, L78>V, L83>A)-IGKC]

oportuzumab monatox (100)

immunoglobulin scFv fusion protein, anti-[*Homo sapiens* tumor-associated calcium signal transducer 1 (TACSTD1, gastrointestinal tumor-associated protein 2, GA733-2, epithelial glycoprotein 2, EGP- 2, epithelial cell adhesion molecule Ep-CAM, KSA, KS1/4 antigen, M4S1, tumor antigen 17-1A, CD326)] humanized monoclonal antibody scFv fused with *Pseudomonas aeruginosa* exotoxin A; hexahistidyl -humanized scFv [V-KAPPA (*Homo*

sapiens IGKV1- 39*01 (78%)- IGKJ1*01, I126>L) [11.3.9] (7-118) -26-mer linker -VH (*Homo sapiens* IGHV7-4-1*02 -(IGHD)-IGHJ4*01, V124>L) [8.8.9] (145-260)] -20-mer linker - *Pseudomonas aeruginosa* exotoxin A (ETA) [277-633 precursor fragment, containing domain II (281-393) with furin proteolytic cleavage site (302-313), domain Ib (394-433), domain III (434-637)] (281-637) -hexahistidyl-lysyl-aspartyl-glutamylleucyl

taplitumomab paptox (84)
immunoglobulin G1, anti-(human antigen CD19) (mouse monoclonal B43 γ1-chain), disulfide with mouse monoclonal B43 κ-chain, dimer, disulfide with protein PAP (pokeweed antiviral)

telimomab aritox (66)
ricin A chain-antibody T 101 Fab fragment immunotoxin

zolimomab aritox (80)
immunoglobulin G1, anti-(human CD5 (antigen) heavy chain) (mouse monoclonal H65-RTA γ1-chain), disulfide with mouse monoclonal H65-RTA light chain, dimer, disulfide with ricin (castor bean A-chain)

som-

efpegsomatropin (113)
recombinant human growth hormone (somatropin) and human immunoglobulin G4 Fc fragment dimer, produced in *Escherichia coli* (nonglycosylated), linked together with polyethylene glycol derivative linker:
$N^{\alpha.1}$,$N^{1.1'}$-[ω-(oxypropane-1,3-diyl)-α-(propane-1,3-diyl)poly(oxyethylene)] human growth hormone, human immunoglobulin G4 Fc fragment (IGHG4*01 H-CH2-CH3)-(9'-229')-peptide dimer (3'-3")-disulfide

eftansomatropin alfa (118)
human somatotropin (1-191) fused to a hybrid Fc consisting of human immunoglobulin D (IgD) hinge region, fused to the IgD N-terminal CH2 region (192-229), fused to the immunoglobulin G4 (IgG4) C-terminal CH2 region, fused to the IgG4 CH3 region (230-436), disulfide dimer, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

somavaratan (112)
rDNA derived human somatropin (growth hormone of 191 residues) fusion protein with a hydrophilic amino acid sequence* (913 residues) at the N-terminus and another** (146 residues) at the C-terminus, produced in Escherichia coli.
* starting with alanine plus 76 dodecapeptides: EPAGSPTSTEEG (AE3G2P2S2T2), three different sequences of AG3P2S4T2 and 72 of 4 different sequences of AE2G2P2S3T2
** starting with glycylglycine plus 12 dodecapeptides of 4 different sequences of AE2G2P2S3T2

-stim

efbemalenograstim alfa (121)
human granulocyte colony-stimulating factor (G-CSF) fragment fused via a peptidyl linker to a human immunoglobulin G2 Fc fragment variant, dimer:
[human granulocyte colony-stimulating factor (G-CSF, pluripoietin) short [V^{36},S^{37},E^{38}>del] isoform (1-174)]-[GSG3S(G4S)2 linker (175-190)]-[human immunoglobulin G2 Fc fragment (223 C-terminal residues) (*Homo sapiens* IGHG2*01 (natural S344>A variant); hinge (191-197), CH2 (P297>S) (198-306), CH3 (307-411), CHS (412-413)(191-413)] fusion protein, dimer (193-193':196-196')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

eflapegrastim (112)

human granulocyte colony-stimulating factor and human IgG4 Fc dimer linked together with polyethylene glycol derivative, produced in *Escherichia coli*:
$N^{\alpha.1}$,$N^{1.9'}$-[ω-(oxypropane-1,3-diyl)-α-(propane-1,3-diyl)poly(oxyethylene)] des-(1-L-alanine,37-39)-[18-L-serine(C>S),69-L-serine(P>S)]human granulocyte colony-stimulating factor (G-CSF, pluripoietin) (1-174)-peptide and des-(1-8)-human immunoglobulin G4 Fc fragment (IGHG4*01 H-CH2-CH3) (9'-229')-peptide dimer (11'-11")-disulfide

eflenograstim alfa (117)
human granulocyte-colony stimulating factor (G-CSF) fused to a hybrid human immunoglobulin consisting of the Fc fragment of the IgG4 fused to the hinge region and amino-terminus of the IgD heavy chain isotype 2, produced in Chinese hamster ovary (CHO) cells, glycoform alfa;
[human granulocyte-colony stimulating factor (G-CSF) short isoform (1-174)]-[immunoglobulin heavy chain delta (IGHD) constant region isoform 2 (133-170)-peptide (C-terminal hinge and N-terminal CH2 domains) (175-212)]-[immunoglobulin heavy chain gamma 4 (IGHG4) constant region (121-327)-peptide (CH2 and CH3 domains) (213-419)]-fusion protein, (203-203')-disulfide dimer, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

romiplostim (97)[25]
L-methionyl[human immunogloblin heavy constant gamma 1-(227 *C*-terminal residues)-peptide (Fc fragment)] fusion protein with 41 amino acids peptide, (7-7':10,10')-bisdisulfide dimer

-tide

cenderitide (105)
natriuretic peptide receptor type B (NPR-B) agonist;
human C-type natriuretic peptide-(32-53)-peptide (CNP-22) fusion protein with eastern green mamba (*Dendroaspis angusticeps*) natriuretic peptide-(24-38)-peptide

dulaglutide (103) [26]
glucagon-like peptide-1-immunoglobulin G4 fusion protein, [2-glycyl,16-L-glutamyl,30-glycyl][human glucagon-like peptide 1-(7-37)-peptide] {(8-A>G,22-G>E,36-R>G)-GLP-1(7-37)} fusion protein with tris(tetraglycyl-L-seryl)-L-alanine (linker) fusion protein with des-276-lysine-[57-L-proline,63-L-alanine,64-L-alanine]human immunoglobulin G4 Fc region {(10-S>P)-H-(4-F>A,5-L>A)-CH2-(107-K>-)-CH3 of IGHG4*01}, dimer (55-55':58-58')-bisdisulfide

efinopegdutide (118)
glucagon-like peptide-1 (GLP-1) analogue, conjugated by a 10 kDa polyethylene glycol (PEG) linker (n ~ 225) to an Fc portion dimer of human immunoglobulin G4 (IgG4):
$N^{1.1}$-{3-[ω-(3-{3-[(3*RS*)-3-({16,20-anhydro-[Ser^{2}>Aib,Ser^{16}>Glu,Arg^{17}>Lys,Gln^{20}>Lys,Asp^{21}>Glu,Lys^{30}>Cys]-oxyntomodulin (1-30)-peptide 30-amide}-$S^{3.30}$-yl)-2,5-dioxopyrrolidin-1-yl]propanamido}propoxy) poly(oxyethylene)-α-yloxy]propyl}[immunoglobulin γ4 heavy chain constant region C-terminal 221-peptide dimer disulfide], non-glycosylated, immunoglobulin fragment dimer produced in *Escherichia coli*

efocipegtrutide (126)
chimeric triple receptor agonist peptide (1"-40"), sharing balanced sequence homology with glucagon, glucagon-like peptide 1 (GLP1) and gastric inhibitory polypeptide (GIP, glucose-dependent insulinotropic polypeptide, incretin hormone), produced by chemical synthesis, conjugated at the S atom of the C-terminal cysteinamide 40" via a polyethylene glycol linker

[25] INN selected before the implementation of the *ef-* suffix.
[26] INN selected before the implementation of the *ef-* suffix.

(~10 kDa) to the N atom of one N-terminal proline residue of the dimer (3-3')-disulfide of an immunoglobulin G4 (IgG4) heavy chain constant fragment (Fc, C-terminal 221-peptide, produced in *Escherichia coli,* not glycosylated)

efpeglenatide (111)

exenatide derivative and human IgG4 Fc dimer linked together with polyethylene glycol derivative:
$N^{6.27}$,$N^{1.9'}$-[ω-(oxypropane-1,3-diyl)-α-(propane-1,3-diyl)poly(oxyethylene)] [1-(imidazol-4-ylacetic acid)]exendin-4 *Heloderma suspectum* (Gila monster), human immunoglobulin G4 Fc fragment-(9'-229')-peptide dimer (11'-11")-disulfide

elsiglutide (104)

[2-glycine(A>G),3-glutamic acid(D>E),8-serine(D>S),10-leucine(M>L),11-serine(N>S),16-alanine(N>A),24-alanine(N>A),28-alanine(Q>A)]human glucagon-like peptide 2 (GLP-2) fusion protein with hexalysinamide

glepaglutide (116)

mutated human glucagon like peptide-2 (GLP-2) analogue with a C-terminal hexa-lysine addition;
[2-glycine(A>G),3-glutamic acid(D>E),5-threonine(S>T),8-serine(D>S),10-leucine(M>L),11-alanine(N>A),16-alanine(N>A),24-alanine(N>A),28-alanine(Q>A)]human glucagon-like peptide 2 (GLP-2) fusion peptide with hexalysinamide

vanutide cridificar (100)[27]

inactivated diphtheria toxin (carrier) covalently linked to human beta-amyloid protein 42 short fragments: pentadecakis[$N^{6\text{-Lys}}$-(sulfanylacetyl)]-[52-glutamic acid(G>E)]diphtheria toxin *Corynebacterium diphtheriae* thioether with human beta-amyloid protein 42-(1-7)-peptidylcysteine

vurolenatide (126)

exendin 4 (*Heloderma suspectum*, Gila monster lizard) (1-39) fused via a Gly-Gly dipeptide linker (40-41) to an artificial hydrophilic protein (864-peptide, 42-905) comprising 72 randomly repeating dodecapeptides (4 types of $A_1E_2G_2P_2S_3T_2$), produced in *Escherichia coli*

-motide

amilomotide (105)

virus like particle of bacteriophage Q-beta coat protein that is coupled to multiple copies of human beta-amyloid1-6 peptide fragment;
reaction products of bacteriophage Q-beta coat protein with human beta-amyloid protein-(1-6)-peptidylglycylglycyl-L-cysteine and 3-(2,5-dioxo-2,5-dihydro-1*H*-pyrrole-1-yl)-*N*-{6-[(2,5-dioxopyrrolidin-1-yl)oxy]-6-oxohexyl}propanamide

sultimotide alfa (117)

a fusion protein consisting of fragments of hepatitis B virus transcription factor X, large S-protein antigen (envelope antigen), B antigen (core antigen) and of a C-terminal six-histidine tag, expressed by engineered whole heat-killed *Saccharomyces cerevisiae*, glycoform alfa;
Met-Ala-Asp-Glu-Ala-Pro-Thr-Ser-{des-(69-83)-[P^{59}>F]protein X (hepatitis B virus)-(52-127)-peptide (9-69)}-
{[M^{1}>E,G^{3}>Q,Q^{10}>K,P^{19}S,G^{35}>R,N^{39}>A,H^{51}>T,P^{65}>L,T^{86}>Q,A^{91}>N]large S protein (hepatitis B virus) (70-243)}-{[T^{4}>I,V^{25}>I,N^{207}>S,L^{209}>V,L^{213}>I]small S protein (hepatitis B

[27] The names and the descriptions of toxins are published in Annex 4.1 of "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".

virus) (244-469)}-{des-Met[1]-[S[12]>T]capsid protein (hepatitis B virus) (470-651)}-His_6 (652-657) fusion protein, produced in *Saccharomyces cerevisiae,* glycoform alfa

tecemotide (108)
human mucin-1 (carcinoma-associated mucin, episialin, CD227)-(107-131)-peptide (sequence 40 times repeated) fusion protein with 6-*N*-hexadecanoyl-L-lysylglycine

zastumotide (110)
19,137,308,342,395-penta[*S*-(2-amino-2-oxoethyl)]-{[2-aspartic acid(K^2>D),3-proline(L^3>P)]glycerophosphoryl diester phosphodiesterase (*Haemophilus influenzae* strain 86-028NP EC 3.1.4.46)-(1-127)-peptide fusion protein with [2-aspartic acid(P^2>D)]human melanoma-associated antigen 3 (MAGE-3 antigen, antigen MZ2-D, cancer/testis antigen 1.3 or CT1.3) fusion protein with diglycylheptahistidine}

Others:

carocovatein (127)
severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) Spike (S) glycoprotein (S glycoprotein, UniProt P0DTC2), stable prefusion conformation variant (R^{669}>G, R^{670}>S, R^{672}>S, K^{973}>P, V^{974}>P), C-terminal transmembrane domain (1196-1260) deleted and replaced with the ^{1196}GSGYIPEAPRDGQAYVRKDGEWVLLSTFLGRSLEVLFQ^{1233} peptide containing the enterobacteria phage T4 fibritin C-terminal foldon domain fragment ^{1198}GYIPEAPRDGQAYVRKDGEWVLLSTFL^{1224}, followed by the remnant of a human rhinovirus (HRV) 3C protease cleavage sequence (^{1228}LEVLFQ^{1233}), trimer, produced in Chinese hamster ovary (CHO)-S cells, glycoform alfa

dianexin (109)
recombinant DNA derived annexin A5 dimer covalently linked by a 14 residues peptide linker, produced in *Escherichia coli* (nonglycosylated):
L-methionyl-human annexin A5 fusion protein with glycyl-L-seryl-L-leucyl-L-α-glutamyl-L-valyl-L-leucyl-L-phenylalanyl-L-glutaminylglycyl-L-prolyl-L-serylglycyl-L-lysyl-L-leucyl-human annexin A5

efepoetin alfa (117)
human erythropoietin (epoetin alfa) fused to a hybrid human immunoglobulin (Ig), consisting of the Fc fragment of the IgG4 fused to the hinge and amino-terminus of the IgD heavy chain isotype 2, produced in Chinese hamster ovary (CHO) cells, glycoform alfa;
[human erythropoietin (EPO) (1-166)]-[immunoglobulin heavy chain delta (IGHD) isoform 2 constant region (133-170)-peptide (C-terminal hinge region and N-terminal CH2 domain) (167-204)]-[immunoglobulin heavy chain gamma 4 (IGHG4) constant region (121-327)-peptide (CH2 and CH3 domains) (205-411)]-fusion protein, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

efmitermant alfa (121)
human follistatin fragment fused via a peptidyl linker to a human immunoglobulin G2 Fc fragment, dimer:
[human follistatin (FST, FS, activin-binding protein) (1-291)-peptide]-[TG3 linker (292-295)]-[human immunoglobulin G2 Fc fragment (223 C-terminal residues) [*Homo sapiens* IGHG2*01; hinge (296-302), CH2 (303-411), CH3 (412-516), CHS (517-518)] (296-518) (natural S449>A variant)] fusion protein, dimer (198-198':201-201')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

insulin efsitora alfa (122)
human insulin B-chain (1-30) variant (Y16>E, F25>H, T27>G, P28>G, K29>G, T30>G) fused via a G2SG4 peptide linker (31-37) to human insulin A-chain (38-58) variant (I10>T47, Y14>D51, N21>G58) and via a (G4Q)3G5 peptide linker (59-78) to a human immunoglobulin

G2 C-terminal K>del Fc fragment (79-299), dimer (80-80':83-83')-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa

isunakinra (113)
human interleukin-1 beta-(1-8)-peptide fusion protein with human interleukin-1 receptor antagonist protein-(14-45)-peptide fusion protein with human interleukin-1 beta-(42-120)-peptide fusion protein with human interleukin-1 receptor antagonist protein-(120-147)-peptide fusion protein with human interleukin-1 beta-(148-153)-peptide non-glycosylated

pemziviptadil (124)
fusion protein comprising l-methionyl (1)-vasoactive intestinal polypeptide (human VIP) (2-29) and an elastin-like artificial polymer (30-629) of 120 alternating pentapeptides of three types VPGVG, VPGGG, and VPGAG, and a C-terminal pentapeptide VPGWP (630-634), produced in *Escherichia coli*

topsalysin (111)
recombinant DNA derived proaerolysin, pore-forming protein, from *Aeromonas hydrophila,* with the furin site substituted with a prostate specific antigen (PSA) cleavage site, fusion protein with 6 histidines, produced in *Escherichia coli* (nonglycosylated): [427-L-histidine(K>H),428-L-serine(V>S),429-L-serine(R>S),430-L-lysine(R>K),431-L-leucine(A>L),432-L-glutamine(R>Q)]proaerolysin *Aeromonas hydrophila* fusion protein with hexa-L-histidine

torapsel (91)[28]
42-89-glycoprotein (human clone PMT21:PL85 P-selectin glycoprotein ligand fusion protein with immunoglobulin (human constant region)

trebananib (106)[28]
immunoglobulin G1 Fc fragment fused with two synthetic polypeptides that bind the *Homo sapiens* ANGPT2 (angiopoietin 2);
methionyl (1) -gamma1 heavy chain fragment (2-228) [*Homo sapiens* IGHG1*01 hinge (EPKSC 1-5>del) (2-11), CH2 (12-121), CH3 (122-228)] fused, at the C-terminal end, with a synthetic polypeptide that comprises two 14-mer amino acid repeats that bind angiopoietin 2 (229-287) [linker (229-235) -14-mer (236-249) –linker (250-271) -14-mer (272-285) -leucyl-glutamate]; (7-7':10-10')-bisdisulfide dimer

verpasep caltespen (95)
60 kDa chaperonin 2 (heat shock protein 65 from *Mycobacterium bovis* strain BCG) (*caltespen*) fusion protein with L-histidylprotein E7 from human papillomavirus type 16 (*verpasep*).

[28] INN selected before the implementation of the *ef-* suffix.

ANNEX 2 .

List of INN for conjugated proteins[29]

classified by groups

[29] Two or more entities that are linked together by a chemical reaction *in vitro* after they have been separately produced.

-ase

bovhyaluronidase azoximer (112)
hyaluronidase-2 bovine (hyaluronoglucosaminidase-2, Hyal-2, EC 3.2.1.35) *Bos taurus* precursor protein linked to poly{[1-(carboxymethyl)piperazin-1-ium-1,4-diyl bromide]ethylene-*co*-[(piperazine-1,4-diyl-1-oxide)ethylene]} by an amido covalent bond

-bep

tezatabep matraxetan (122)
three-alpha-helix binding protein, derived from an immunoglobulin G (IgG)-binding domain of a staphylococcal protein A (SpA), designed to bind receptor tyrosine-protein kinase erbB-2 (ERBB2, Neu, HER2), produced by peptide synthesis, conjugated at the C-terminal Cys^{61} to one (3*RS*)-2,5-dioxo-1-(2-{2-[4,7,10-tris(carboxymethyl)-1,4,7,10-tetraazacyclododecan-1-yl]acetamido}ethyl)pyrrolidin-3-yl (*matraxetan*) group

matraxetan
(3*RS*)-2,5-dioxo-1-(2-{2-[4,7,10-tris(carboxymethyl)-1,4,7,10-tetraazacyclododecan-1-yl]acetamido}ethyl)pyrrolidin-3-yl

-tide

nendratareotide uzatansine (124)
S^2,S^7-cyclo{d-phenylalanyl-L-cysteinyl-L-tyrosyl-D-tryptophyl-L-lysyl-L-threonyl-L-cysteinyl-3-[(3-{[(2*S*)-1-{[(1^4*S*,1^6*S*,2*R*,3^2*S*,3^3*S*,4*S*,10*E*,12*E*,14*R*)-8^6-chloro-1^4-hydroxy-8^5,14-dimethoxy-2,3^3,7,10-tetramethyl-1^2,6-dioxo-7-aza-1(6,4)-[1,3]oxazinana-3(2,3)-oxirana-8(1,3)-benzenacyclotetradecaphane-10,12-dien-4-yl]oxy}-1-oxopropan-2-yl](methyl)amino}-3-oxopropyl)disulfanyl]-L-alaninamide}

uzatansine
(3-{[(2*S*)-1-{[(1^4*S*,1^6*S*,2*R*,3^2*S*,3^3*S*,4*S*,10*E*,12*E*,14*R*)-8^6-chloro-1^4-hydroxy-8^5,14-dimethoxy-2,3^3,7,10-tetramethyl-1^2,6-dioxo-7-aza-1(6,4)-[1,3]oxazinana-3(2,3)-oxirana-8(1,3)-benzenacyclotetradecaphane-10,12-dien-4-yl]oxy}-1-oxopropan-2-yl](methyl)amino}-3-oxopropyl)sulfanyl

sudocetaxel zendusortide (126)
$N^{6.5}$,$N^{6.13}$-bis[4-({(2*R*,3*S*)-1-{[4-(acetyloxy)-2α-(benzoyloxy)-5β,20-epoxy-1,7β,10β-trihydroxy-9-oxotax-11-en-13α-yl]oxy}-3-[(*tert*-butoxycarbonyl)amino]-1-oxo-3-phenylpropan-2-yl}oxy)-4-oxobutanoyl][*N*-acetylglycyl-L-valyl-L-arginyl-L-alanyl-L-lysyl-L-alanylglycyl-L-valyl-L-arginyl-L-asparaginyl-(2*S*)-2-aminohexanoyl-L-phenylalanyl-L-lysyl-L-seryl-L-α-glutamyl-L-seryl-L-tyrosine]

sudocetaxel
4-({(2*R*,3*S*)-1-{[4-(acetyloxy)-2α-(benzoyloxy)-5β,20-epoxy-1,7β,10β-trihydroxy-9-oxotax-11-en-13α-yl]oxy}-3-[(*tert*-butoxycarbonyl)amino]-1-oxo-3-phenylpropan-2-yl}oxy)-4-oxobutanoyl

tozuleristide (115)
$N^{6.27}$-[6-(2-{(1*E*,2*E*,4*E*,6*E*)-7-[1,1-dimethyl-3-(4-sulfonatobutyl)-1*H*-benzo[*e*]indol-3-ium-2-yl]hepta-2,4,6-trien-1-ylidene}-1,1-dimethyl-1,2-dihydro-3*H*-benzo[*e*]indol-3-yl)hexanoyl]-[Lys^{15}>Arg,Lys^{23}>Arg]chlorotoxin (*Leiurus quinquestriatus quinquestriatus*) (Egyptian scorpion)

-tide & *-xetan* (for *chelating agents*)

guraxetan

(4*S*)-4-carboxy-4-[4,7,10-tris(carboxymethyl)-1,4,7,10-tetraazacyclododecan-1-yl]butanoyl

lutetium (^{177}Lu) zadavotide guraxetan (125)

[*N*-{(4*S*)-4-carboxy-κ*O*-4-[4,7,10-tris(carboxy-κ^{3}*O*^{4},*O*^{7},*O*^{10}-methyl)-1,4,7,10-tetraazacyclododecan-1-yl-κ^{4}*N*^{1},*N*^{4},*N*^{7},*N*^{10}]butanoyl}-3-iodo-D-tyrosyl-D-phenylalanyl-*N*^{6}-(8-{*N*^{2}-[(l-glutamic acid-*N*-yl)carbonyl]-L-lysin-*N*^{6}-yl}-8-oxooctanoyl)-D-lysinato(3−)](^{177}Lu)lutetium

trizoxetan

(4*RS*)-4-[4,7-bis(carboxymethyl)-1,4,7-triazonan-1-yl]-4-carboxybutanoyl

satoreotide trizoxetan (114)

S^{2},*S*^{7}-cyclo[*N*-{(4*RS*)-4-[4,7-bis(carboxymethyl)-1,4,7-triazonan-1-yl]-4-carboxybutanoyl}-4-chloro-L-phenylalanyl-D-cysteinyl-4-[(4*S*)-2,6-dioxo-1,3-diazinane-4-carboxamido]-L-phenylalanyl-4-(carbamoylamino)-D-phenylalanyl-L-lysyl-L-threonyl-L-cysteinyl-D-tyrosinamide]

lutetium (^{177}Lu) vipivotide tetraxetan (123)

{*N*-[(*N*^{6}-{3-(naphthalen-2-yl)-*N*-[*trans*-4-({2-[4,7,10-tris(carboxy-κ^{3}*O*^{4},*O*^{7},*O*^{10}-methyl)-1,4,7,10-tetraazacyclododecan-1-yl-κ^{4}*N*^{1},*N*^{4},*N*^{7},*N*^{10}]acetamido-κ*O*}methyl)cyclohexane-1-carbonyl]-L-alanyl}-L-lysin-*N*^{2}-yl)carbonyl]-L-glutamato(3−)}(^{177}Lu)lutetium

satoreotide tetraxetan (118)

S^{2},*S*^{7}-cyclo[4-chloro-*N*-{[4,7,10-tris(carboxymethyl)-1,4,7,10-tetraazacyclododecan-1-yl]acetyl}-L-phenylalanyl-D-cysteinyl-4-[(4*S*)-2,6-dioxo-1,3-diazinane-4-carboxamido]-L-phenylalanyl-4-(carbamoylamino)-D-phenylalanyl-L-lysyl-L-threonyl-L-cysteinyl-D-tyrosinamide]

vipivotide tetraxetan (120)

N-[(*N*^{6}-{3-(naphthalen-2-yl)-*N*-[*trans*-4-({2-[4,7,10-tris(carboxymethyl)-1,4,7,10-tetraazacyclododecan-1-yl]acetamido}methyl)cyclohexane-1-carbonyl]-L-alanyl}-L-lysin-*N*^{2}-yl)carbonyl]-L-glutamic acid

-mab

berdoxam

[4-(8,19,30-trihydroxy-9,12,20,23,31-pentaoxo-2,8,13,19,24,30-hexaazadotriacontane-1-thioyl)phenyl]carbamothioyl

zirconium (^{89}Zr) crefmirlimab berdoxam (127)

immunoglobulin scFv-kappa-heavy-G1h-CH3-CHS dimer, anti-[*Homo sapiens* CD8A (CD8a molecule, CD8)], monoclonal antibody;
scFv-kappa-heavy-G1-h-linker-CH3-CHS chain (1-376) [V-KAPPA (*Homo sapiens* IGKV1-27*01 (87.4%) -IGKJ4*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1-107) -18-mer glycyl-seryl-threonyl-tris(seryl-triglycyl)-glycyl-diseryl linker (108-125) -VH Musmus/Homsap (*Mus musculus* IGHV14-3*02 (73.5%) -(IGHD) -IGHJ3*01 (84.6%)/*Homo sapiens* IGHV3-66*01 (71.4%) -(IGHD) -IGHJ1*01 (92.3%), CDR-IMGT [8.8.11] (151-158.176-183.222-232)) (126-243) -*Homo sapiens* IGHG1*03 hinge 1-17 (244-260), 10-mer triglycyl-diseryl-triglycyl-seryl-glycyl linker (261-270), *Homo sapiens* IGHG1*03 nG1m1 CH3-CHS (CH3 E12 (286), M14 (288) (271-375), CHS K2>del (376)) (271-376)]; dimer (254-254":257-257":260-260")-trisdisulfide, produced in Chinese hamster ovary (CHO) cells, non-glycosylated, conjugated at N^{6} of lysine residues with an average of 0.8-2.5 [4-(8,19,30-trihydroxy-9,12,20,23,31-pentaoxo-2,8,13,19,24,30-hexaazadotriacontane-1-thioyl)phenyl]carbamothioyl (berdoxam) groups and converted to (^{89}Zr)zirconium(4+) chelate complex salts

clezutoclax

(2*RS*)-1-({(19*S*,22*S*,26^{3}*S*,26^{5}*S*)-16^{2}-(2,6-anhydro-7,8-dideoxy-L-*glycero*-L-*gulo*-oct-8-ylonic acid)-5^{6}-carboxy-12-[(3*S*)-3,4-dihydroxybutyl]-6^{5},8^{5},8^{7},19-tetramethyl-3,13,18,21,24,26^{2}-hexaoxo-22-(propan-2-yl)-26^{5}-[(2-sulfoethoxy)methyl]-4^{3},4^{4}-dihydro-4^{1}*H*-9,14-dioxa-2,12,17,20,23-pentaaza-4(8,2)-isoquinolina-1(2)-[1,3]benzothiazola-5(2,5)-pyridina-6(4,1)-pyrazola-26(1)-pyrrolidina-8(1,3)-adamantana-16(1,4)-benzenahexacosaphan-26^{3}-yl}amino)-3-carboxy-1-oxopropan-2-yl and (1*RS*)-3-({(19*S*,22*S*,26^{3}*S*,26^{5}*S*)-...hexacosaphan-26^{3}-yl}amino)-1-carboxy-3-oxopropyl

mirzotamab clezutoclax (121)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD276 (B7H3, B7-H3, B7RP-2)], monoclonal antibody, conjugated with clezutoclax, an inhibitor of BCL2L1 (BCL2-like 1, BCL-XL);
gamma1 heavy chain chimeric (1-446) [VH (*Mus musculus* IGHV3-1*02 (86.6%) -(IGHD) -IGHJ2*01 (86.7%)/*Homo sapiens* IGHV4-38-2*01 (83.5%) -(IGHD) -IGHJ4*01 (86.7%)) [9.7.9] (1-116) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (213) (117-214), hinge 1-15 (215-229), CH2 L1.3>A (233), L1.2>A (234) (230-339), CH3 E12 (355), M14 (357) (340-444), CHS (445-446)) (117-446)], (219-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (82.2%) -IGKJ2*02 (100%)) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (225-225":228-228")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa; conjugated, on an average of 2 cysteinyl, with clezutoclax, comprising a cleavable dipeptide (valine-alanine) linker

tedromer

(3*RS*)-1-[1,1,1-tris({3-[2-(2,2,2-tris{[(2-{α-(bromo / ethoxy / hydro / hydroxy)poly[1-(10,10-dimethyl-6-oxido-6-oxo-2,5,7-trioxa-10-aza-6λ^{5}-phosphaundecan-10-ium-1-oyl)-1-methylethane-1,2-diyl]-ω-yl}-2-methylpropanoyl)oxy]methyl}ethoxy)acetamido]propanamido}methyl)-16,32-dioxo-3,6,9,12,19,22,25,28-octaoxa-15,31-diazatetratriacontan-34-yl]-2,5-dioxopyrrolidin-1-yl

tarcocimab tedromer (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* VEGFA (vascular endothelial growth factor A, VEGF-A, VEGF)], humanized monoclonal antibody, conjugated via a linker to a nona-antennary dendrimer with phosphorylcholine polymer end groups;
gamma1 heavy chain humanized (1-453) [VH (*Homo sapiens* IGHV3-30*02 (75.8%) -(IGHD) -IGHJ4*01 (93.3%), CDR-IMGT [8.8.16] (26-33.51-58.97-112)) (1-123) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1, G1v14 CH2 A1.3, A1.2 (CH1 R120>K (220) (124-221), hinge 1-15 (222-236), CH2 L1.3>A (240), L1.2>A (241), G1>A (243) (237-346), CH3 E12 (362), M14 (364), L123>C (449) (347-451), CHS (452-453)) (124-453)], (226-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-16*01 (87.4%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (232-232":235-235")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-K1SV lacking the glutamine synthetase (GS-KO) gene, glycoform alfa, substituted at an average of one S atom of cysteine residues 449 and 449" with the (3*RS*)-1-[1,1,1-tris({3-[2-(2,2,2-tris{[(2-{α-(bromo / ethoxy / hydro / hydroxy)poly[1-(10,10-dimethyl-6-oxido-6-oxo-2,5,7-trioxa-10-aza-6λ^{5}-phosphaundecan-10-ium-1-oyl)-1-methylethane-1,2-diyl]-ω-yl}-2-methylpropanoyl)oxy]methyl}ethoxy)acetamido]propanamido}methyl)-16,32-dioxo-3,6,9,12,19,22,25,28-octaoxa-15,31-diazatetratriacontan-34-yl]-2,5-dioxopyrrolidin-1-yl (tedromer) group

-mab & duocarmazine

duocarmazine

(6^1S,19*S*,22*S*,31^3RS)-19-[3-(carbamoylamino)propyl]-6^1-(chloromethyl)-1^4-hydroxy-9-[2-(2-hydroxyethoxy)ethyl]-6^9,12-dimethyl-2,5,8,13,18,21,24,31^2,31^5-nonaoxo-22-(propan-2-yl)-6^1,6^2-dihydro-7,14,25,28-tetraoxa-3,9,12,17,20,23-hexaaza-6(3,5)-benzo[*e*]indola-4(6,2)-imidazo[1,2-*a*]pyridina-31(1)-pyrrolidina-1(1),16(1,4)-dibenzenahentriacontaphan-31^3-yl

trastuzumab duocarmazine (115)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody conjugated to the pro-drug *seco*-duocarmycin-hydroxybenzamide-azaindole (*seco*-DUBA);
gamma1 heavy chain (1-449) [humanized VH (*Homo sapiens* (IGHV3-66-*01 (81.60%) -(IGHD)-IGHJ6*01) [8.8.13] (1-120) -*Homo sapiens* IGHG1*01, G1m17, nG1m1 (CH1 (121-218), hinge (219-233),CH2 (234-343), CH3 D12>E (359), L14>M (361) (344-448), CHS K>del (449)) (121-449)], (223-214')-disulfide with kappa light chain (1'-214') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.30%) -IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (108'-214')]; dimer (229-229":232-232")-bisdisulfide, conjugated on an average of 2 or 4 cysteines, to *seco*-DUBA via the cleavable linker *N*-[2-(2-maleimidoethoxy)ethoxycarbonyl]-L-valyl-L-citrullinyl-*p*-aminobenzyloxycarbonyl-*N*-[2-(2-hydroxyethoxy)ethyl]-*N*-[2-(methylamino)ethyl]carbamoyl

vobramitamab duocarmazine (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD276 (B7H3, B7-H3, B7-related protein 2, B7RP2, B7RP-2, B7 homolog 3, B7 homologue 3)], humanized monoclonal antibody, conjugated to the pro-drug seco-duocarmycin-*p*-hydroxybenzamide-azaindole (seco-DUBA) via a linker;
gamma1 heavy chain humanized (1-447) [VH (*Homo sapiens* IGHV3-7*01 (89.8%) -(IGHD) -IGHJ6*01 (92.9%), CDR-IMGT [8.8.10] (26-33.51-58.97-106)) (1-117) -*Homo sapiens* IGHG1*03 (100%), G1m3, nG1m1 (CH1 R120 (214) (118-215), hinge 1-15 (216-230), CH2 (231-340), CH3 E12 (356), M14 (358) (341-445), CHS (446-447)) (118-447)], (220-215')-disulfide with kappa light chain humanized (1'-215') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ5*01 (100%), CDR-IMGT [6.3.10] (27-32.50-52.89-98)) (1'-108') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (226-226":229-229")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-S, glycoform alfa, conjugated on an average of 2.7 cysteines, to seco-DUBA via the cleavable linker *N*-[2-(2-maleimidoethoxy)ethoxycarbonyl]-L-valyl-L-citrullyl-*p*-aminobenzyloxycarbonyl-*N*-[2-(2-hydroxyethoxy)ethyl]-*N*-[2-(methylamino)ethyl]carbamoyl

-mab & biotin

biotin (RL45)[30]

5-[(3a*S*,4*S*,6a*R*)-2-oxohexahydro-1*H*-thieno[3,4-*d*]imidazol-4-yl]pentanoic acid

iodine (^{131}I) derlotuximab biotin (113)

immunoglobulin G1-kappa, anti-[*Homo sapiens* DNA/histone 1 (H1) complex], chimeric monoclonal antibody radiolabeled with iodine-131 and biotinylated; gamma1 heavy chain (1-450) [*Mus musculus* VH (IGHV2-6-5*01 -(IGHD)-IGHJ4*01) [8.7.14] (1-120) - *Homo sapiens* IGHG1*01, G1m17,1 (CH1 V121>A (218) (121-218), hinge (219-233), CH2 (234-343), CH3 (344-448), CHS (449-450)) (121-450)], (223-215')-disulfide with kappa light

[30] Recommended list number.

chain (1'-215') [*Mus musculus* V-KAPPA (IGKV4-57-1*01 -IGKJ1*01) [7.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (109'-215')]; dimer (229-229":232-232")-bisdisulfide; (^{131}I) iodinated with iodine-131 covalently linked to tyrosines, and biotinylated

-mab & -bulin (for *antineoplastics; mitotic inhibitor, tubulin binder)*

ecteribulin

(3*RS*)-1-[(6*S*,9*S*)-1-amino-6-[(4-{[({(2*S*)-2-hydroxy-3-[(1^{2}*S*,1^{3}*S*,1^{4}*R*,1^{5}*R*,3^{2}*R*,-3^{4}*R*,3^{6}*S*,6^{2}*S*,6^{5}*S*,9^{2}*S*,9^{3a}*R*,9^{4a}*R*,9^{5}*S*,9^{5a}*S*,9^{7}*R*,9^{9a}*S*,9^{10a}*R*,9^{10b}*S*)-1^{4}-methoxy-3^{4}-methyl-3^{3},6^{3}-bis(methylidene)-11-oxo-9-decahydro-9^{3}*H*-9(2,7)-(2,5-epoxyfuro[2',3':4,5]furo[3,2-*b*]pyrano[2,3-*e*]pyrana)-3(2,6)-oxana-1(2,3),6(2,5)-bis(oxolana)cyclododecaphan-1^{5}-yl]propyl}carbamoyl)oxy]methyl}phenyl)carbamoyl]-1,8,11-trioxo-9-(propan-2-yl)-14,17-dioxa-2,7,10-triazanonadecan-19-yl]-2,5-dioxopyrrolidin-3-yl

farletuzumab ecteribulin (125)

immunoglobulin G1-kappa, anti-[*Homo sapiens* FOLR1 (folate receptor 1, folate receptor alpha, FR-alpha, adult folate-binding protein, FBP, ovarian tumor-associated antigen MOv18)], humanized monoclonal antibody, conjugated to *eribulin* via a cleavable linker; gamma1 heavy chain humanized (1-449) [VH (*Homo sapiens* IGHV3-30*03 (83.5%) -(IGHD) -IGHJ6*01 (90.9%) T123>P (114), CDR-IMGT [8.8.12] (26-33.51-58.97-108)) (1-119) -*Homo sapiens* IGHG1*01 (100%), G1m17,1 (CH1 K120 (216) (120-217), hinge 1-15 (218-232), CH2 (233-342), CH3 D12 (358), L14 (360) (343-447), CHS (448-449)) (120-449)], (222-217')-disulfide with kappa light chain humanized (1'-217') [V-KAPPA (*Homo sapiens* IGKV1-13*02 (81.2%) -IGKJ2*01 (91.7%) L124>V (107), CDR-IMGT [7.3.11] (27-33.51-53.90-100)) (1'-110') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (156), V101 (194) (111'-217')]; dimer (228-228":231-231")-bisdisulfide, produced in a Chinese hamster ovary (CHO)-K1SV cell line, glycoform alfa; substituted at an average of four S atoms of cysteine residues (reduced inter-chain disulfide bonds) with (3*RS*)-1-[(6*S*,9*S*)-1-amino-6-[(4-{[({(2*S*)-2-hydroxy-3-[(1^{2}*S*,1^{3}*S*,1^{4}*R*,1^{5}*R*,3^{2}*R*,3^{4}*R*,-3^{6}*S*,6^{2}*S*,6^{5}*S*,9^{2}*S*,9^{3a}*R*,9^{4a}*R*,9^{5}*S*,9^{5a}*S*,9^{7}*R*,9^{9a}*S*,9^{10a}*R*,9^{10b}*S*)-1^{4}-methoxy-3^{4}-methyl-3^{3},6^{3}-bis(methylidene)-11-oxo-9-decahydro-9^{3}*H*-9(2,7)-(2,5-epoxyfuro[2',3':4,5]furo[3,2-*b*]pyrano[2,3-*e*]pyrana)-3(2,6)-oxana-1(2,3),6(2,5)-bis(oxolana)cyclododecaphan-1^{5}-yl]propyl}carbamoyl)oxy]methyl}phenyl)carbamoyl]-1,8,11-trioxo-9-(propan-2-yl)-14,17-dioxa-2,7,10-triazanonadecan-19-yl]-2,5-dioxopyrrolidin-3-yl (*ecteribulin*) groups

tazevibulin

[8-(4-{[(2*S*)-1-{[(2*S*)-5-(carbamoylamino)-1-(4-{[({3-[(3*S*)-4-{[(2*S*)-1-{[(3*S*,4*E*)-5-carboxy-2-methylhex-4-en-3-yl](methyl)amino}-3,3-dimethyl-1-oxobutan-2-yl]amino}-2-methyl-3-(methylamino)-4-oxobutan-2-yl]phenyl}carbamoyl)oxy]methyl}anilino)-1-oxopentan-2-yl]amino}-3-methyl-1-oxobutan-2-yl]amino}-4-oxobutanoyl)-8,9-dihydro-1*H*(or 3*H*)-dibenzo[*b*,*f*][1,2,3]triazolo[4,5-*d*]azocin-1(or 3)-yl]methyl

luveltamab tazevibulin (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* FOLR1 (folate receptor 1, folate receptor alpha, FR-alpha, adult folate-binding protein, FBP, ovarian tumor-associated antigen MOv18)], humanized monoclonal antibody, conjugated on four modified phenylalanine residues via a cleavable valyl-citrullyl linker with a hemiasterlin analogue; gamma1 heavy chain humanized (1-455) [VH (*Homo sapiens* IGHV3-66*01 (79.6%) -(IGHD) -IGHJ4*01 (93.3%), CDR-IMGT [8.8.17] (27-34.52-59.98-114)) (1-125) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 Y85.2>**F** (pAMF) (188), R120>K (222) (126-223), hinge 1-15 (224-238), CH2 (239-348), CH3 E12 (364), M14 (366), F85.2> **F** (pAMF) (412) (349-453), CHS (454-455)) (126-455)], (228-215')-disulfide with kappa light chain humanized (1'-215') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (28-33.51-53.90-98)) (1'-108') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (234-234":237-237")-bisdisulfide, produced by a cell-free protein synthesis system based on *Escherichia coli* lysate, non-

glycosylated, conjugated at C-4 of the four l-phenylalanyl residues 188, 412, 188" and 412" with [8-(4-{[(2*S*)-1-{[(2*S*)-5-(carbamoylamino)-1-(4-{[({3-[(3*S*)-4-{[(2*S*)-1-{[(3*S*,4*E*)-5-carboxy-2-methylhex-4-en-3-yl](methyl)amino}-3,3-dimethyl-1-oxobutan-2-yl]amino}-2-methyl-3-(methylamino)-4-oxobutan-2-yl]phenyl}carbamoyl)oxy]methyl}anilino)-1-oxopentan-2-yl]amino}-3-methyl-1-oxobutan-2-yl]amino}-4-oxobutanoyl)-8,9-dihydro-1*H*(or 3*H*)-dibenzo[*b*,*f*][1,2,3]triazolo[4,5-*d*]azocin-1(or 3)-yl]methyl (tazevibulin) groups

-mab & -dotin[31] (for *synthetic derivatives of dolastatin series*)

amadotin

(3*RS*)-1-[(3*R*,4*S*,7*S*,10*S*)-1-{(2*S*)-2-[(1*R*,2*R*)-3-{[(2*S*)-1-amino-3-(1*H*-indol-3-yl)-1-oxopropan-2-yl]amino}-1-methoxy-2-methyl-3-oxopropyl]pyrrolidin-1-yl}-4-[(2*S*)-butan-2-yl]-3-methoxy-5,11-dimethyl-1,6,9,15,18-pentaoxo-7,10-di(propan-2-yl)-5,8,11,16,17-pentaazatricosan-23-yl]-2,5-dioxopyrrolidin-3-yl

lupartumab amadotin (115)

immunoglobulin G1-lambda1, anti-[*Homo sapiens* LYPD3 (Ly6/PLAUR domain containing 3, GPI-anchored cell-surface protein C4.4a, C4.4A)], *Homo sapiens* monoclonal antibody conjugated to an auristatin W derivative;
gamma1 heavy chain (1-446) [*Homo sapiens* VH (IGHV3-48*03 (92.90%) -(IGHD) -IGHJ4*01) [8.8.10](1-117) -IGHG1*01, Gm17,1 (CH1 (118-215), hinge (216-230), CH2 (231-340), CH3 (341-445), CHS K>del (446)) (118-446)], (220-216')-disulfide with lambda1 light chain (1'-217') [*Homo sapiens* V-LAMBDA (IGLV1-47*01 (87.90%) -IGLJ2*01) [9.3.11] (1'-111') -IGLC2*01 (112'-217')]; dimer (226-226":229-229")-bisdisulfide; *S*-substituted on an average of 4 reduced cysteinyl by reaction with *N*-demethyl-*N*-[4-(6-maleimidohexanohydrazido)-4-oxobutyl]auristatin W amide

ixadotin

6-[(2-{*N*-methyl-L-valyl-L-valyl-(3*R*,4*S*,5*S*)-3-methoxy-5-methyl-4-(methylamino)heptanoyl-(2*R*,3*R*)-3-methoxy-2-methyl-3-[(2*S*)-pyrrolidin-2-yl]propanoyl-L-tryptophyl}-1,2-oxazinan)-$N^{2.1}$-yl]hexanoyl

aprutumab ixadotin (115)

immunoglobulin G1-lambda1, anti-[*Homo sapiens* FGFR2 (fibroblast growth factor receptor 2, keratinocyte growth factor receptor, KGFR, CD332)], *Homo sapiens* monoclonal antibody conjugated to an auristatin W derivative;
gamma1 heavy chain (1-451) [*Homo sapiens* VH (IGHV3-23*01 (98.00%) -(IGHD) -IGHJ5*02) [8.8.15](1-122) -IGHG1*01, Gm17,1 (CH1 (123-220), hinge (221-235), CH2 (236-345), CH3 (346-450),CHS K>del (451)) (123-451)], (225-215')-disulfide with lambda1 light chain (1'-216') [*Homo sapiens* V-LAMBDA (IGLV1-47*01 (90.70%) -IGLJ3*02) [8.3.11] (1'-110') -IGLC2*01 (111'-216')]; dimer (231-231":234-234")-bisdisulfide; conjugated, on an average of 4 lysyl, to *N*-(5-carboxypentyl)-*N*-demethyl-auristatin W (AW) $C^{1.5}$-(1,2-oxazinan-2-yl) derivative

mafodotin

N-{(2*R*,3*R*)-3-[(2*S*)-1-[(3*R*,4*S*,5*S*)-4-({*N*-[6-(2,5-dioxo-2,5-dihydro-1*H*-pyrrol-1-yl)hexanoyl]-*N*-methyl-L-valyl-L-valyl}methylamino)-3-methoxy-5-methylheptanoyl]pyrrolidin-2-yl]-3-methoxy-2-methylpropanoyl}-L-phenylalanine

belantamab mafodotin (118)

immunoglobulin G1-kappa, anti-[*Homo sapiens*TNFRSF17 (TNF receptor superfamily member 17, tumor necrosis factor receptor superfamily, member 17, B cell maturation

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[31] The names ending in *-dotin* and the descriptions are published in Annex 4.2 of "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".

antigen, BCMA, BCM, TNFRSF13A, CD269)], humanized monoclonal antibody conjugated to auristatin F;
gamma1 heavy chain (1-451) [humanized VH (*Homo sapiens* IGHV1-69*06 (83.7%) -(IGHD)-IGHJ4*01 (85.7%)) [8.8.14] (1-121) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 K120 (218) (122-219), hinge (220-234), CH2 (235-344), CH3 D12 (360), L14 (362) (345-449), CHS (450-451)) (122-451)], (224-214')-disulfide with kappa light chain (1'-214') [humanized V-KAPPA (*Homo sapiens* IGKV1-33*01 (90.5%) -IGKJ2*02 (100%)) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 A45.1 (153), V101 (191)(108'-214')]; dimer (230-230":233-233")-bisdisulfide; conjugated, on an average of 4 cysteinyl, to monomethylauristatin F (MMAF), via a noncleavable maleimidocaproyl (mc) linker

denintuzumab mafodotin (111)
immunoglobulin G1-kappa auristatin F conjugate, anti-[*Homo sapiens* CD19 (B lymphocyte surface antigen B4, Leu-12)], humanized monoclonal antibody;
gamma1 heavy chain (1-450) [humanized VH (*Homo sapiens* IGHV4-31*02 (84.80%) -(IGHD)-IGHJ4*01) [10.7.12] (1-120) -*Homo sapiens* IGHG1*01 (CH1 (121-218), hinge (219-233), CH2 (234-343), CH3 (344-448), CHS (449-450)) (121-450)], (223-213')-disulfide with kappa light chain (1'-213') [humanized V-KAPPA (*Homo sapiens* IGKV3-11*01 (85.30%) -IGKJ2*02) [5.3.9] (1'-106') -*Homo sapiens* IGKC*01 (107'-213')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 4 cysteinyl, to monomethylauristatin F (MMAF), via a noncleavable maleimidocaproyl (mc) linker

depatuxizumab mafodotin (115)
immunoglobulin G1-kappa, anti-[*Homo sapiens* EGFR (epidermal growth factor receptor, receptor tyrosine-protein kinase erbB-1, ERBB1, HER1, HER-1, ERBB)], humanized and chimeric monoclonal antibody conjugated to auristatin F;
gamma1 heavy chain humanized (1-446) [humanized VH (*Homo sapiens* IGHV4-30-4*01 (84.50%) -(IGHD)-IGHJ4*01) [9.7.9] (1-116) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 (117-214), hinge (215-229), CH2 (230-339), CH3 (340-444), CHS (445-446)) (117-446)], (219-214')-disulfide with kappa light chain chimeric (1'-214') [*Mus musculus* V-KAPPA (*Mus musculus* IGKV14-100*01 -IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (108'-214')]; dimer (225-225":228-228")-bisdisulfide; conjugated, on an average of 4 cysteinyl, to monomethylauristatin F (MMAF), via a noncleavable maleimidocaproyl (mc) linker

vorsetuzumab mafodotin (107)
immunoglobulin G1-kappa auristatin F conjugate, anti-[*Homo sapiens* CD70 (tumor necrosis factor superfamily member 7, TNFSF7, CD27LG, CD27L)], humanized monoclonal antibody conjugated to auristatin F;
gamma1 heavy chain (1-448) [humanized VH (*Homo sapiens* IGHV1-2*02 (86.70%) -(IGHD)-IGHJ6*01) [8.8.11] (1-118) -*Homo sapiens* IGHG1*01 (119-448)], (221-218')-disulfide (if not conjugated) with kappa light chain (1'-218') [humanized V-KAPPA (*Homo sapiens* IGKV4-1*01 (79.20%) -IGKJ1*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01 (112'-218')]; (227-227":230-230")-bisdisulfide dimer; conjugated, on an average of 3 to 5 cysteinyl, to monomethylauristatin F (MMAF), via a non-cleavable maleimidocaproyl (mc) linker

opadotin
(1*Z*)-*N*-{[(13*S*,16*S*,19*S*,20*R*)-19-[(2*S*)-butan-2-yl]-22-{(2*S*)-[(1*R*,2*R*)-3-{[(1*S*)-1-carboxy-2-phenylethyl]amino}-1-methoxy-2-methyl-3-oxopropyl]pyrrolidin-1-yl}-20-methoxy-12,18-dimethyl-14,17,22-trioxo-13,16-di(propan-2-yl)-3,6,9-trioxa-12,15,18-triazadocosan-1-yl]oxy}ethanimidoyl

anvatabart opadotin (127)
immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody; conjugated at two engineered sites via a stable

covalent linker with the microtubule-disrupting agent AS-269
gamma1 heavy chain humanized (1-449) [VH humanized (*Homo sapiens* IGHV3-66*01 (81.6%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.13] (26-33.51-58.97-109)) (1-120) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 A1.4>**F** (pAF) (121), K120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 D12 (359), L14 (361) (344-448), CHS K2>del (449)) (121-449)], (223-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-K1, glycoform alfa; substituted at C-4 of Phe121 and Phe121" with two (1*Z*)-*N*-{[(13*S*,16*S*,19*S*,20*R*)-19-[(2*S*)-butan-2-yl]-22-{(2*S*)-[(1*R*,2*R*)-3-{[(1*S*)-1-carboxy-2-phenylethyl]amino}-1-methoxy-2-methyl-3-oxopropyl]pyrrolidin-1-yl}-20-methoxy-12,18-dimethyl-14,17,22-trioxo-13,16-di(propan-2-yl)-3,6,9-trioxa-12,15,18-triazadocosan-1-yl]oxy}ethanimidoyl (opadotin) groups

pelidotin

(3*RS*)-1-(6-{[(2*S*)-1-({[(2S)-5-(carbamoylamino)-1-[4-({[(1-{[(2*S*)-1-{[(3*R*,4*S*,5*S*)-3-methoxy-1-{(2*S*)-2-[(1*R*,2*R*)-1-methoxy-2-methyl-3-oxo-3-{[(1*S*)-2-phenyl-1-(1,3-thiazol-2-yl)ethyl]amino}propyl]pyrrolidin-1-yl}-5-methyl-1-oxoheptan-4-yl](methyl)amino}-3-methyl-1-oxobutan-2-yl]amino}-2-methyl-1-oxopropan-2-yl)carbamoyl]oxy}methyl)anilino]-1-oxopentan-2-yl}amino)-3-methyl-1-oxobutan-2-yl]amino}-6-oxohexyl)-2,5-dioxopyrrolidin-3-yl

cofetuzumab pelidotin (117)

immunoglobulin G1-kappa, anti-[*Homo sapiens* PTK7 (protein tyrosine kinase 7, colon carcinoma kinase 4, CCK4) extracellular domain], humanized monoclonal antibody, conjugated to auristatin-0101;
gamma1 heavy chain (1-448) [humanized VH (*Homo sapiens* IGHV1-3*01 (81.60%) -(IGHD) -IGHJ4*01) [8.8.12] (1-119) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 K120 (216) (120-217), hinge (218-232), CH2 (233-342), CH3 D12 (358), L14 (360) (343-447), CHS K>del (448)) (120-448)], (222-218')-disulfide with kappa light chain (1'-218') [humanized V-KAPPA (*Homo sapiens* IGKV3-11*01 (83.80%) -IGKJ4*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01, Km3 A45.1 (157), V101 (195) (112'-218')]; dimer (228-228":231-231")-bisdisulfide; conjugated, on an average of 4 cysteinyl, to auristatin-0101 (Aur0101), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

rilsodotin

(3*RS*)-1-(1-{oligo-*O*-[(2-carboxyethyl)carbamoyl]oligo-*O*-{22-[(3*RS*)-3-(l-cystein-*S*-yl)-2,5-dioxopyrrolidin-1-yl]-5,10,20-trioxo-13,16-dioxa-2,6,9,19-tetraazadocosan-1-oyl}oligo-*O*-[(3-{[(2*S*)-1-(3-{*N*,*N*-dimethyl-L-valyl-L-valyl-(3*R*,4*S*,5*S*)-3-methoxy-5-methyl-4-(methylamino)heptanoyl-(2*R*,3*R*)-3-methoxy-2-methyl-3-[(2*S*)-pyrrolidin-2-yl]propanoyl-L-phenylalaninamido}propoxy)-1-oxopropan-2-yl]amino}-3-oxopropyl)carbamoyl]-reduced oxidized dextran (~5-10 kDa)-*O*-yl}-1,5,10,20-tetraoxo-13,16-dioxa-2,6,9,19-tetraazadocosan-22-yl)-2,5-dioxopyrrolidin-3-yl

upifitamab rilsodotin (123)

immunoglobulin G1-kappa, anti-[*Homo sapiens* SLC34A2 (solute carrier family 34 sodium phosphate member 2, sodium/phosphate cotransporter 2B, NaPi2b, NaPi3b, NAPI-3B)], monoclonal antibody, conjugated, via a thioether bond, to3 to 5 flexible polymers PHF-BA-EG2-MI-AF-HPA-Ala, each comprising maleimide (MI) bioconjugation linkers and 3 to 4 auristatin F- hydroxypropylamide-L-alanine (AF-HPA-Ala), with a drug ratio of 12:1 to 15:1;
gamma1 heavy chain (1-449) [VH (*Homo sapiens* IGHV1-46*01 (81.6%) -(IGHD) -IGHJ4*01 (92.9%)) CDR-IMGT [8.8.12] (26-33.51-58.97-108) (1-119) -glycinyl (120) -*Homo sapiens* IGHG1*03 (100%), G1m3, nG1m1 (CH1 R120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 E12 (359), M14 (361) (344-448), CHS K>del (449)) (121-

449)], (223-215')-disulfide with kappa light chain (1'-215') [V-KAPPA (*Mus musculus* IGKV10-94*01 (84.2%) -IGKJ5*01 (91.7%)/*Homo sapiens* IGKV1-33*01 (83.2%) -IGKJ2*01 (90.9%)) CDR-IMGT [6.3.9] (27-32.50-52.89-97) (1'-107') -arginyl (108') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (154), V101 (192) (109"-215')];

dimer (229-229":232-232")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa; conjugated, via a thioether bond, from 3 to 5 flexible biodegradable polymers, poly(1-hydroxymethylethylene hydroxymethyl-formal) (PHF)-BA-EG2-MI-AF-HPA-Ala, each comprising maleimide (MI) conjugation linkers and 3 to 4 cytotoxic auristatin F- hydroxypropylamide-L-alanine (AF-HPA-Ala), with a drug ratio of 12:1 to 15:1

ugodotin

(3*S*,6*R*,7*R*,8^{2}*S*,11*R*,12*S*,15*S*,18*S*,30^{3}*RS*)-12-[(2*S*)-butan-2-yl]-3-carboxy-7,11-dimethoxy-6,13,19,23-tetramethyl-5,9,14,17,24,30^{2},30^{5}-heptaoxo-15,18-di(propan-2-yl)-4,13,16,19,23-pentaaza-8(2,1),30(1)-dipyrrolidina-1(1),22(1,4)-dibenzenatriacontaphan-30^{3}-yl

lonigutamab ugodotin (124)

immunoglobulin G1-kappa, anti-[*Homo sapiens* IGF1R (insulin like growth factor 1 receptor, IGF1-R, IGF-1R, CD221)], humanized monoclonal antibody conjugated to a dolastatin derivative (ugodotin groups);
gamma1 heavy chain humanized (1-449) [VH humanized (*Homo sapiens* IGHV1-46*01 (92.8%) -(IGHD) -IGHJ4*01 (100%)) CDR-IMGT [8.8.13] (26-33.51-58.97-109) (1-120) -*Homo sapiens* IGHG1*03 (100%) G1m3, nG1m1 (CH1 R120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 E12 (359), M14 (361) (344-448), CHS K>del (449)) (121-449)], (223-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA humanized (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ4*01 (100%)) CDR-IMGT [6.3.9] (27-32.50-52.89-97) (1'-107') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide, produced in Chinese hamster ovary (CHO)-K1SV cell line lacking the glutamine synthetase gene (GSKO), glycoform alfa; conjugated at the cysteines 223, 214', 223" and 214"' with four (3*S*,6*R*,7*R*,8^{2}*S*,11*R*,12*S*,15*S*,18*S*,30^{3}*RS*)-12-[(2*S*)-butan-2-yl]-3-carboxy-7,11-dimethoxy-6,13,19,23-tetramethyl-5,9,14,17,24,30^{2},30^{5}-heptaoxo-15,18-di(propan-2-yl)-4,13,16,19,23-pentaaza-8(2,1),30(1)-dipyrrolidina-1(1),22(1,4)-dibenzenatriacontaphan-30^{3}-yl (ugodotin) groups

vedotin

1-(6-{[(2*S*)-1-({(2*S*)-5-carbamoylamino-1-[(4-{[(2*S*)-{[(2*S*)-1-{[(3*R*,4*S*,5*S*)-1-{(2*S*)-2-[(1*R*,2*R*)-3-{[(1*S*,2*R*)-1-hydroxy-1-phenylpropan-2-yl]amino}-1-methoxy-2-methyl-3-oxopropyl]pyrrolidin-1-yl}-3-methoxy-5-methyl-1-oxoheptan-4-yl](methyl)amino}-3-methyl-1-oxobutan-2-yl]amino}-3-methyl-1-oxobutan-2-yl]methylcarbamoyloxy}phenyl)amino]-1-oxopentan-2-yl}amino)-3-methyl-1-oxobutan-2-yl]amino}-6-oxohexyl)-2,5-dioxopyrrolidin-3-yl

azintuxizumab vedotin (116)

immunoglobulin G1-kappa, anti-[*Homo sapiens* SLAMF7 (SLAM family member 7, CD2 subset 1, CS1, CD2-like receptor-activating cytotoxic cells, CRACC, 19A24, CD319)], humanized and chimeric monoclonal antibody antibody conjugated to auristatin E;
gamma1 heavy chain (1-447) [humanized VH (*Homo sapiens* IGHV3-7*01(91.80%) -(IGHD) -IGHJ4*01 L123>T (112)) [8.8.10] (1-117) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (214) (118-215), hinge (216-230), CH2 (231-340), CH3 E12(366), M14 (368) (341-445), CHS (446-447) (118-447)], (220-220')- disulfide with kappa light chain chimeric (1'-220') [*Mus musculus* V-KAPPA (IGKV1-110*01 (93.00%) -IGKJ4*01) [11.3.10] (1'-113') -*Homo sapiens* IGKC*01, Km3 A45.1 (159), V101 (197) (114'-220')]; dimer (226-226":229-229")-bisdisulfide; conjugated, on an average of 3 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker.

brentuximab vedotin (103)

immunoglobulin G1-kappa auristatin E conjugate, anti-[*Homo sapiens* TNFRSF8 (tumor necrosis factor receptor superfamily member 8, KI-1, CD30)], chimeric monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-446) [*Mus musculus* VH (IGHV1-84*02 -(IGHD)-IGHJ3*01) [8.8.10] (1-117) -*Homo sapiens* IGHG1*01 CH3 K130>del (118-446)], (220-218')-disulfide (if not conjugated) with kappa light chain (1'-218') [*Mus musculus* V-KAPPA (IGKV3-4*01 -IGKJ1*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01 (112'-218')];(226-226")-disulfide dimer; conjugated, on an average of 3 to 5 cysteinyl, to monomethylauristatin E (MMAE), via a maleimidecaproyl-valyl-citrullinyl-*p*-aminobenzylcarbamate (mc-val-cit-PABC) linker

disitamab vedotin (120)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain humanized (1-445) [VH (*Homo sapiens* IGHV1-69-2*01 (83.5%) -(IGHD) -IGHJ1*01 (92.9%)) [8.8.8] (1-115) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (212) (116-213), hinge (214-228), CH2 (229-338), CH3 E12 (354), M14 (357) (339-443), CHS (444-445)) (116-445)] (218-212')-disulfide with kappa light chain humanized (1'-212') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (83.3%) -IGKJ4*01 (100%))[6.3.7] (1'-105') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (151), V101 (189) (106'-212')]; dimer (224-224":227-227")-bisdisulfide; conjugated on an average of 4 cysteinyl to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

enapotamab vedotin (118)

immunoglobulin G1-kappa, anti-[*Homo sapiens* AXL (AXL receptor tyrosine kinase, tyrosine-protein kinase receptor UFO)], *Homo sapiens* monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-445) [*Homo sapiens* VH (IGHV3-23*01 (95.9%) -(IGHD) -IGHJ3*02 (100%)) [8.8.9] (1-116) -*Homo sapiens* IGHG1*03, G1m3 nG1m1 (CH1 R120 (213) (117-214), hinge (215-229), CH2 (230-339), CH3 E12 (355), M14 (357) (340-444), CHS K>del (445)) (117-445)], (219-215')-disulfide with kappa light chain (1'-215') [*Homo sapiens* V-KAPPA (IGKV3-20*01 (100%) -IGKJ2*01 (100%)) [7.3.9] (1'-108') -*Homo sapiens* IGKC*01, Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (225-225":228-228")-bisdisulfide; conjugated, on an average of 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-p-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

enfortumab vedotin (109)

immunoglobulin G1-kappa, anti-[*Homo sapiens* PVRL4 (poliovirus receptor-related 4, nectin-4, nectin 4, PPR4, LNIR], *Homo sapiens* monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-447) [*Homo sapiens* VH (IGHV3-48*02 (98.00%) -(IGHD)-IGHJ6*01) [8.8.10] (1-117) -IGHG1*03 (CH1 (118-215), hinge (216-230), CH2 (231-340), CH3 (341-445), CHS (446-447)) (118-447)], (220-214')-disulfide with kappa light chain (1'-214') [*Homo sapiens* V-KAPPA (IGKV1-12*01 (96.80%) -IGKJ4*01) [6.3.9] (1'-107') -IGKC*01 (108'-214')]; dimer (226-226":229-229")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidecaproyl-valyl-citrullinyl-*p*-aminobenzylcarbamate (mc-val-cit-PABC) linker

glembatumumab vedotin (113)

immunoglobulin G2-kappa, anti-[*Homo sapiens* GPNMB (glycoprotein (transmembrane) nmb, glycoprotein transmembrane NMB, glycoprotein nonmetastatic melanoma protein B, CG56972, osteoactivin, hematopoietic growth factor inducible neurokinin-1 type, HGFIN) extracellular domain], *Homo sapiens* monoclonal antibody conjugated to auristatin E;

gamma2 heavy chain (1-445) [*Homo sapiens* VH (IGHV4-31*02 (94.90%) -(IGHD)-IGHJ4*01) [10.7.11] (1-119) -IGHG2*01, G2m.. (CH1 (120-217), hinge (218-229), CH2 (230-338), CH3 (339-443), CHS (444-445)) (120-445)], (133-215')-disulfide with kappa light chain (1'-215') [*Homo sapiens* V-KAPPA (IGKV3-15*01 (96.80%) -IGKJ1*01) [6.3.10] (1'-108') -IGKC*01, Km3 (109'-215')]; dimer (221-221":222-222":225-225":228-228")-tetrakisdisulfide; conjugated, on an average of 5 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

iladatuzumab vedotin (117)

immunoglobulin G1-kappa, anti-[*Homo sapiens*CD79B (immunoglobulin-associated CD79 beta)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-447) [humanized VH (*Homo sapiens* IGHV3-23*04 (76.50%) -(IGHD) -IGHJ4*01) [8.8.10] (1-117) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 A1.4>C (118), R120>K (214) (118-215), hinge (216-230), CH2 (231-340), CH3 E12 (356), M14 (358) (341-445), CHS (446-447)) (119-447)], (220-218')-disulfide with kappa light chain (1'-218') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (85.90%) -IGKJ1*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01, Km3 A45.1 (157), V101 (195) (112'-218')]; dimer (226-226":229-229")-bisdisulfide; conjugated on 2 cysteinyl (at the position gamma1 CH1 1.4 (118, 118")), to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-p-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

indusatumab vedotin (112)

immunoglobulin G1-kappa, anti-[*Homo sapiens* GUCY2C (guanylate cyclase 2C, guanylyl cyclase C, GCC, guanylate cyclase C, GC-C, heat-stable enterotoxin receptor, hSTAR, intestinal guanylate cyclase)], *Homo sapiens* monoclonal antibody;
gamma1 heavy chain (1-449) [*Homo sapiens* VH (IGHV4-34*01 (94.80%) -(IGHD)-IGHJ1*01) [8.7.13] (1-119)-IGHG1*01 (CH1 (120-217), hinge (218-232), CH2 (233-342), CH3 (343-447), CHS (448-449)) (120-449)], (222-214')-disulfide with kappa light chain (1'-214') [*Homo sapiens* V-KAPPA (IGKV3-15*01 (95.80%) -IGKJ1*01 K123>N (103) [6.3.9] (1'-107') -IGKC*01 (108'-214')]; dimer (228-228":231-231")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

ladiratuzumab vedotin (117)

immunoglobulin G1-kappa, anti-[*Homo sapiens* SLC39A6 (solute carrier family 39 member 6, solute carrier family 39 (metal ion transporter) member 6, solute carrier family 39 (zinc transporter) member 6, LIV-1)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-450) [humanized VH (*Homo sapiens* IGHV1-2*02 (87.60%) -(IGHD) -IGHJ4*01) [8.8.13] (1-120) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 K120 (217) (121-218), hinge (219-233), CH2 (234-343), CH3 D12 (359), L14 (361) (344-448), CHS (449-450)) (121-450)], (223-219')-disulfide with kappa light chain (1'-219') [humanized V-KAPPA (*Homo sapiens* IGKV2-30*02 (89.00%) -IGKJ4*01) [11.3.9] (1'-112') -*Homo sapiens* IGKC*01, Km3 A45.1 (158), V101 (196) (113'-219')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-p-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

losatuxizumab vedotin (116)

immunoglobulin G1-kappa, anti-[*Homo sapiens* EGFR (epidermal growth factor receptor, receptor tyrosine-protein kinase erbB-1, ERBB1, HER1, HER-1, ERBB) delta 2-7 isoform (delta2-7EGFR, de2-7 EGFR, EGFRvIII)], humanized and chimeric monoclonal antibody conjugated to auristatin E;
humanized gamma1 heavy chain (1-446) [humanized VH (*Homo sapiens* IGHV4-30-4*01

(81.40%) -(IGHD) -IGHJ4*01) [9.7.9] (1-116) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (213) (117-214), hinge (215-229), CH2 (230-339), CH3 E12 (355), M14 (357) (340-444), CHS (445-446)) (117-446)], (219-214')-disulfide with chimeric kappa light chain (1'-214') [*Mus musculus* V-KAPPA (IGKV14-100*01 (86.30%) -IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (225-225":228-228")-bisdisulfide; conjugated, on an average of 3 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-p-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

lifastuzumab vedotin (110)

immunoglobulin G1-kappa auristatin E conjugate, anti-[*Homo sapiens* SLC34A2 (solute carrier family 34 sodium phosphate member 2, sodium/phosphate cotransporter 2B, NaPi2b, NaPi3b)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-450) [humanized VH (*Homo sapiens* IGHV3-23*04 (85.70%) -(IGHD)-IGHJ5*01) [8.8.13] (1-120) -*Homo sapiens* IGHG1*03 (CH1 R120>K (217) (121-218), hinge (219-233), CH2 (234-343), CH3 (344-448), CHS (449-450)) (121-450)], (223-219')-disulfide with kappa light chain (1'-219') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (78.00%) -IGKJ1*01) [11.3.9] (1'-112')-*Homo sapiens* IGKC*01 (113'-219')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproylvalyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

mecbotamab vedotin (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* AXL (AXL receptor tyrosine kinase, tyrosine-protein kinase receptor UFO)], humanized monoclonal antibody, conjugated to auristatin E;
gamma1 heavy chain humanized (1-449) [VH (*Homo sapiens* IGHV5-51*01 (74.2%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.13] (26-33.51-58.97-109)) (1-120) -*Homo sapiens* IGHG1*01 (100%), G1m17,1 (CH1 K120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 D12 (359), L14 (361) (344-448), CHS K2>del (449)) (121-449)], (223-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-5*03 (79.6%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-S, glycoform alfa, conjugated, on an average of 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

pinatuzumab vedotin (108)

immunoglobulin G1-kappa auristatin E conjugate, anti-[*Homo sapiens* CD22 (sialic acid binding Ig-like lectin 2, SIGLEC2, SIGLEC-2, Blymphocyte cell adhesion molecule, BL-CAM, Leu-14)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-450) [humanized VH (*Homo sapiens* IGHV3-66*01 (79.60%) -(IGHD)-IGHJ4*01) [8.8.13] (1-120) -*Homo sapiens* IGHG1*03 (CH1 R120>K (217) (121-218), hinge (219-233), CH2 (234-343), CH3 (344-448), CHS (449-450)) (121-450)], (223-219')-disulfide (if not conjugated) with kappa light chain (1'-219') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (80.00%) -IGKJ1*01) [11.3.9] (1'-112') -*Homo sapiens* IGKC*01 (113'-219')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidecaproyl-valylcitrullinyl-*p*-aminobenzylcarbamate (mc-val-cit-PABC) linker

polatuzumab vedotin (110)

immunoglobulin G1-kappa auristatin E conjugate, anti-[*Homo sapiens* CD79B (immunoglobulin-associated CD79 beta)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-447) [humanized VH (*Homo sapiens* IGHV3-23*04 (76.50%)-

(IGHD)-IGHJ4*01) [8.8.10] (1-117) -*Homo sapiens* IGHG1*03 (CH1 R120>K (214)(118-215), hinge (216-230), CH2 (231-340), CH3 (341-445), CHS (446-447)) (118-447)], (220-218')-disulfide with kappa light chain (1'-218') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (85.90%) -IGKJ1*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01 (112'-218')]; dimer (226-226":229-229")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

samrotamab vedotin (118)

immunoglobulin G1-kappa, anti-[*Homo sapiens* LRRC15 (leucine-rich repeat-containing protein 15, leucine-rich repeat induced by beta-amyloid homolog, LIB)], humanized and chimeric monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-450) [humanized VH (*Homo sapiens* IGHV1-2*02 (77.6%) -(IGHD) -IGHJ5*01 (86.7%)) [8.8.13] (1-120) -*Homo sapiens* IGHG1*01 (CH1 (121-218), hinge (219-233), CH2 (234-343), CH3 (344-448), CHS (449-450)) (121-450)], (223-214')-disulfide with kappa light chain chimeric (1'-214') [*Mus musculus* V-KAPPA (IGKV10-96*01 (85.30%) -IGKJ1*01 (91.7%)/*Homo sapiens* IGKV1-39*01 (84.2%) -IGKJ4*01 (100%)) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01,Km3 A45.1 (153), V101 (191)(108'-214')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 2 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-p-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

sirtratumab vedotin (117)

immunoglobulin G2-kappa, anti-[*Homo sapiens* SLITRK6 (SLIT and NTRK like family member 6)], *Homo sapiens* monoclonal antibody conjugated to auristatin E;
gamma2 heavy chain (1-446) [*Homo sapiens* VH (IGHV3-33*01 (96.90%) -(IGHD) -IGHJ6*01) [8.8.13] (1-120) -IGHG2*01, G2m.. (CH1 (121-218), hinge (219-230), CH2 V45.1 (281) (231-339), CH3 (340-444), CHS (445-446)) (121-446)], (134-219')-disulfide with kappa light chain (1'-219') [*Homo sapiens* V-KAPPA (IGKV2-28*01 (93.00%) -IGKJ1*01) [11.3.9] (1'-112') -IGKC*01, Km3 A45.1 (158), V101 (196) (113'-219')]; dimer (222-222":223-223":226-226":229-229")-tetrakisdisulfide; conjugated, on an average of 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

sofituzumab vedotin (110)

immunoglobulin G1-kappa auristatin E conjugate, anti-[*Homo sapiens* MUC16 (mucin 16, MUC-16, cancer antigen 125, CA125)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-446) [humanized VH (*Homo sapiens* IGHV3-48*03 (79.80%) -(IGHD)-IGHJ4*01) [9.8.9] (1-116) -*Homo sapiens* IGHG1*03 (CH1 R120>K (213) (117-214), hinge (215-229), CH2 (230-339), CH3 (340-444), CHS (445-446)) (117-446)], (219-214')-disulfide with kappa light chain (1'-214') [humanized V-KAPPA (*Homo sapiens* IGKV1-5*01 (87.90%) -IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01 (108'-214')]; dimer (225-225":228-228")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproylvalyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

telisotuzumab vedotin (115)

immunoglobulin G1-kappa, anti-[*Homo sapiens* MET (met proto-oncogene, hepatocyte growth factor (HGF) receptor, HGFR, scatter factor (SF) receptor, HGF/SF receptor, receptor tyrosine-protein kinase c-met, papillary renal cell carcinoma 2, RCCP2)], humanized monoclonal antibody conjugated to auristatin E;
gamma1 heavy chain (1-445) [humanized VH (*Homo sapiens* IGHV1-2*02 (92.90%) -(IGHD)-IGHJ4*01) [8.8.11] (1-118) -*Homo sapiens* IGHG1*03, G1m3 (CH1 (119-216), hinge K7>del, T8>C (223), T10>del (217-229), CH2 (230-339), CH3 (340-444), CHS K>del (445)) (119-445)], (221-218')-disulfide with kappa light chain (1'-218') [humanized

V-KAPPA (*Homo sapiens* IGKV4-1*01 (85.10%) -IGKJ4*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01, Km3 (112'-218')]; dimer (223-223":225-225":228:228")-trisdisulfide; conjugated, on an average of 3 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

tisotumab vedotin (113)

immunoglobulin G1-kappa, anti-[*Homo sapiens* F3 (coagulation factor III (thromboplastin, tissue factor), CD142)], *Homo sapiens* monoclonal antibody conjugated to auristatin E; gamma1 heavy chain (1-448) [*Homo sapiens* VH (IGHV3-23*01 (93.90%) -(IGHD)-IGHJ5*01) [8.8.11] (1-118) -IGHG1*03, G1m3 (CH1 (119-216), hinge (217-231), CH2 (232-341), CH3 (342-446), CHS (447-448)) (119-448)], (221-214')-disulfide with kappa light chain (1'-214') [*Homo sapiens* V-KAPPA (IGKV1D-16*01 (96.80%) -IGKJ2*01) [6.3.9] (1'-107') -IGKC*01, Km3 (108'-214')]; dimer (227-227":230-230")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

vandortuzumab vedotin (112)

immunoglobulin G1-kappa, anti-[*Homo sapiens* STEAP1 (six-transmembrane epithelial antigen of the prostate 1, PRSS24, STEAP)], humanized monoclonal antibody; gamma1 heavy chain (1-454) [humanized VH (*Homo sapiens* IGHV3-48*03 (80.80%) -(IGHD)-IGHJ4*01) [9.7.17] (1-124) -*Homo sapiens* IGHG1*03 (CH1 R120>K (221) (125-222), hinge (223-237),CH2 (238-347), CH3 (348-452), CHS (453-454)) (125-454)], (227-220')-disulfide with kappa light chain (1'-220') [humanized V-KAPPA (*Homo sapiens* IGKV1-16*01 (81.20%) -IGKJ1*01) [12.3.9] (1'-113') -*Homo sapiens* IGKC*01 (114'-220')]; dimer (233-233":236-236")-bisdisulfide; conjugated, on an average of 3 to 4 cysteinyl, to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

zilovertamab vedotin (124)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ROR1 (receptor tyrosine kinase like orphan receptor 1, NTRKR1)], humanized monoclonal antibody conjugated to auristatin E; gamma1 heavy chain humanized (1-446) [VH (*Homo sapiens* IGHV2-70*19 (65.0%) -(IGHD) -IGHJ4*01 (93.3%) Q120>H (108)) CDR-IMGT [8.7.10] (26-33.51-57.96-105) (1-116) -*Homo sapiens* IGHG1*01 (100%) G1m17,1 (CH1 K120 (213) (117-214), hinge 1-15 (215-229), CH2 (230-339), CH3 D12 (355), L14 (357) (340-444), CHS (445-446)) (117-446)], (219-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV3D-11*02 (67.8%) -IGKJ4*01 (90.9%) G120>E (100)) CDR-IMGT [6.3.9] (27-32.50-52.89-97) (1'-107') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (225-225":228-228")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa; conjugated on an average of 4.0 ± 0.5 cysteinyl to monomethylauristatin E (MMAE), via a cleavable maleimidocaproyl-valyl-citrullinyl-*p*-aminobenzyloxycarbonyl (mc-val-cit-PABC) type linker

zovodotin

(3*RS*)-1-[(6*S*,9*S*)-1-amino-6-{[4-({*N*,*N*-dimethyl-L-valyl-L-valyl-(3*R*,4*S*,5*S*)-3-methoxy-5-methyl-4-(methylamino)heptanoyl-(2*R*,3*R*)-3-methoxy-2-methyl-3-[(2*S*)-pyrrolidin-2-yl]propanoyl}sulfamoyl)phenyl]carbamoyl}-1,8,11-trioxo-9-(propan-2-yl)-14,17,20-trioxa-2,7,10-triazadocosan-22-yl]-2,5-dioxopyrrolidin-3-yl

zanidatamab zovodotin (126)

immunoglobulin half-IG G1-kappa/scFv-h-CH2-CH3, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody, biparatopic (targeting two different non-overlapping epitopes on ERBB2, on extracellular domains 2 (ECD2) and 4 (ECD4)), conjugated to a derivative of auristatin;

gamma1 heavy chain, anti-ERBB2 extracellular domain 2 (ECD2), humanized (1-449) [VH humanized (*Homo sapiens* IGHV3-66*01 (78.8%) -(IGHD) -IGHJ4*01 (100%)) CDR-IMGT[8.8.12] (27-34.52-59.98-109) (1-120) -*Homo sapiens* IGHG1*01 G1m17,1 (CH1 K120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 T6>V (353), L7>Y (354), D12 (359), L14 (361), F85.1>A (408), Y86>V (410) (344-448), CHS K2>del (449)) (121-449)], (223- 215')-disulfide with kappa light chain, anti ERBB2 ECD2, humanized (1'-215') [V-KAPPA humanized (*Homo sapiens* IGKV1-16*01 (84.2%) -IGKJ1*01 (100%)) CDR-IMGT [6.3.9] (28-33.51-53.90-98) (1'-108') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (154), V101 (192) (109'-215')];
IG scFv-h-CH2-CH3 single chain, anti-ERBB2 extracellular domain 4 (ECD4), humanized (1"-481") [scFv V-kappa-VH anti-ERBB2 ECD4 (1'-248') [V-KAPPA humanized (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ1*01 (100%)) CDR-IMGT [6.3.9] (28-33.51-53.90-98) (1'-108') -20-mer pentakis(diglycyl-seryl-glycyl) linker (109"-128") -VH humanized (*Homo sapiens* IGHV3-66*01 (81.6%) -(IGHD) -IGHJ4*01 (100%)) CDR-IMGT [8.8.13] (154-161.179-186.225-237) (129"-248")] -dialanyl linker (249"-250") -*Homo sapiens* IGHG1*01 h-CH2-CH3, G1m1 (251"-481") [hinge 1-15, C5>S (255) (251-265), CH2 (266-375), CH3 T6>V (385), D12 (391), L14 (393), T22>L (401), K79>L (427), T81>W (429) (376-480), CHS K2>del (481)]]; dimer (229-261":232-264")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa, conjugated, on an average of 2 to 3 cysteinyl, to a sulfonamide containing auristatin derivative, via a cleavable 1-maleimido-3,6,9-trioxadodecan-12-oyl-valyl-citrullyl linker

-mab & -imod (for *immunomodulators, both stimulant/suppressive and stimulant*)

imbotolimod

1-[4-(4-amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-8-yl)piperazin-1-yl]-3,6,9,12,15,18,21,24,27,30-decaoxatritriacontan-33-oyl

trastuzumab imbotolimod (127)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody, conjugated to imbotolimod, comprising a linker and a derivative of *telratolimod*;
gamma1 heavy chain humanized (1-449) [VH (*Homo sapiens* IGHV3-66*01 (81.6%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.13] (26-33.51-58.97-109)) (1-120) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 E12 (359), M14 (361) (344-448), CHS K2>del (449)) (121-449)], (223-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa, conjugated at N^6 of an average of 2.5 lysyl residues with 1-[4-(4-amino-2-butyl-1*H*-imidazo[4,5-*c*]quinolin-8-yl)piperazin-1-yl]-3,6,9,12,15,18,21,24,27,30-decaoxatritriacontan-33-oyl (imbotolimod) groups

zuvotolimod

pertuzumab zuvotolimod (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody, conjugated via a cleavable linker to an analogue of *motolimod* (an agonist for the toll-like receptor 8, TLR8);
gamma1 heavy chain humanized (1-448) [VH (*Homo sapiens* IGHV3-66*01 (78.8%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.12] (26-33.51-58.97-108)) (1-119) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (216) (120-217), hinge 1-15

(218-232), CH2 (233-342), CH3 E12 (358), M14 (360) (343-447), CHS K2>del (448)) (120-448)], (222-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-NL1*01 (84.2%) -IGKJ2*01 (91.7%) L124>V (104), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (228-228":231-231")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-K1, glycoform alfa, substituted at S of an average of 4 cysteinyl residues of reduced inter-chain disulfide bridges with (11*S*,14*S*,22^{3}*RS*)-1^{2}-amino-11-[3-(carbamoylamino)propyl]-1^{4}-(dipropylcarbamoyl)-2,5,10,13,16,22^{2},22^{5}-heptaoxo-14-(propan-2-yl)-4^{7},4^{8}-dihydro-1^{3}*H*,4^{5}*H*-6-oxa-3,9,12,15-tetraaza-1(8)-[1]benzazepina-4(3,6)-[1,6]naphthyridina-22(1)-pyrrolidina-8(1,4)-benzenadocosaphan-22^{3}-yl (zuvotolimod) groups

-mab & -irine (for *cytotoxic pyrrolobenzodiazepine dimers and analogues*)

pamozirine

(1^{11a}*S*,9^{11}*S*,9^{11a}*S*,16*S*,19*S*,27^{3}*RS*)-9^{11}-hydroxy-1^{7},9^{7}-dimethoxy-1^{2},9^{2},16-trimethyl-1^{5},9^{5},10,15,18,21,27^{2},27^{5}-octaoxo-19-(propan-2-yl)-1^{5},1^{11a},9^{11},9^{11a}-tetrahydro-1^{1}*H*,9^{1}*H*,9^{5}*H*-2,8,11-trioxa-14,17,20-triaza-1(8),9(8,10)-bis(pyrrolo[2,1-*c*][1,4]benzodiazepina)-27(1)-pyrrolidina-13(1,4)-benzenaheptacosaphan-27^{3}-yl

tamrintamab pamozirine (120)

immunoglobulin G1-kappa, anti-[*Homo sapiens* DPEP3 (dipeptidase 3)], humanized monoclonal antibody conjugated to a pyrrolobenzodiazepine dimer (PBD) SC-DR002 via light Cys215;
gamma1 heavy chain humanized (1-452) [VH (*Homo sapiens* IGHV1-69*01 (85.7%) -(IGHD) -IGHJ6*01 (90.9%)) [8.8.16] (1-123) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 K120 (220) (124-221), hinge C5>S (226) (222-236), CH2 (237-346), CH3 D12 (362), L14 (364) (347-451), CHS K>del (452)) (124-452)], non-covalently associated with kappa light chain humanized (1'-215') [V-KAPPA (*Homo sapiens* IGKV3D-20*01 (86.50%) -IGKJ2*01 (100.0%)) [7.3.9] (1'-108'),-*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (232-232":235-235")-bisdisulfide; conjugated at each CL C126 (215', 215'") to a pyrrolobenzodiazepine dimer (PBD) SC-DR002 via a protease-cleavable maleimide linker (LD6.23)

sunirine

(3Ξ)-1-[2-(6-{[(2*S*)-1-({(2*S*)-1-[3-({[(12*S*,12a*S*)-8-methoxy-6-oxo-12-sulfo-11,12,12a,13-tetrahydro-6*H*-indolo[2,1-*c*][1,4]benzodiazepin-9-yl]oxy}methyl)-5-({[(12a*S*)-8-methoxy-6-oxo-11,12,12a,13-tetrahydro-6*H*-indolo[2,1-*c*][1,4]benzodiazepin-9-yl]oxy}methyl)anilino]-1-oxopropan-2-yl}amino)-1-oxopropan-2-yl]amino}-6-oxohexanamido)ethyl]-2,5-dioxopyrrolidin-3-yl

pivekimab sunirine (125)

immunoglobulin G1-kappa, anti-[*Homo sapiens* IL3RA (interleukin 3 receptor subunit alpha, interleukin 3 receptor, alpha (low affinity), CD123)], monoclonal antibody, conjugated with sulfonated DGN549-C, a cytotoxic indolobenzodiazepine dimer bonded to a protease-cleavable maleimidoethylamino-adipyl-Ala-Ala linker;
gamma1 heavy chain (1-450) [VH (*Homo sapiens* IGHV1-46*01 (80.6%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.14] (26-33.51-58.97-110)) (1-121) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 K120 (218) (122-219), hinge 1-15 (220-234), CH2 (235-344), CH3 D12 (360), L14 (362), S122>C (446) (345-449), CHS K2>del (450)) (122-450)], (224-214')-disulfide with kappa light chain (1'-214') [V-KAPPA Musmus/Homsap (*Mus musculus* IGKV14-111*01 (83.2%) -IGKJ2*03 (83.3%) S120>Q (100), L124>V (104)/*Homo sapiens* IGKV1-16*01 (82.1%) -IGKJ2*01 (91.7%) L124>V (104), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (230-230":233-233")-bisdisulfide, produced in a Chinese hamster ovary (CHO)-K1 cell line, glycoform alfa; conjugated at the sulfur atoms of Cys^{446} and Cys$^{446"}$

with approximately two (3Ξ)-1-[2-(6-{[(2*S*)-1-({(2*S*)-1-[3-({[(12*S*,12a*S*)-8-methoxy-6-oxo-12-sulfo-11,12,12a,13-tetrahydro-6*H*-indolo[2,1-*c*][1,4]benzodiazepin-9-yl]oxy}methyl)-5-({[(12a*S*)-8-methoxy-6-oxo-11,12,12a,13-tetrahydro-6*H*-indolo[2,1-*c*][1,4]benzodiazepin-9-yl]oxy}methyl)anilino]-1-oxopropan-2-yl}amino)-1-oxopropan-2-yl]amino}-6-oxohexanamido)ethyl]-2,5-dioxopyrrolidin-3-yl (*sunirine*) groups

talirine

S^{239},$S^{239''}$-bis[($2^{11a}S$,$8^{11a}S$,12*S*,15*S*,$23^{3}RS$)-1^{4},2^{7},8^{7}-trimethoxy-12-methyl-2^{5},8^{5},11,14,17,23^{2},23^{5}-heptaoxo-15-(propan-2-yl)-2^{5},2^{11a},8^{5},8^{11a}-tetrahydro-$2^{1}H$,$8^{1}H$-3,7-dioxa-10,13,16-triaza-2(2,8),8(8,2)-bis(pyrrolo[2,1-*c*][1,4]benzodiazepina)-23(1)-pyrrolidina-1(1),9(1,4)-dibenzenatricosaphan-23^{3}-yl]

serclutamab talirine (120)

immunoglobulin G1-kappa, anti-[*Homo sapiens* EGFR (epidermal growth factor receptor, receptor tyrosine-protein kinase erbB-1, ERBB1, HER1, HER-1, ERBB)], monoclonal antibodyconjugated to the pyrrolobenzodiazepine (PDB) dimer SGD-1882;
gamma1 heavy chain (1-446) [VH (*Homo sapiens* IGHV4-30-4*01 (81.4%) -(IGHD) -IGHJ4*01 (92.9%)) [9.7.9] (1-116) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (213) (117-214), hinge (215-229), CH2 S3>C (238) (230-339), CH3 E12 (355), M 14 (357) (340-444), CHS (445-446)) (117-446)], (219-214')-disulfide with kappa light chain (1'-214') [V-KAPPA (*Mus musculus* IGKV14-100*01 (86.3%) -IGKJ1*01 (100%)/*Homo sapiens* IGKV1-12*01 (74.7%) -IGKJ4*01 (90.9%)) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (225-225'':228-228'')-bisdisulfide; conjugated, on two site-specific drug attachment engineered cysteines (C238, C238''), to pyrrolobenzodiazepine (PDB) dimers SGD-1882, via a cathepsin-cleavable maleimidocaproyl-valine-alanine (MC-Val-Ala) type linker

vadastuximab talirine (113)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD33 (sialic acid binding Ig-like lectin 3, SIGLEC3, SIGLEC-3, gp67, p67)], chimeric monoclonal antibody conjugated to the pyrrolobenzodiazepine (PDB) dimer SGD-1882;
gamma1 heavy chain (1-447) [*Mus musculus* VH (IGHV1-85*01 -(IGHD)-IGHJ4*01) [8.8.10] (1-117) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 (118-215), hinge (216-230), CH2 S3>C (239) (231-340), CH3 (341-445), CHS (446-447)) (118-447)], (220-214')-disulfide with kappa light chain (1'-214') [*Mus musculus* V-KAPPA (IGKV14-111*01 -*Homo sapiens* IGKJ4*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (108'-214')]; dimer (226-226'':229-229'')-bisdisulfide; conjugated, on two site-specific drug attachment engineered cysteines (C239, C239''), to a maximum of 2 pyrrolobenzodiazepine (PDB) dimers SGD-1882, each via a cleavable (valine-alanine dipeptide as cathepsine B cleavage site) maleimidocaproyl type linker

tesirine

($1^{11a}S$,$9^{11}S$,$9^{11a}S$,16*S*,19*S*,$52^{3}RS$)-9^{11}-hydroxy-1^{7},9^{7}-dimethoxy-1^{2},9^{2},16-trimethyl-1^{5},9^{5},10,15,18,21,49,52^{2},52^{5}-nonaoxo-19-(propan-2-yl)-1^{5},1^{11a},9^{11},9^{11a}-tetrahydro-$1^{1}H$,$9^{1}H$,$9^{5}H$-2,8,11,24,27,30,33,36,39,42,45-undecaoxa-14,17,20,48-tetraaza-1(8),9(8,10)-bis(pyrrolo[2,1-*c*][1,4]benzodiazepina)-52(1)-pyrrolidina-13(1,4)benzenadopentacontaphan-52^{3}-yl

camidanlumab tesirine (117)

immunoglobulin G1-kappa, anti-[*Homo sapiens* IL2RA (interleukin 2 receptor alpha subunit, IL-2RA, TAC, p55, CD25)], *Homo sapiens* monoclonal antibody conjugated to the pyrrolobenzodiazepine (PBD) dimer SCX;
gamma1 heavy chain (1-445) [*Homo sapiens* VH (IGHV1-69*02 (94.90%) -(IGHD) -IGHJ4*01) [8.8.8] (1-115) -*Homo sapiens* IGHG1*03, G1m3, nG1m1 (CH1 R120 (212) (116-213), hinge (214-228), CH2 (229-338), CH3 E12 (354), M14 (356) (339-443), CHS (444-445)) (116-445)], (218-214')-disulfide with kappa light chain (1'-214') [*Homo sapiens* V-KAPPA (IGKV3-20*01 (99.00%) -IGKJ4*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (224-224'':227-227'')-bisdisulfide;

conjugated, on an average of 2 cysteines, to the pyrrolobenzodiazepine (PBD) dimer SCX, via a cleavable (valine-alanine dipeptide as cathepsine B cleavage site) maleimide type linker containing a spacer PEG (n=8)

loncastuximab tesirine (117)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD19 (B lymphocyte surface antigen B4, Leu-12)], chimeric monoclonal antibody conjugated to the pyrrolobenzodiazepine (PBD) dimer SCX;
gamma1 heavy chain (1-449) [*Mus musculus* VH (IGHV1-69*02 (85.70%) -(IGHD) -IGHJ4*01) [8.8.13] (1-120) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (217) (121-218), hinge (219-233), CH2 (234-343), CH3 E12 (359), M14 (361) (344-448), CHS K2>del (449)) (121-449)], (223-211')-disulfide with kappa light chain (1'-211') [*Mus musculus* V-KAPPA (IGKV4-70*01 (91.40%) -IGKJ1*01) [5.3.7] (1'-104') -*Homo sapiens* IGKC*01, Km3 A45.1 (150), V101 (188) (105'-211')]; dimer (229-229":232-232")-bisdisulfide;conjugated, on an average of 2 cysteines, to the pyrrolobenzodiazepine (PBD) dimer SCX, via a cleavable (valine-alanine dipeptide as cathepsine B cleavage site) maleimide type linker containing a spacer PEG (n=8)

rovalpituzumab tesirine (113)

immunoglobulin G1-kappa, anti-[*Homo sapiens* DLL3 (delta-like ligand 3*)*], humanized monoclonal antibody conjugated to the pyrrolobenzodiazepine (PBD) dimer SCX;
gamma1 heavy chain (1-447) [humanized VH (*Homo sapiens* IGHV1-18*01 (86.700%) -(IGHD)-IGHJ4*01) [8.8.11] (1-118) -*Homo sapiens* IGHG1*01 G1m17,1 (CH1 (119-216), hinge (217-231), CH2 (232-341), CH3 (342-446), CHS K2>del (447)) (119-447)], (221-214')-disulfide with kappa light chain (1'-214') [humanized V-KAPPA (*Homo sapiens* IGKV3-15*01 (87.40%) -IGKJ2*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (108'-214')]; dimer (227-227":230-230")-bisdisulfide; conjugated, on an average of 2 cysteines, to the pyrrolobenzodiazepine (PBD) dimer SCX, via a cleavable (valine-alanine dipeptide as cathepsine B cleavage site) maleimide type linker containing a spacer PEG (n=8)

uzoptirine

2-acetamido-4-*O*-{2-acetamido-2,6-dideoxy-6-[(1^{11a}*S*,9^{11}*S*,9^{11a}*S*,16*S*,19*S*,35^{5a}*RS*,35^{6}*SR*,35^{6a}*SR*)-9^{11}-hydroxy-1^{7},9^{7}-dimethoxy-1^{2},9^{2},16-trimethyl-1^{5},9^{5},10,15,18,21,30,30,32-nonaoxo-19-(propan-2-yl)-1^{5,11a},9^{11,11a},35^{5,5a,6,6a,7,8}-decahydro-1^{1}*H*,9^{1}*H*,9^{5}*H*-2,8,11,23,26,33-hexaoxa-30λ^{6}-thia-14,17,20,29,31-pentaaza-1(8),9(8,10)-bis(pyrrolo[2,1-*c*][1,4]benzodiazepina)-35(6)-cyclopropa[5,6]cycloocta[1,2-*d*][1,2,3]triazola-13(1,4)-benzenapentatriacontaphan-35^{1}(35^{4}*H*)-yl]-β-D-galactopyranosyl}-2-deoxy-β-D-glucopyranosyl groups [thereof minor amounts (~10 %) substituted with a 6-*O*-(6-deoxy-α-L-galactopyranosyl) group (6-*O*-fucosylated)]

mipasetamab uzoptirine (123)

immunoglobulin G1-kappa, anti-[*Homo sapiens* AXL (AXL receptor tyrosine kinase, tyrosine-protein kinase receptor UFO)], humanized monoclonal antibody conjugated to the pyrrolobenzodiazepine (PBD) dimer, SG3199;
gamma1 heavy chain humanized (1-451) [VH humanized (*Homo sapiens* IGHV3-30*03 (92.9%) -(IGHD) -IGHJ4*01 (92.3%)) CDR-IMGT [8.8.15] (26-33.51-58.97-111) (1-122) -*Homo sapiens* IGHG1*03 nG1m1 (CH1 R120>K (219) (123-220), hinge 1-15 (221-235), CH2 (236-345), CH3 E12 (361), M14 (363) (346-450), CHS K>del (451)) (123-451)], (225-215')-disulfide with kappa light chain humanized (1'-215') [V-KAPPA (*Homo sapiens* IGKV3-11*01 (84.4%) -IGKJ4*01 (90.9%)) CDR-IMGT [7.3.9] (27-33.51-53.90-98) (1'-108') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (231-231":234-234")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa; conjugated on the two glycoengineered N84.4, via a spacer and a cleavable valine-alanine linker, to the cytotoxic pyrrolobenzodiazepine (PBD) dimer, SG3199

-mab & -onide (for *steroids for topical use, acetal derivatives*)

fosimdesonide

2-{[2-({(2*S*)-4-carboxy-1-[4-({4-[11β-hydroxy-3,20-dioxo-21-(phosphonooxy)-2'*H*,16β*H*-[1,3]dioxolo[4',5':16,17]pregna-1,4-dien-2'α-yl]phenyl}methyl)anilino]-1-oxobutan-2-yl}amino)-2-oxoethyl]amino}-2-oxoethyl

adalimumab fosimdesonide (127)

immunoglobulin G1-kappa, anti-[*Homo sapiens* TNF (tumor necrosis factor (TNF) superfamily member 2, TNFSF2, TNF-alpha, TNFA)], *Homo sapiens* monoclonal antibody, conjugated to a derivative of the glucocorticoid receptor modulator (GRM) *desonide (24)(12)* via a (cystein-*S*-yl)acetyl-Gly-Glu link;
gamma1 heavy chain *Homo sapiens* (1-450) [VH (*Homo sapiens* IGHV3-9*01 (93.9%) -(IGHD) -IGHJ4*01 (92.9%)) CDR-IMGT [8.8.14] (26-33.51-58.97-110) (1-121) -*Homo sapiens* IGHG1*01 (100%) G1m17,1 (CH1 K120 (218) (122-219), hinge 1-15 (220-234), CH2 (235-344), CH3 D12 (360), L14 (362) (345-449), CHS K>del (450)) (122-450)], (224-214')-disulfide with kappa light chain *Homo sapiens* (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-27*01 (95.8%) -IGKJ2*01 (91.7%) L124>V (104)) CDR-IMGT [6.3.9] (27-32.50-52.89-97) (1'-107') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (230-230":233-233")-bisdisulfide, produced in a Chinese hamster ovary (CHO) cell line derived from CHO-K1, glycoform alfa; conjugated at the S atoms of the reduced cysteinyl 224, 214', 224" and 214'" with four 2-{[2-({(2S)-4-carboxy-1-[4-({4-[11β-hydroxy-3,20-dioxo-21-(phosphonooxy)-2'*H*,16β*H*-[1,3]dioxolo[4',5':16,17]pregna-1,4-dien-2'α-yl]phenyl}methyl)anilino]-1-oxobutan-2-yl}amino)-2-oxoethyl]amino}-2-oxoethyl (fosimdesonide) groups

antibody *& pactil*

pactil

acetyl at C-4 of phenylalanine residues in proteins

anvatabart pactil (127)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody, conjugated at two engineered phenylalanine sites with *p*-acetyl groups;
gamma1 heavy chain humanized (1-449) [VH humanized (Homo sapiens IGHV3-66*01 (81.6%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.13] (26-33.51-58.97-109)) (1-120) -Homo sapiens IGHG1*01, G1m17,1 (CH1 A1.4>**F** (pAF) (121), K120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 D12 (359), L14 (361) (344-448), CHS K2>del (449)) (121-449)], (223-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (Homo sapiens IGKV1-39*01 (86.3%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -Homo sapiens IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide , produced in Chinese hamster ovary (CHO) cells, cell line CHO-K1, glycoform alfa; substituted with two acetyl groups at C-4 of Phe121 and Phe121"

antibody *& -siran*

etedesiran

all-P-ambo-2'-*O*-methyl-*P*-thiouridylyl-(3'→5')-2'-deoxy-2'-fluoro-*P*-thiouridylyl-(3'→5')-2'-*O*-methylcytidylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyladenylyl-(3'→5')-2'-deoxy-2'-fluoroadenylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyladenylyl-(3'→5')-2'-*O*-methylcytidylyl-(3'→5')-2'-*O*-methyladenylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyluridylyl-(3'→5')-2'-*O*-methyluridylyl-(3'→5')-2'-deoxy-2'-fluorocytidylyl-(3'→5')-2'-*O*-

methyluridylyl-(3'→5')-2'-deoxy-2'-fluoroadenylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyl-*P*-thioguanylyl-(3'→5')-2'-*O*-methyluridylyl-(3'→5')-2'-*O*-methyluridine duplex with *all*-*P*-*ambo*-(3*RS*)-1-({*cis*- or *trans*-4-[(6-{[2'-*O*-methyl-*P*-thioadenylyl-(5'→3')-2'-*O*-methyl-*P*-thioadenylyl-(5'→3')-2'-*O*-methylguanylyl-(5'→3')-2'-*O*-methylcytidylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methylcytidylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methylguanylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-deoxy-2'-fluorocytidylyl-(5'→3')-2'-deoxy-2'-fluoroadenylyl-(5'→3')-2'-deoxy-2'-fluoroadenylyl-(5'→3')-2'-*O*-methylguanylyl-(5'→3')-2'-*O*-methyladenylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methyl-*P*-thiocytidylyl-(5'→3')-2'-*O*-methyl-*P*-thiocytidylyl-(5'→3')-2'-*O*-methyl-5'-cytidylyl]oxy}hexyl)carbamoyl]cyclohexyl}methyl)-2,5-dioxopyrrolidin-3-yl

delpacibart etedesiran (127)

immunoglobulin G1-kappa, anti-[*Homo sapiens* TFRC (transferrin receptor, TfR1)], humanized monoclonal antibody; conjugated via a 4-(maleimidomethyl) cyclohexanecarboxamide (MCC) linker with a double-stranded small interfering RNA (siRNA) which causes cleavage of the mRNA that encodes myotonin-protein kinase (MT-PK, myotonic dystrophy 1 protein kinase, DM1 protein kinase, DMPK, DM-kinase, DMK, EC:2.7.11.1);
gamma1 heavy chain humanized (1-445) [VH (*Homo sapiens* IGHV1-2*06 (87.8%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.9] (26-33.51-58.97-105)) (1-116) -*Homo sapiens* IGHG1*03, G1m3, nG1m1, G1v14 CH2 A1.3, A1.2, G1v48 CH2 R113 (CH1 R120 (213) (117-214), hinge 1-15 (215-229), CH2 L1.3>A (233), L1.2>A (234), L113>R (327) (230-339), CH3 E12 (355), M14 (357) (340-444), CHS K2>del (445)) (117-445)], (219-214)-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-NL1*01 (84.2%) -IGKJ4*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (225-225": 228-228")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, glycoform alfa; substituted on average at one sulfur atom of a reduced cysteine residue 219, 225, 214', 219", 225", or 214"' with an *all*-*P*-*ambo*-2'-*O*-methyl-*P*-thiouridylyl-(3'→5')-2'-deoxy-2'-fluoro-*P*-thiouridylyl-(3'→5')-2'-*O*-methylcytidylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyladenylyl-(3'→5')-2'-deoxy-2'-fluoroadenylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyladenylyl-(3'→5')-2'-*O*-methylcytidylyl-(3'→5')-2'-*O*-methyladenylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyluridylyl-(3'→5')-2'-*O*-methyluridylyl-(3'→5')-2'-deoxy-2'-fluorocytidylyl-(3'→5')-2'-*O*-methyluridylyl-(3'→5')-2'-deoxy-2'-fluoroadenylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methylguanylyl-(3'→5')-2'-*O*-methyl-*P*-thioguanylyl-(3'→5')-2'-*O*-methyluridylyl-(3'→5')-2'-*O*-methyluridine duplex with *all*-*P*-*ambo*-(3*RS*)-1-({*cis*- or *trans*-4-[(6-{[2'-*O*-methyl-*P*-thioadenylyl-(5'→3')-2'-*O*-methyl-*P*-thioadenylyl-(5'→3')-2'-*O*-methylguanylyl-(5'→3')-2'-*O*-methylcytidylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methylcytidylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methylguanylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-deoxy-2'-fluorocytidylyl-(5'→3')-2'-deoxy-2'-fluoroadenylyl-(5'→3')-2'-deoxy-2'-fluoroadenylyl-(5'→3')-2'-*O*-methylguanylyl-(5'→3')-2'-*O*-methyladenylyl-(5'→3')-2'-*O*-methyluridylyl-(5'→3')-2'-*O*-methyl-*P*-thiocytidylyl-(5'→3')-2'-*O*-methyl-*P*-thiocytidylyl-(5'→3')-2'-*O*-methyl-5'-cytidylyl]oxy}hexyl)carbamoyl]cyclohexyl}methyl)-2,5-dioxopyrrolidin-3-yl (etedesiran) group

antibody & *tazide*

tazide

azidomethyl

ispectamab tazide (127)

immunoglobulin G1-kappa [186,410-bis[4-(azidomethyl)-L-phenylalanine]], anti-[*Homo sapiens* TNFRSF17 (TNF receptor superfamily member 17, tumor necrosis factor receptor

superfamily, member 17, B cell maturation antigen, BCMA, BCM, TNFRSF13A, CD269)], humanized monoclonal antibody;
L-methionyl (1)-gamma1 heavy chain humanized (1-453) [VH (*Homo sapiens* IGHV3-66*01 (82.7%) -(IGHD) -IGHJ4*01 (92.9%), CDR-IMGT [8.8.15] (27-34.52-59.98-112)) (1-123) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 Y85.2>**F** (pAMF) (186), R120>K (220) (124-221), hinge 1-15 (222-236), CH2 (237-346), CH3 E12 (362), M14 (364), F85.2>**F** (pAMF) (410) (347-451), CHS (452-453)) (124-453)], (226-215')-disulfide with L-methionyl (1')-kappa light chain humanized (1'-215') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (84.2%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (28-33.51-53.90-98)) (1'-108') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (232-232":235-235")-bisdisulfide, produced by a cell-free protein synthesis system based on *Escherichia coli* lysate, non-glycosylated, conjugated at C-4 of the four L-phenylalanyl residues 186, 410, 186" and 410" with azidomethyl (tazide) groups by genetically predetermined incorporation of 4-(azidomethyl)-L-phenylalanyl residues in these specific positions

luveltamab tazide (126)
immunoglobulin G1-kappa, anti-[Homo sapiens FOLR1 (folate receptor 1, folate receptor alpha, FR-alpha, adult folate-binding protein, FBP, ovarian tumor-associated antigen MOv18)], humanized monoclonal antibody, genetically modified at four specific positions with reactive
4-(azidomethyl)-L-phenylalanine residues;
gamma1 heavy chain humanized (1-455) [VH (*Homo sapiens* IGHV3-66*01 (79.6%) -(IGHD) -IGHJ4*01 (93.3%), CDR-IMGT [8.8.17] (27-34.52-59.98-114)) (1-125) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 Y85.2>F (pAMF) (188), R120>K (222) (126-223), hinge 1-15 (224-238), CH2 (239-348), CH3 E12 (364), M14 (366), F85.2>**F** (pAMF) (412) (349-453), CHS (454-455)) (126-455)], (228-215')-disulfide with kappa light chain humanized (1'-215') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (28-33.51-53.90-98)) (1'-108') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (234-234":237-237")-bisdisulfide, produced by a cell-free protein synthesis system based on Escherichia coli lysate, non-glycosylated; conjugated at C-4 of the four L-phenylalanyl residues 188, 412, 188" and 412" with azidomethyl (tazide) groups

-mab & -tecan (for *antineoplastics, topoisomerase I inhibitors*)

deruxtecan
(3*RS*)-1-[(10*S*)-10-benzyl-1-{[(1*S*,9*S*)-9-ethyl-5-fluoro-9-hydroxy-4-methyl-10,13-dioxo-2,3,9,10,13,15-hexahydro-1*H*,12*H*-benzo[*de*]pyrano [3',4':6,7]indolizino[1,2-*b*]quinolin-1-yl]amino}-1,6,9,12,15,18-hexaoxo-3-oxa-5,8,11,14,17-pentaazatricosan-23-yl]-2,5-dioxopyrrolidin-3-yl

datopotamab deruxtecan (123)
immunoglobulin G1-kappa, anti-[*Homo sapiens* TACSTD2 (tumor-associated calcium signal transducer 2, membrane component chromosome 1 surface marker 1, M1S1, gastrointestinal tumor-associated antigen GA7331, pancreatic carcinoma marker protein GA733-1, epithelial glycoprotein-1, EGP-1, trophoblast antigen-2, cell surface glycoprotein Trop-2, TROP2)], humanized monoclonal antibody conjugated to *deruxtecan*, comprising a linker and a camptothecin derivative;
gamma1 heavy chain humanized (1-451) [VH (*Homo sapiens* IGHV1-3*01(79.6%) -(IGHD) -IGHJ4*01 (93.3%)) CDR-IMGT [8.8.14] (26-33.51-58.97-110) (1-121) -*Homo sapiens* IGHG1*03 (100%) G1m3, nG1m1 (CH1 R120 (218) (122-219), hinge 1-15 (220-234), CH2 (235-344), CH3 E12 (360), M14 (362) (345-449), CHS (450-451)) (122-451)], (224-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (84.2%) -IGKJ2*01 (100%)) CDR-IMGT [6.3.9] (27-32.50-52.89-97) (1'-107') -

Homo sapiens IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (230-230":233-233")-bisdisulfide; produced in Chinese hamster ovary (CHO) cells, glycoform alfa, conjugated, on an average of 4 cysteinyl, to *deruxtecan*, comprising a linker and a camptothecin derivative

ifinatamab deruxtecan (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD276 (B7H3, B7-H3, B7-related protein 2, B7RP2, B7RP-2, B7 homolog 3, B7 homologue 3)], humanized monoclonal antibody, conjugated to deruxtecan, comprising a linker and a camptothecin derivative;
gamma1 heavy chain humanized (1-452) [VH (*Homo sapiens* IGHV1-3*01 (83.7%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.15] (26-33.51-58.97-111)) (1-122) -*Homo sapiens* IGHG1*03 (100%), G1m3, nG1m1 (CH1 R120 (219) (123-220), hinge 1-15 (221-235), CH2 (236-345), CH3 E12 (361), M14 (363) (346-450), CHS (451-452)) (123-452)], (225-213')-disulfide with kappa light chain humanized (1'-213') [V-KAPPA (*Homo sapiens* IGKV3D-11*02 (85.6%) -IGKJ1*01 (100%), CDR-IMGT [5.3.9] (27-31.49-51.88-96)) (1'-106') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (152), V101 (190) (107'-213')]; dimer (231-231":234-234")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-K1SV, glycoform alfa, conjugated, on an average of 4 cysteinyl, each via a thioether bond, to *deruxtecan*, comprising a linker and a camptothecin derivative.

patritumab deruxtecan (121)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB3 (receptor tyrosine-protein kinase erbB-3, HER3)], *Homo sapiens* monoclonal antibody, conjugated to deruxtecan, comprising a linker and a camptothecin derivative;
gamma1 heavy chain *Homo sapiens* (1-447) [VH (*Homo sapiens* IGHV4-34*01 (99.0%) -(IGHD) -IGHJ2*01 (100%)) [8.7.11] (1-117) -*Homo sapiens* IGHG1*03 (100%) G1m3, nG1m1 (CH1 R120 (214) (118-215), hinge 1-15 (216-230), CH2 (231-340), CH3 E12 (356), M14 (358) (341-445), CHS (446-447)) (123-452)], (220-220')-disulfide with kappa light chain *Homo sapiens* (1'-220') [V-KAPPA (*Homo sapiens* IGKV4-1*01 (95.0%) -IGKJ1*01 (100%)) [12.3.9] (1'-113') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (159), V101 (197) (114'-220')]; dimer (226-226":229-229")-bisdisulfide, produced in Chinese Hamster Ovary (CHO) cell line, glycoform alfa; conjugated, on an average of 8 cysteinyl, to deruxtecan, comprising a linker and a camptothecin derivative

trastuzumab deruxtecan (116)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody conjugated to deruxtecan, comprising a linker and a camptothecin derivative;
gamma1 heavy chain (1-450) [humanized VH (*Homo sapiens* IGHV3-66*01 (81.60%) -(IGHD)-IGHJ4*02) [8.8.13] (1-120) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (217) (121-218), hinge (219-233),CH2 (234-343), CH3 E12 (359), M14 (361) (344-448), CHS (449-450)) (121-450)], (223-214')-disulfide with kappa light chain (1'-214') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.20%) -IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 A45.1, V101 (108'-214')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 8 cysteinyl, to deruxtecan, comprising a linker and a camptothecin derivative.

govitecan

(3*RS*)-1-[(4-{[(1-{(34*S*)-38-amino-34-[(4-{[({[(4*S*)-4,11-diethyl-9-hydroxy-3,14-dioxo-3,4,12,14-tetrahydro-1*H*-pyrano[3',4':6,7]indolizino[1,2-*b*]quinolin-4-yl]oxy}carbonyl)oxy]methyl}phenyl)carbamoyl]-28,32-dioxo-3,6,9,12,15,18,21,24,30-nonaoxa-27,33-diazaoctatriacontan-1-yl}-1*H*-1,2,3-triazol-4-yl)methyl]carbamoyl}cyclohexyl)methyl]-2,5-dioxopyrrolidin-3-yl

labetuzumab govitecan (113)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CEACAM5 (carcinoembryonic antigen-related cell adhesion molecule 5, CEA, CD66e)], monoclonal antibody conjugated to 7-ethyl-10-hydroxycamptothecin (SN-38), active metabolite of irinotecan;
gamma1 heavy chain (1-449) [humanized VH (*Homo sapiens* IGHV3-48*01 (75.30%) -(IGHD)-IGHJ5*01) [8.8.12] (1-119) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 (120-217), hinge (218-232), CH2 (233-342), CH3 (343-447), CHS (448-449)) (120-449)], (222-213')-disulfide with kappa light chain (1'-213') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (85.70%) -IGKJ1*01) [6.3.8] (1'-106') -*Homo sapiens* IGKC*01, Km3 (107'-213')]; dimer (228-228":231-231")-bisdisulfide;
conjugated, on an average of 6 cysteinyl, to 7-ethyl-10-hydroxycamptothecin (SN-38), active metabolite of irinotecan (CPT-11, camptothecin-11), via a maleimide-type cleavable linker (carbonate group, 4-aminobenzyl alcohol and cathepsine-B-cleavable dipeptide Phe-Lys) and containing a triazoline group and a spacer PEG (n=8)

sacituzumab govitecan (113)

immunoglobulin G1-kappa, anti-[*Homo sapiens* TACSTD2 (tumor-associated calcium signal transducer 2, membrane component chromosome 1 surface marker 1, M1S1, gastrointestinal tumor-associated antigen GA7331, pancreatic carcinoma marker protein GA733-1, epithelial glycoprotein-1, EGP-1, trophoblast antigen-2, cell surface glycoprotein Trop-2, TROP2)], humanized monoclonal antibody conjugated to 7-ethyl-10-hydroxycamptothecin (SN-38), active metabolite of irinotecan;
gamma1 heavy chain (1-451) [humanized VH (*Homo sapiens* IGHV7-4-1*02 (85.70%) -(IGHD)-IGHJ2*01) [8.8.14] (1-121) -*Homo sapiens* IGHG1*03, Gm3 (CH1 (122-219), hinge (220-234), CH2 (235-344), CH3 (345-449), CHS (450-451)) (122-451)], (224-214')-disulfide with kappa light chain (1'-214') [humanized V-KAPPA (*Homo sapiens* IGKV1-9*01 (82.20%) -IGKJ4*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (108'-214')]; dimer (230-230":233-233")-bisdisulfide;
conjugated, on an average of 6 cysteinyl, to 7-ethyl-10-hydroxycamptothecin (SN-38), active metabolite of irinotecan (CPT-11, camptothecin-11), via a maleimide-type cleavable linker (carbonate group, 4-aminobenzyl alcohol and cathepsine-B-cleavable dipeptide Phe-Lys) and containing a triazoline group and a spacer PEG (n=8)

rezetecan

(3*RS*)-1-[(2*R*,10*S*)-10-benzyl-2-cyclopropyl-1-{[(1*S*,9*S*)-9-ethyl-5-fluoro-9-hydroxy-4-methyl-10,13-dioxo-2,3,9,10,13,15-hexahydro-1*H*,12*H*-benzo[*de*]pyrano[3',4':6,7]indolizino[1,2-*b*]quinolin-1-yl]amino}-1,6,9,12,15,18-hexaoxo-3-oxa-5,8,11,14,17-pentaazatricosan-23-yl]-2,5-dioxopyrrolidin-3-yl

trastuzumab rezetecan (127)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody, conjugated via a cleavable linker with a camptothecin derivative;
gamma1 heavy chain humanized (1-450) [VH (*Homo sapiens* IGHV3-66*01 (81.6%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.13] (26-33.51-58.97-109)) (1-120) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 E12 (359), M14 (361) (344-448), CHS (449-450)) (121-450)], (223-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-K1SV lacking the glutamine synthetase (GS-KO) gene, glycoform alfa, conjugated, on an average of 5.3 to 6.4 cysteinyl, with (3*RS*)-1-[(2*R*,10*S*)-10-benzyl-2-cyclopropyl-1-{[(1*S*,9*S*)-9-ethyl-5-fluoro-9-hydroxy-4-methyl-10,13-dioxo-2,3,9,10,13,15-hexahydro-1*H*,12*H*-benzo[*de*]pyrano[3',4':6,7]indolizino[1,2-*b*]quinolin-1-yl]amino}-

1,6,9,12,15,18-hexaoxo-3-oxa-5,8,11,14,17-pentaazatricosan-23-yl]-2,5-dioxopyrrolidin-3-yl (rezetecan) groups

-mab & ozogamicin

***ozogamicin** (86)*

methyl (1*R*,4*Z*,8*S*,13*E*)-13-[2-[[2-[[[*p*-(3-carbamoylpropoxy)-α-methylbenzylidene]hydrazino]carbonyl]-1,1-dimethylethyl]dithio]ethylidene]-8-[[4,6-dideoxy-4-[[[2,6-dideoxy-4-*S*-[4-[(6-deoxy-3-*O*-methyl-α-L-mannopyranosyl) oxy]-3-iodo-5,6-dimethoxy-*O*-toluoyl]-4-thio-β-D-*ribo*-hexopyranosyl]oxy]amino]-2-*O*-[2,4-dideoxy-4-(*N*-ethylacetamido)-3-*O*-methyl-α-L-*threo*-pentopyranosyl]-β-D-glucopyranosyl]oxy]-1-hydroxy-11-oxobicyclo[7.3.1]trideca-4,9-diene-2,6-diyne-10-carbamate

gemtuzumab ozogamicin (115)

immunoglobulin G4-kappa, anti-[*Homo sapiens* CD33 (sialic acid binding Ig-like lectin 3, SIGLEC3, SIGLEC-3, gp67, p67)], humanized monoclonal antibody conjugated to *N*-acetyl-gamma calicheamicin;
gamma4 heavy chain (1-443) [humanized VH (*Homo sapiens* IGHV1-3*01 (72.90%) -(IGHD) -IGHJ5*01) [8.8.9] (1-116)), IGHG4*01 (CH1 (117-214), hinge S10>P (224) (215-226), CH2 (227-336), CH3 (337-441), CHS (442-443)) (117-443)], (130-218')-disulfide with kappa light chain (1'-218') [humanized V-KAPPA (*Homo sapiens* IGKV1-5*01 (81.90%) -IGKJ1*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01, Km3 (112'-218')]; dimer (232-232":235-235")-bisdisulfide; conjugated, on an average of 2 or 3 lysyl (0-6), to *N*-acetyl-*S*'-des(methylsulfanyl)-*S*'-(4-hydrazinyl-2-methyl-4-oxobutan-2-yl)calicheamicin γ_1 via a bifunctional 4-(4-acetylphenoxy)butanoyle (AcBut) linker

inotuzumab ozogamicin (92)

immunoglobulin G4, anti-(human CD22 (antigen)) (human-mouse monoclonal G544 heavy chain), disulfide with human-mouse monoclonal G544 κ-chain, dimer, conjugate with methyl *N*-{(1*R*,4*Z*,8*S*,13*E*)-8-(4,6-dideoxy-4-{[(4-*S*-{4-[(6-deoxy-3-*O*-methyl-α-L-mannopyranosyl)oxy]-3-iodo-5,6-dimethoxy-2-methylbenzoyl}-4-thio-β-D-*ribo*-hexopyranosyl)oxy]amino}-2-*O*-[4-(*N*-ethylacetamido)-2,4-dideoxy-3-*O*-methyl-α-L-*threo*-pentopyranosyl]-β-D-glucopyranosyloxy)-13-[2-({4-[2-(1-{[4-(4-amino-4-oxobutyl)oxy]phenyl}ethylidene)hydrazinyl]-2-methyl-4-oxobutan-2-yl}disulfanyl)ethylidene]-1-hydroxy-11-oxobicyclo[7.3.1]trideca-4,9-diene-2,6-diyn-10-yl}carbamate

-mab & -tansine[32]

debotansine

{8-[(2*S*)-28-{[(1^4*S*,1^6*S*,2*R*,3^2*S*,3^3*S*,4*S*,10*E*,12*E*,14*R*)-8^6-chloro-1^4-hydroxy-8^5,14-dimethoxy-2,3^3,7-trimethyl-1^2,6-dioxo-7-aza-1(6,4)-[1,3]oxazinana-3(2,3)-oxirana-8(1,3)-benzenacyclotetradecaphane-10,12-dien-4-yl]oxy}-2,3,9-trimethyl-1,4,8,24-tetraoxo-12,15,18,21-tetraoxa-3,9,25-triazaoctacosan-28-oyl]-8,9-dihydro-1*H*(or 3*H*)-dibenzo[*b*,*f*][1,2,3]triazolo[4,5-*d*]azocin-1(or 3)-yl}methyl

ispectamab debotansine (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* TNFRSF17 (TNF receptor superfamily member 17, tumor necrosis factor receptor superfamily, member 17, B cell maturation antigen, BCMA, BCM, TNFRSF13A, CD269)], humanized monoclonal antibody, conjugated at C-4 of four specific phenylalanine residues with *N*$^{2'}$-deacetylmaytansine via a

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[32] The names ending in *-tansine* and the descriptions are published in Annex 4.2 of "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".

noncleavable linker;
gamma1 heavy chain humanized (1-453) [VH (*Homo sapiens* IGHV3-66*01 (82.7%) -(IGHD) -IGHJ4*01 (92.9%), CDR-IMGT [8.8.15] (27-34.52-59.98-112)) (1-123) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 Y85.2>**F** (pAMF) (186), R120>K (220) (124-221), hinge 1-15 (222-236), CH2 (237-346), CH3 E12 (362), M14 (364), F85.2>**F** (pAMF) (410) (347-451), CHS (452-453)) (124-453)], (226-215')-disulfide with kappa light chain humanized (1'-215') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (84.2%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (28-33.51-53.90-98)) (1'-108') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (154), V101 (192) (109'-215')]; dimer (232-232":235-235")-bisdisulfide, produced by a cell-free protein synthesis system based on *Escherichia coli* lysate, non-glycosylated, substituted at C-4 of the l-phenylalanyl residues 186, 410, 186" and 410" with {8-[(2*S*)-1-{[(1^{4}*S*,1^{6}*S*,2*R*,3^{2}*S*,3^{3}*S*,4*S*,10*E*,12*E*,14*R*)-8^{6}-chloro-1^{4}-hydroxy-8^{5},14-dimethoxy-2,3^{3},7,10-tetramethyl-1^{2},6-dioxo-7-aza-1(6,4)-[1,3]oxazinana-3(2,3)-oxirana-8(1,3)-benzenacyclotetradecaphane-10,12-dien-4-yl]oxy}-2,3,9-trimethyl-1,4,8,24-tetraoxo-12,15,18,21-tetraoxa-3,9,25-triazaoctacosan-28-oyl]-8,9-dihydro-1*H*(or 3*H*)-dibenzo[*b*,*f*][1,2,3]triazolo[4,5-*d*]azocin-1(or 3)-yl}methyl (debotansine) groups

emtansine

4-({3-[(3-{[(2*S*)-1-{[(1*S*,2*R*,3*S*,5*S*,6*S*,16*E*,18*E*,20*R*,21*S*)-11-chloro-21-hydroxy-12,20-dimethoxy-2,5,9,16-tetramethyl-8,23-dioxo-4,24-dioxa-9,22-diazatetracyclo[19.3.1.1^{10,14}.0^{3,5}]hexacosa-10,12,14(26),16,18-pentaen-6-yl]oxy}-1-oxopropan-2-yl](methyl)amino}-3-oxopropyl)sulfanyl]-2,5-dioxopyrrolidin-1-yl}methyl)cyclohexanecarbonyl

trastuzumab emtansine (103)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, HER-2, p185c-erbB2, NEU, EGFR2)], humanized monoclonal antibody conjugated to maytansinoid DM1;
gamma1 heavy chain (1-449) [humanized VH (*Homo sapiens* IGHV3-66*01 (81.60%) -(IGHD)-IGHJ6*01 T123>L) [8.8.13] (1-120) -*Homo sapiens* IGHG1*03 (121-449) CH1 R120>K], (223-214')-disulfide with kappa light chain (1'-214') [humanized V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.30%) -IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01 (108'-214')]; (229-229":232-232")-bisdisulfide dimer; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM1 via a succinimidyl-4-(*N*-maleimidomethyl) cyclohexane-1-carboxylate (SMCC) linker

laprituximab emtansine (114)

immunoglobulin G1-kappa, anti-[*Homo sapiens* EGFR (epidermal growth factor receptor, receptor tyrosine-protein kinase erbB-1, ERBB1, HER1, HER-1, ERBB)], chimeric monoclonal antibody conjugated to maytansinoid DM1; gamma1 heavy chain (1-448) [*Mus musculus* VH (IGHV1-7*01 -(IGHD)-IGHJ4*01) [8.8.12] (1-119) -*Homo sapiens* IGHG1*01, Gm17,1 (CH1 (120-217), hinge (218-232), CH2 (233-342), CH3 (343-447), CHS K2>del (448) (120-448)], (222-214')-disulfide with kappa light chain (1'-214') [*Mus musculus* V-KAPPA (IGKV19-93*01-IGKJ2*03) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (108'-214')]; dimer (228-228":231-231")-bisdisulfide; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM1 via a succinimidyl-4-(*N*-maleimidomethyl) cyclohexane-1-carboxylate (SMCC) linker forming a nonreducible thioether bond

naratuximab emtansine (114)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD37 (tetraspanin-26, TSPAN26)], chimeric monoclonal antibody conjugated to maytansinoid DM1;
gamma1 heavy chain (1-444) [*Mus musculus* VH (IGHV2-3*01 -(IGHD)- IGHJ3*01) [8.7.9] (1-115) -*Homo sapiens* IGHG1*01, Gm17,1 (CH1 (116-213), hinge (214-228), CH2 (229-338), CH3 (339-443), CHS K2>del (444)) (116-444)], (218-214')-disulfide with kappa light chain (1'-214') [*Mus musculus* V-KAPPA (IGKV12-46*01 - IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01, Km3 (108'-214')]; dimer (224-224":227-227")-bisdisulfide;

conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM1 via a succinimidyl-4-(N-maleimidomethyl) cyclohexane-1-carboxylate (SMCC) linker forming a nonreducible thioether bond

mertansine

{(4*RS*)-4-[(3-{[(2*S*)-1-{[(1*S*,2*R*,3*S*,5*S*,6*S*,16*E*,18*E*,20*R*,21*S*)-11-chloro-21-hydroxy-12,20-dimethoxy-2,5,9,16-tetramethyl-8,23-dioxo-4,24-dioxa-9,22-diazatetracyclo[19.3.1.1^{10,14}.0^{3,5}]hexacosa-10,12,14(26),16,18-pentaen-6-yl]oxy}-1-oxopropan-2-yl](methyl}amino}-3-oxopropyl)disulfanyl]pentanoyl}

cantuzumab mertansine (105)

immunoglobulin G1-kappa, anti-[*Homo sapiens* MUC1 sialylated carbohydrate, tumour-associated (CA242, cancer antigen 242)], humanized monoclonal antibody conjugated to maytansinoid DM1;
gamma1 heavy chain (1-449) [humanized VH (*Homo sapiens* IGHV7-4-1*02 (76.50%) -(IGHD)-IGHJ2*01 R120>Q (111), L123>T (114)) [8.8.12] (1-119) -*Homo sapiens* IGHG1*01 (120-449)], (222-219')-disulfide with kappa light chain (1'-219') [humanized V-KAPPA (*Homo sapiens* IGKV2-28*01 (82.00%) -IGKJ3*01 V124>L (109), D125>E (110), I126>L (111)) [11.3.9] (1'-112') -*Homo sapiens* IGKC*01 (113'-219')]; (228-228":231-231")-bisdisulfide dimer; conjugated, on an average of 4 lysyl, to maytansinoid DM1 [$N^{2'}$-deacetyl-$N^{2'}$-(3-mercapto-1-oxopropyl)-maytansine] via the reductible SPP linker [*N*-succinimidyl 4-(2-pyridyldithio)pentanoate]

lorvotuzumab mertansine (103)

immunoglobulin G1-kappa, anti-[*Homo sapiens* NCAM1 (neural cell adhesion molecule 1, CD56, NCAM-1)], humanized monoclonal antibody conjugated to maytansinoid DM1;
gamma1 heavy chain (1-448) [humanized VH (*Homo sapiens* IGHV3-30*03 (91.80%) -(IGHD)-IGHJ4*01) [8.8.11] (1-118) –*Homo sapiens* IGHG1*01 (119-448)], (221-219')-disulfide with kappa light chain (1'-219') [humanized V-KAPPA (*Homo sapiens* IGKV2-30*02 (92.00%) -IGKJ1*01) [11.3.9] (1'-112') -*Homo sapiens* IGKC*01 (113'-219')]; (227-227":230-230")-bisdisulfide dimer; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM1 via a thiopentanoate linker

ravtansine

4-[(5-{[(1*S*)-1-{[(1*S*,2*R*,3*S*,5*S*,6*S*,16*E*,18*E*,20*R*,21*S*)-11-chloro-21-hydroxy-12,20-dimethoxy-2,5,9,16-tetramethyl-8,23-dioxo-4,24-dioxa-9,22-diazatetracyclo[19.3.1.1^{10,14}.0^{3,5}]hexacosa-10,12,14(26),16,18-pentaen-6-yl]oxy}-1-oxopropan-2-yl](methyl)amino}-2-methyl-5-oxopentan-2-yl)disulfanyl]butanoyl

anetumab ravtansine (109)

immunoglobulin G1-lambda2, anti-[*Homo sapiens* MSLN (mesothelin, pre-pro-megakaryocyte-potentiating factor, megakaryocyte potentiating factor, MPF, CAK1)], *Homo sapiens* monoclonal antibody conjugated to maytansinoid DM4;
gamma1 heavy chain (1-450) [*Homo sapiens* VH (IGHV5-51*01 (94.90%) -(IGHD)-IGHJ4*01) [8.8.13] (1-120) -IGHG1*01 (CH1 (121-218), hinge (219-233), CH2 (234-343), CH3 (344-448), CHS (449-450)) (121-450)], (223-216')-disulfide with lambda light chain (1'-217') [*Homo sapiens* V-LAMBDA (IGLV2-14*01 (95.60%) -IGLJ2*01) [9.3.11] (1'-111') -IGLC2*01 A43>G (155) (112'-217')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 3 lysyl, to maytansinoid DM4 [$N^{2'}$-deacetyl-$N^{2'}$-(4-mercapto-4-methyl-1-oxopentyl)-maytansine] via the reducible SPDB linker [*N*-succinimidyl 4-(2-pyridyldithio)butanoate]

cantuzumab ravtansine (105)

immunoglobulin G1-kappa, anti-[*Homo sapiens* MUC1 sialylated carbohydrate, tumour-associated (CA242, cancer antigen 242)], humanized monoclonal antibody conjugated to maytansinoid DM4;
gamma1 heavy chain (1-449) [humanized VH (*Homo sapiens* IGHV7-4-1*02 (76.50%) -

(IGHD)-IGHJ2*01 R120>Q (111), L123>T (114)) [8.8.12] (1-119) -*Homo sapiens* IGHG1*01 (120-449)], (222-219')-disulfide with kappa light chain (1'-219') [humanized V-KAPPA (*Homo sapiens* IGKV2-28*01 (82.00%) -IGKJ3*01 V124>L (109),D125>E (110), I126>L (111)) [11.3.9] (1'-112') -*Homo sapiens* IGKC*01 (113'-219')]; (228-228":231-231")-bisdisulfide dimer; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM4 [$N^{2'}$-deacetyl-$N^{2'}$-(4-mercapto-4-methyl-1-oxopentyl)-maytansine] via the reducible SPDB linker [*N*-succinimidyl 4-(2-pyridyldithio)butanoate]

coltuximab ravtansine (109)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD19 (B lymphocyte surface antigen B4, Leu-12)], chimeric monoclonal antibody conjugated to maytansinoid DM4;
gamma1 heavy chain (1-450) [Mus musculus VH (IGHV1-69*02 -(IGHD)-IGHJ4*01) [8.8.13] (1-120) -*Homo sapiens* IGHG1*01 (CH1 (121-218), hinge (219-233), CH2 (234-343), CH3 (344-448), CHS (449-450)) (121-450)], (223-211')-disulfide with kappa light chain (1'-211') [Mus musculus V-KAPPA (IGKV4-70*01 -IGKJ1*01) [5.3.7] (1'-104') -*Homo sapiens* IGKC*01 (105'-211')]; dimer (229-229":232-232")-bisdisulfide; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM4 [$N^{2'}$-deacetyl-$N^{2'}$-(4-mercapto-4-methyl-1-oxopentyl)-maytansine] via the reducible SPDB linker [*N*-succinimidyl 4-(2-pyridyldithio)butanoate]

indatuximab ravtansine (105)

immunoglobulin G4-kappa, anti-[*Homo sapiens* SDC1 (syndecan-1, CD138)], chimeric monoclonal antibody conjugated to maytansinoid DM4;
gamma4 heavy chain (1-449) [*Mus musculus* VH (IGHV1-9*01 - (IGHD)-IGHJ4*01) [8.8.15] (1-122) -*Homo sapiens* IGHG4*01 (123-449)], (136-214')-disulfide with kappa light chain (1'-214') [*Mus musculus* V-KAPPA (IGKV10-94*01 -IGKJ1*01) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01 (108'-214')]; (228-228":231-231")-bisdisulfide dimer; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM4 [$N^{2'}$-deacetyl-$N^{2'}$-(4-mercapto-4-methyl-1-oxopentyl)-maytansine] via the reducible SPDB linker [*N*-succinimidyl 4-(2-pyridyldithio)butanoate]

praluzatamab ravtansine (121)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD166 (activated leucocyte cell adhesion molecule, ALCAM)], humanized monoclonal antibody conjugated to maytansinoid DM4;
gamma1 heavy chain humanized (1-450) [VH (*Homo sapiens* IGHV2-5*01 (88.9%) -(IGHD) -IGHJ4*01 (92.9%)) [10.7.13] (1-121) -*Homo sapiens* IGHG1*03v G1m3>G1m17, nG1m1 (CH1 K120 (218) (122-219), hinge 1-15 (220-234), CH2 (235-344), CH3 E12 (360), M14 (362) (345-449), CHS K2>del (450)) (122-450)], (224-270')-disulfide with kappa light chain humanized (1'-270') [N-terminal region (1'-22') -8-mer linker (23'-30') -protease cleavable region (31'-48') -3-mer linker (49'-51') -V-KAPPA (*Homo sapiens* IGKV2-28*01 (89.0%) -IGKJ2*01 (100%)) [11.3.9] (52'-163') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (209), V101 (247) (164'-270')]; dimer (230-230":233-233")-bisdisulfide, produced in Chinese Hamster Ovary (CHO)-derived cell line, glycoform alfa; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM4 [$N^{2'}$-deacetyl-$N^{2'}$-(4-mercapto-4-methyl-1-oxopentyl)-maytansine] via the reducible SPDB linker [*N*-succinimidyl 4-(2-pyridyldithio)butanoate]

tusamitamab ravtansine (123)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CEACAM5 (carcinoembryonic antigen-related cell adhesion molecule 5, CEA, CD66e)], monoclonal antibody, conjugated to maytansinoid DM4;
gamma1 heavy chain (1-449) [VH (*Mus musculus* IGHV5-12-1*01 (86.6%) -(IGHD) -IGHJ3*01 (92.9%)/*Homo sapiens* IGHV3-23*01 (77.3%) -(IGHD) -IGHJ4*01 (92.9%)) CDR-IMGT [8.8.13] (26-33.51-58.97-109) (1-120) -*Homo sapiens* IGHG1*01 (100%), G1m17,1 (CH1 K120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 D12 (359), L14 (361) (344-448), CHS K>del (449) (121-449)], (223-214')-disulfide with kappa light chain (1'-214') [V-KAPPA (*Mus musculus* IGKV12-44*01 (87.4%) -IGKJ4*01

(100%)/*Homo sapiens* IGKV1-39*01 (82.1%) -IGKJ2*02 (90.9%)) CDR-IMGT [6.3.9](27-32.50-52.89-97) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide, produced in a Chinese hamster ovary (CHO) cell line derived from CHO-K1SV, glycoform alfa; conjugated, on an average of 3 to 4 lysyl, to maytansinoid DM4 [*N*2'- deacetyl-*N*2'-(4-mercapto-4-methyl-1-oxopentyl)-maytansine] via the reducible SPDB linker [*N*-succinimidyl 4-(2-pyridyldithio)butanoate]

soravtansine

(2*RS*)-4-[2-(5-{[(2*S*)-1-{[(1*S*,2*R*,3*S*,5*S*,6*S*,16*E*,18*E*,20*R*,21*S*)-11-chloro-21-hydroxy-12,20-dimethoxy-2,5,9,16-tetramethyl-8,23-dioxo-4,24-dioxa-9,22-diazatetracyclo[19.3.1.1^{10,14}.0^{3,5}]hexacosa-10,12,14(26),16,18-pentaen-6-yl]oxy}-1-oxopropan-2-yl](methyl)amino}-2-methyl-5-oxopentan-2-yl)disulfanyl]-2-sulfobutanoyl

mirvetuximab soravtansine (113)

immunoglobulin G1-kappa, anti-[*Homo sapiens* FOLR1 (folate receptor 1, folate receptor alpha, FR-alpha, adult folate-binding protein, FBP, ovarian tumor-associated antigen MOv18)], chimeric monoclonal antibody conjugated to maytansinoid DM4;
gamma1 heavy chain (1-447) [*Mus musculus* VH (IGHV1-37*01 -(IGHD)-IGHJ4*01) [8.8.11] (1-118) -*Homo sapiens* IGHG1*01, G1m17,1 (CH1 (119-216), hinge (217-231), CH2 (232-341), CH3 (342-446), CHS K2>del (447)) (119-447)], (221-218')-disulfide with kappa light chain (1'-218') [*Mus musculus* V-KAPPA (IGKV3-9*01 -IGKJ2*01) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01, Km3 (112'-218')]; dimer (227-227":230-230")-bisdisulfide;
conjugated, on an average of 3 or 4 lysyl, to maytansinoid DM4 [N2'-deacetyl-N2'-(4-mercapto-4-methyl-1-oxopentyl)-maytansine] via the reducible sulfo-SPDB linker [N-succinimidyl 4-(2-pyridyldithio)-2-sulfobutanoate]

tapatansine

(3*RS*)-1-[(2*S*,14*S*,17*R*,20*S*)-1-{[(1^{4}*S*,1^{6}*S*,2*R*,3^{2}*S*,3^{3}*S*,4*S*,10*E*,12*E*,14*R*)-8^{6}-chloro-1^{4}-hydroxy-8^{5},14-dimethoxy-2,3^{3},7,10-tetramethyl-1^{2},6-dioxo-7-aza-1(6,4)-[1,3]oxazinana-3(2,3)-oxirana-8(1,3)-benzenacyclotetradecaphane-10,12-dien-4-yl]oxy}-2,3,14,17,20-pentamethyl-1,4,13,16,19,22-hexaoxo-10-thia-3,12,15,18,21-pentaazaheptacosan-27-yl]-2,5-dioxopyrrolidin-3-yl

izeltabart tapatansine (127)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ADAM9 (ADAM metallopeptidase domain 9, cone rod dystrophy 9, CORD9, meltrin gamma, MDC9, MCMP)], humanized monoclonal antibody, conjugated with the tubulin inhibitor *N*$^{2'}$-deacetylmaytansine via a 6-(6-maleimidohexanoyl-L-alanyl-D-alanyl-L-alaninamidomethylthio)hexanoyl linker at two engineered cysteine sites 448 and 448";
gamma1 heavy chain humanized (1-452) [VH humanized (*Homo sapiens* IGHV3-64*07 (81.6%) -(IGHD) -IGHJ4*01 (80%), CDR-IMGT [8.8.16] (26-33.51-58.97-112)) (1-123) -*Homo sapiens* IGHG1*03, G1m3, nG1m1, G1v21 CH2 Y15.1, T16, E18, G1v44 CH3 C122 (CH1 R120 (220) (124-221), hinge 1-15 (222-236), CH2 M>Y15.1 (258), S>T16 (260), T>E18 (262) (237-346), CH3 E12 (362), M14 (364), S>C122 (448) (347-451), CHS K2>del (452)) (124-452)], (226-218')-disulfide with kappa light chain humanized (1'-218') [V-KAPPA (*Homo sapiens* IGKV4-1*01 (77.2%) -IGKJ2*02 (100%), CDR-IMGT [10.3.9] (27-36.54-56.93-101)) (1'-111') -*Homo sapiens* IGKC*01, Km3, A45.1 (157), V101 (195) (112'-218')]; dimer (232-232":235-235")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-S, glycoform alfa; substituted at the sulfur atoms of the l-cysteinyl residues 448 and 448" with two (3*RS*)-1-[(2*S*,14*S*,17*R*,20*S*)-1-{[(1^{4}*S*,1^{6}*S*,2*R*,3^{2}*S*,3^{3}*S*,4*S*,10*E*,12*E*,14*R*)-8^{6}-chloro-1^{4}-hydroxy-8^{5},14-dimethoxy-2,3^{3},7,10-tetramethyl-1^{2},6-dioxo-7-aza-1(6,4)-[1,3]oxazinana-3(2,3)-oxirana-8(1,3)-benzenacyclotetradecaphane-10,12-dien-4-yl]oxy}-2,3,14,17,20-pentamethyl-1,4,13,16,19,22-hexaoxo-10-thia-3,12,15,18,21-pentaazaheptacosan-27-yl]-2,5-dioxopyrrolidin-3-yl (tapatansine) groups

-mab & -xetan (for *chelating agents)*[33]

corixetan

4-{4-[3-{bis[2-(3-hydroxy-1-methyl-2-oxo-1,2-dihydropyridine-4-carboxamido)ethyl]amino}-2-({bis[2-(3-hydroxy-1-methyl-2-oxo-1,2-dihydropyridine-4-carboxamido)ethyl]amino}methyl)propyl]anilino}-4-oxobutanoyl

anetumab corixetan (121)

immunoglobulin G1-lambda2, anti-[*Homo sapiens* MSLN (mesothelin, pre-pro-megakaryocyte-potentiating factor, megakaryocyte-potentiating factor, MPF, CAK1)], *Homo sapiens* monoclonal antibody, conjugated to chelator corixetan;
gamma1 heavy chain *Homo sapiens* (1-450) [VH (*Homo sapiens* IGHV5-51*01 (94.9%) -(IGHD) -IGHJ4*01 (86.7%)) [8.8.13] (1-120) -*Homo sapiens* IGHG1*01 (100%) G1m17,1 (CH1 K120 (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 D12 (359) L14 (361) (344-448), CHS (449-450)) (121-450)], (223-216')-disulfide with lambda light chain *Homo sapiens* (1'-217') [V-LAMBDA (*Homo sapiens* IGLV2-14*01 (95.6%) -IGKJ2*01 (100%)) [9.3.11] (1'-111') -*Homo sapiens* IGLC2*01 (99.1%) A43>G (155) (112'-217')]; dimer (229-229":232-232")-bisdisulfide, produced in Chinese Hamster Ovary (CHO)-S cell line, glycoform alfa; conjugated to chelator corixetan, with an average of 0.5 chelator per antibody

pelgifatamab corixetan (124)

immunoglobulin G1-kappa, anti-[*Homo sapiens* FOLH1 (folate hydrolase, prostate specific membrane antigen, PSMA)], *Homo sapiens* monoclonal antibody conjugated to chelator corixetan;
gamma1 heavy chain *Homo sapiens* (1-453) [VH (*Homo sapiens* IGHV3-33*01 (96.9%) -(IGHD) -IGHJ6*01 (100%)) CDR-IMGT [8.8.16] (26-33.51-58.97-112) (1-123) -*Homo sapiens* IGHG1*03 (100%) G1m3, nG1m1 (CH1 R120 (220) (124-221), hinge 1-15 (222-236), CH2 (237-346), CH3 E12 (362), M14 (364) (347-451), CHS (452-453)) (124-453)], (226-214')-disulfide with kappa light chain *Homo sapiens* (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-27*01 (94.7%) -IGKJ3*01 (100%)) CDR-IMGT [6.3.9] (27-32.50-52.89-97) (1'-107') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (232-232":235-235")-bisdisulfide, produced in a Chinese hamster ovary (CHO)-K1 cell line, glycoform alfa; conjugated to chelator corixetan, with an average of 0.8 chelator groups per antibody

trastuzumab corixetan (126)

immunoglobulin G1-kappa, anti-[*Homo sapiens* ERBB2 (epidermal growth factor receptor 2, receptor tyrosine-protein kinase erbB-2, EGFR2, HER2, HER-2, p185c-erbB2, NEU, CD340)], humanized monoclonal antibody, conjugated to *corixetan*, comprising a linker and an octadentate chelator;
gamma1 heavy chain humanized (1-449) [VH (*Homo sapiens* IGHV3-66*01 (81.6%) -(IGHD) -IGHJ4*01 (100%), CDR-IMGT [8.8.13] (26-33.51-58.97-109)) (1-120) -*Homo sapiens* IGHG1*03v, G1m3>G1m17, nG1m1 (CH1 R120>K (217) (121-218), hinge 1-15 (219-233), CH2 (234-343), CH3 E12 (359), M14 (361) (344-448), CHS K2>del (449)) (121-449)], (223-214')-disulfide with kappa light chain humanized (1'-214') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (86.3%) -IGKJ1*01 (100%), CDR-IMGT [6.3.9] (27-32.50-52.89-97)) (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (229-229":232-232")-bisdisulfide, produced in Chinese hamster ovary (CHO) cells, cell line CHO-K1, glycoform alfa, conjugated to the chelator group *corixetan* on an average of 0.5 lysyl per antibody

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[33] The names ending in *-xetan* and the descriptions are published in "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".

satetraxetan

rac-(4-{[(2*R*)-1,4,7,10-tetrakis(carboxymethyl)-1,4,7,10-tetraazacyclododecan-2-yl]methyl}phenyl)carbamothioyl

actinium (^{225}Ac) lintuzumab satetraxetan (121)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD33 (sialic acid binding Ig-like lectin 3, SIGLEC3, SIGLEC-3, gp67, p67)], humanized monoclonal antibody, conjugated to satetraxetan (DOTA derivative) and radiolabelled with actinium-225 (^{225}Ac);
gamma1 heavy chain humanized (1-446) [VH (*Homo sapiens* IGHV1-3*01 (79.6%) -(IGHD) -IGHJ4*01 (100%)) [8.8.9] (1-116) -*Homo sapiens* IGHG1*01 (100%) G1m17,1 (CH1 K120 (213) (117-214), hinge 1-15 (215-229), CH2 (230-339), CH3 D12 (355), L14 (357) (340-444), CHS (445-446)) (117-446)], (219-218')-disulfide with kappa light chain humanized (1'-218') [V-KAPPA (*Homo sapiens* IGKV1-39*01 (82.8%) -IGKJ1*01 (100%)) [10.3.9] (1'-111') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (157), V101 (195) (112'-218')]; dimer (225-225":228-228")-bisdisulfide, produced in SP2/0-Ag14 murine myeloma cell line, glycoform alfa; actinium-225 (^{225}Ac) radiolabelled satetraxetan (DOTA derivative) conjugate, on an average of 1 or 2 lysyl

lutetium (^{177}Lu) lilotomab satetraxetan (112)

immunoglobulin G1-kappa, anti-[*Homo sapiens* CD37 (TSPAN26, tetraspanin-26)], *Mus musculus* monoclonal antibody, lutetium (Lu 177) radiolabelled satetraxetan (DOTA derivative) conjugate;
gamma1 heavy chain (1-443) [*Mus musculus* VH (IGHV1S135*01 (96.90%) -(IGHD)-IGHJ4*01) [8.8.12] (1-119) -IGHG1*01 (CH1 E84>Q (177), P95>T (193), R96>W (194) (120-216), hinge (217-229), CH2 (230-336), CH3 N84.2>D (395), N84.4>D (397) (337-441), CHS (442-443)) (120-443)], (221-214')-disulfide with kappa light chain (1'-214') [*Mus musculus* V-KAPPA (IGKV6-25*01 (93.70%) -IGKJ4*01) [6.3.9] (1'-107') -IGKC*01 (108'-214')]; dimer (223-223":226-226":228-228")-trisdisulfide, an average of 1 to 2 amino groups (N^6 of lysines) are substituted:
N-[*rac*-(4-{[(2*R*)-1,4,7,10-tetrakis(carboxymethyl)-1,4,7,10-tetraazacyclododecan-2-yl]methyl}phenyl)carbamothioyl] (^{177}Lu)lutetium(3+) chelate

tetraxetan

2-[4,7,10-tris(carboxymethyl)-1,4,7,10-tetraazacyclodecan-1-yl]acetyl

rosopatamab tetraxetan (122)

immunoglobulin G1-kappa, anti-[*Homo sapiens* FOLH1 (folate hydrolase, prostate specific membrane antigen, PSMA)], monoclonal antibody, *tetraxetan* conjugate;
gamma1 heavy chain (1-445) [VH (*Mus musculus* IGHV1-26*01 (78.4%) -(IGHD) -IGHJ2*01 (92.9%)/*Homo sapiens* IGHV1-69-2*01 (76.3%) -(IGHD) -IGHJ4*01 (92.9%)) [8.8.8] (1-115) -*Homo sapiens* IGHG1*01 (100%) G1m17,1 (CH1 K120 (212) (116-213), hinge 1-15 (214-228), CH2 (229-338), CH3 D12 (354), L14 (356) (339-443), CHS (444-445)) (116-445)], (218-214')-disulfide with kappa light chain (1'-214') [V-KAPPA (*Mus musculus* IGKV6-23*01 (80.9%) -IGKJ2*03 (72.7%)*Homo sapiens* IGKV1-13*02 (78.7%) -IGKJ3*01 (91.7%)) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01 (100%) Km3 A45.1 (153), V101 (191) (108'-214')];
dimer (224-224":227-227")-bisdisulfide; produced in Chinese hamster ovary (CHO) cells, glycoform alfa, *tetraxetan* (DOTA) conjugate (on an average of 3 to 5 lysyl, linked to the chelator by their N6)

-mab & other chelating agents:

sarotalocan

6-({[3-({(OC-6-13)-bis({3-[bis(3-sulfopropyl)(3-sulfonatopropyl)azaniumyl]propyl}dimethylsilanolato-κO,κO')[(phtalocyaninato(2-)-κ4N29,N30,N31,N32)-1-yl]silicon}oxy)propoxy]carbonyl}amino)hexanoyl

cetuximab sarotalocan (120)

immunoglobulin G1-kappa, anti-[*Homo sapiens* EGFR (epidermal growth factor receptor, avian erythroblastic leukemia viral (v-erb-b) oncogene homolog, ERBB)], chimeric monoclonal antibody conjugated to IRDye 700DX (IR700) near-infrared photosensitizing dye;
gamma1 heavy chain chimeric (1-449) [VH (*Mus musculus* IGHV2-2*03 (93.8%) -(IGHD) -IGHJ3*01 (100%)) [8.7.13] (1-119) -*Homo sapiens* IGHG1*03 (100%), G1m3, nG1m1 (CH1 R120 (216) (120-217), hinge (218-232), CH2 (233-342), CH3 E12 (358), M14 (360) (343-447), CHS (448-449)) (120-449)], (222-214')-disulfide with kappa light chain chimeric (1'-214') [V-KAPPA (*Mus musculus* IGKV5-48*01 (95.8%) -IGKJ5*01 (100%)) [6.3.9] (1'-107') -*Homo sapiens* IGKC*01 (100%), Km3 A45.1 (153), V101 (191) (108'-214')]; dimer (228-228":231-231")-bisdisulfide; conjugated on an average of 2 or 3 lysyl to photosensitizing dye IRDye 700DX

-mab & toxin

setaritox

4-[(1*RS*)-1-{[L-methionyl-ricin toxin A-chain (Met-RTA, produced in *Escherichia coli*)-S^{260}-yl]sulfanyl}ethyl]benzoyl

dafsolimab setaritox (123)

immunoglobulin G2B-kappa, anti-[CD3E (CD3 epsilon, Leu-4)], *Mus musculus* monoclonal antibody conjugated to aglycosylated ricin toxin A (RTA);
gamma2b heavy chain *Mus musculus* (1-456) [VH (*Mus musculus* IGHV1-4*01 (95.9%) -(IGHD) -IGHJ4*01 (94.1%)) CDR-IMGT [8.8.13] (26-33.51-58.97-109) (1-120) -*Mus musculus* IGHG2B*02 (100%) (CH1 (121-217), hinge 1-22 (218-239), CH2 (240-349), CH3 (350-454), CHS (455-456)) (121-456)], (135-213')-disulfide with kappa light chain *Mus musculus* (1'-213') [V-KAPPA (*Mus musculus* IGKV4-59*01 (100%) -IGKJ5*01 (100%)) CDR-IMGT [5.3.9] (27-31.49-51.88-96) (1'-106') -*Mus musculus* IGKC1*01 (100%) (107'-213')];
dimer (229-229":232-232":235-235":238-238")-tetrakisdisulfide, produced in SP2/0-derived mouse myeloma cells, glycoform alfa, substituted at N^6 of an average of 1.6 lysyl residues with 4-[(1*RS*)-1-{[l-methionyl-ricin toxin A-chain (Met-RTA, non-glycosylated, produced in *Escherichia coli*)-*S*^{260}-yl]sulfanyl}ethyl]benzoyl groups

grisnilimab setaritox (123)

immunoglobulin G2A-lambda, anti-[CD7 (CD7 antigen (p41),GP40, LEU-9, TP41, Tp40)], *Mus musculus* monoclonal antibody conjugated to ricin toxin A (RTA);
gamma2a heavy chain *Mus musculus* (1-453) [VH (*Mus musculus* IGHV9-3-1*01 (98%) -(IGHD) -IGHJ2*01 (93.3%)) CDR-IMGT [8.8.16] (26-33.51-58.97-112) (1-123) -*Mus musculus* IGHG2A*01 (100%) (CH1 (124-220), hinge 1-16 (221-236), CH2 (237-346), CH3 (347-451), CHS (452-453)) (124-453)], (138-214')-disulfide with lambda light chain *Mus musculus* (1'-215') [V-LAMBDA (*Mus musculus* IGLV1*01 (98%) -IGLJ1*01 (100%)) CDR-IMGT [9.3.9] (26-34.52-54.91-99) (1'-109') -*Mus musculus* IGLC1*01 (100%) (110'-215')];
dimer (230-230":233-233":235-235")-trisdisulfide, produced in SP2/0-derived mouse myeloma cells, glycoform alfa, substituted at N^6 of an average of 1.6 lysyl residues with 4-[(1*RS*)-1-{[l-methionyl-ricin toxin A-chain (Met-RTA, non-glycosylated, produced in *Escherichia coli*)-*S*^{260}-yl]sulfanyl}ethyl]benzoyl groups

Others:

belzupacap sarotalocan (122)

a modified human papillomavirus (HPV) type 16-derived empty nanoparticle, 55 nm in diameter conjugated to approximately 200 molecules of a phthalocyanine-based photosensitizer

(*sarotalocan* group). Each nanoparticle is comprised of 72 capsomeres, made of 5 molecules of modified viral capsid protein L1 [P^{78}>R, T^{176}>N, D^{273}>T, N^{285}>T, S^{288}>N, T^{353}>P, T^{389}>S] and one molecule of viral capsid protein L2;
human papilloma virus type 16 (HPV16) capsid, a spherical shell of 72 self-assembling pentagonal $(L1)_5(L2)_1$ capsomere units comprising the recombinant viral capsid proteins L1 ([P^{78}>R, T^{176}>N, D^{273}>T, N^{285}>T, S^{288}>N, T^{353}>P, T^{389}>S]-modified) and L2, conjugated to approximately 200 *sarotalocan* groups (near infrared absorbing dye) at N^6 of lysine residues, produced by human embryonic kidney 293 (HEK293) cells

mipsagargin (110)
sarcoplasmic/endoplasmic reticulum Ca^{2+} dependent ATPase (SERCA) inhibitor conjugated to a peptide targeting prostate-specific membrane antigen (PSMA):
N^4-(12-{[(3*S*,3a*R*,4*S*,6*S*,6a*R*,7*S*,8*S*,9b*S*)-6-(acetyloxy)-3,3a-dihydroxy-3,6,9-trimethyl-8-{[(2*Z*)-2-methylbut-2-enoyl]oxy}-7-(octanoyloxy)-2-oxo-2,3,3a,4,5,6,6a,7,8,9b-decahydroazuleno[4,5-*b*]furan-4-yl]oxy}-12-oxododecyl)-L-asparaginyl-L-γ-glutamyl-L-γ-glutamyl-L-γ-glutamyl-L-glutamic acid

transferrin aldifitox (95)[34]
a conjugate of the precursor of human serotransferrin (siderophillin) with a primary amine group used to form an amidine with (4-iminobutane-1,4-diyl)sulfanediyl[(3RS)-2,5-dioxopyrrolidine-1,3-diyl]-1,3-phenylenecarbonyl and forming an *N*-benzoyl derivative of a primary amine group of diphtheria [550-L-phenylalanine]toxin from *Corynebacterium diphtheriae*-(26-560)-peptide

zoptarelin doxorubicin (107)
[6-D-lysine]human gonadoliberin-1 (LHRH) and doxorubicin covalently linked together with glutaric acid:
5-oxo-L-prolyl-L-histidyl-L-tryptophyl-L-seryl-L-tyrosyl-N^6-[5-(2-{(2*S*,4*S*)-4-[(3-amino-2,3,6-trideoxy-α-L-*lyxo*-hexopyranosyl)oxy]-2,5,12-trihydroxy-7-methoxy-6,11-dioxo-1,2,3,4,6,11-hexahydrotetracen-2-yl}-2-oxoethoxy)-5-oxopentanoyl]-D-lysine-L-leucyl-L-arginyl-L-prolylglycinamide

[34] The names and the descriptions of toxins are published in Annex 4.1 of "International Nonproprietary Names (INN) for pharmaceutical substances. Names for radicals, groups & others: comprehensive list (WHO/EMP/RHT/TSN/2015.1)".

ANNEX 3 .

List of INN for pegylated substances

classified by groups

Aptamers, classical and mirror ones (***-apt-***)

avacincaptad pegol (113), egaptivon pegol (111), emapticap pegol (108),lexaptepid pegol (108), olaptesed pegol (109), pegaptanib (88), pegnivacogin (106)

Blood coagulation cascade inhibitors (***-cogin***)

pegnivacogin (106)

Blood coagulation factors (***-cog***)

damoctocog alfa pegol (109), eptacog alfa pegol (activated) (101), nonacog beta pegol (104), rurioctocog alfa pegol (111), turoctocog alfa pegol (108)

Colony stimulating factors (CSFs) (***-stim***)

eflapegrastim (111), empegfilgrastim (107), lipegfilgrastim (107), mecapegfilgrastim (113), pegacaristim (80), pegbovigrastim (109), pegfilgrastim (86), pegnartograstim (80), pegteograstim (109), telpegfilgrastim (123)

Complement receptor antagonist / complement inhibitors (***-copan/coplan***)

pegcetacoplan (118)

Engineered or synthetic protein scaffolds, non-immunoglobulin variable domain derived (***-bep***)

pegdinetanib (103), abicipar pegol (108), palsucibep pegol (126)

Enzymes (***-ase***)

calaspargase pegol (105), elapegademase (116), pegademase (63), pegadricase (105), *pegargiminase (111), pegaspargase (64), pegcrisantaspase (111),* pegloticase (98), *pegorgotein (72), pegtarviliase (127), pegtibatinase (123), pegunigalsidase alfa (115), pegvaliase (111), pegvorhyaluronidase alfa (122), pegzilarginase (117)*

Erythropoietin type blood factors (***-poetin***)

pegdarbepoetin beta (117)

Growth factors and tumour necrosis factors (TNF) (***-ermin***)

pegbelfermin (120), pegipanermin (125), pegozafermin (127)

Growth hormone (GH) derivatives (***som-***)

efpegsomatropin (115), lonapegsomatropin(118), somatropin pegol (103)

Growth hormone antagonists

pegvisomant (82)

Hirudin derivatives (***-irudin***)

pegmusirudin (77)

Insulins

insulin peglispro (107)

Interferons

cepeginterferon alfa-2b (105), mipeginterferon alfa-2b (114), peginterferon alfa-2a (84), peginterferon alfa-2b (84), peginterferon alfacon-2 (116), peginterferon beta-1a (108), peginterferon lambda-1a (105), ropeginterferon alfa-2b (109), sampeginterferon beta-1a (116)

Interleukin type substances (***-kin***)

avipendekin pegol (123), pegaldesleukin (74), pegenzileukin (126), pegilodecakin (117), rezpegaldesleukin (127)

Monoclonal antibodies (***-mab***)

alacizumab pegol (98), certolizumab pegol (97), dapirolizumab pegol (110), enlimomab pegol (77), lulizumab pegol (111), rivabazumab pegol (113)

Peptides and Glycopeptides (***-tide***)

efinopegdutide (118), efocipegtrutide (126), palopegteriparatide (126), pegapamodutide (116), peginesatide (108), pegloxenatide (125), pegmolesatide (125), pegsebrenatide (127)

Receptor molecules, native or modified (***-cept***)

pegsunercept (95)

ANNEX 4 .

Transliteration of Greek letters in English, French and Spanish

Upper case	Lower case	English	French	Spanish	
A	α	alfa (and **not** alpha)	alfa (and **not** alpha)	alfa	
B	β	beta	bêta	beta	
Γ	γ	gamma	gamma	gamma	
Δ	δ	delta	delta	delta	
E	ε	epsilon	epsilon	épsilon	
Z	ζ	zeta	zêta	**dseta**	*
H	η	eta	êta	eta	
Θ	θ	theta	thêta	**zeta**	*
I	ι	iota	iota	iota	
K	κ	kappa	kappa	kappa	
Λ	λ	lambda	lambda	lambda	
M	μ	mu	mu	mi	
N	ν	nu	nu	ni	
Ξ	ξ	xi	xi	xi	
O	ο	omicron	omicron	ómicron	
Π	π	pi	pi	pi	
P	ρ	rho	rhô	ro	
Σ	σ	sigma	sigma	sigma	
T	τ	tau	tau	tau	
Y	υ	upsilon	upsilon	ípsilon	
Φ	φ	phi	phi	fi	
X	χ	chi	khi	ji	
Ψ	ψ	psi	psi	psi	
Ω	ω	omega	oméga	omega	

* letters to be avoided

ANNEX 5 .

Previous naming schemes for monoclonal antibodies

(From Proposed INN List 118 up to Proposed INN List 126)

- The stem ***-mab*** is used for all substances that contain an immunoglobulin variable domain that binds to a defined target, and that are composed of only one pharmacologically active component, unless the other(s) pharmacologically active component(s) is(are) a mAb. The stem is preceded by an infix that indicates the target class (molecule, cell and organ) (Table 7).
- Deletion of the 'species infix' was formally approved during the 64th INN Consultation by the members of the INN Expert Group designated to deal with the selection of international nonproprietary names.
- Full information including the development of the mAb on which the immunoglobulin sequence of the mAb is based, is included in the definition of the INN for mAbs.
- The infixes shown in Table 7 indicate the target class (molecule, cell and organ):

Table 7: Nomenclature scheme for monoclonal antibodies (mAb).

Prefix:	**Infix:** target class	**Stem:**
random	*-ami-* serum amyloid protein (SAP)/amyloidosis *(pre-substem)* *-ba-* bacterial *-ci-* cardiovascular *-de-* metabolic or endocrine pathways *-fung-* fungal *-gro-* skeletal muscle mass related growth factors and receptors *(pre-substem)* *-ki-* interleukin *-li-* immunomodulating *-ne-* neural *-os-* bone *-ta-* tumour *-toxa-* toxin *-vet-* veterinary use *(sub-stem)* *-vi-* viral	*-mab*

Second word
If the monoclonal antibody is conjugated to another protein or to a chemical (e.g. chelator), identification of the conjugate is accomplished by use of a separate, second word or acceptable chemical designation. For mAbs conjugated to a toxin, the suffix *-tox* is used in the second word.

If the monoclonal antibody is radiolabelled, the radioisotope is listed first in the INN, e.g. *technetium (^{99m}Tc) nofetumomab merpentan (81).*

Pegylation
For pegylated monoclonal antibodies see item 2.5: General policy for pegylated substances.

Glycosylation
For glycosylated monoclonal antibodies see item 2.3: General policy for glycosylated substances.

Previous naming schemes for monoclonal antibodies

(From Proposed INN List 103 up to Proposed INN List 117)

- INN for monoclonal antibodies (mAb) are composed of a prefix, a substem A, a substem B and a suffix.
- The common stem for mAbs is ***-mab***, placed as a suffix.
- The stem *-mab* is to be used for all products containing an immunoglobulin variable domain which binds to a defined target.
- **Substem B** indicates the species on which the immunoglobulin sequence of the mAb is based (shown in Table 8).

Table 8: Substem B for the species.

-a-	rat
-axo-	rat-mouse (pre-substem)
-e-	hamster
-i-	primate
-o-	mouse
-u-	human
-vet-	veterinary use (pre-substem)
-xi-	chimeric
-xizu-	chimeric-humanized
-zu-	humanized

The distinction between chimeric and humanized antibodies is as follows:

Chimeric: A chimeric antibody is one for which both chain types are chimeric as a result of antibody engineering. A chimeric chain is a chain that contains a foreign variable domain (originating from one species other than human, or synthetic or engineered from any species including human) linked to a constant region of human origin. The variable domain of a chimeric chain has a V region amino acid sequence which, analysed as a whole, is closer to non-human species than to human.

Humanized: A humanized antibody is one for which both chain types are humanized as a result of antibody engineering. A humanized chain is typically a chain in which the complementarity determining regions (CDR) of the variable domains are foreign (originating from one species other than human, or synthetic) whereas the remainder of the chain is of human origin. Humanization assessment is based on the resulting amino acid sequence, and not on the methodology per se, which allows protocols other than grafting to be used. The variable domain of a humanized chain has a V region amino acid sequence which, analysed as a whole, is closer to human than to other species.

Note: The infix

-xizu- is used for an antibody having both chimeric and humanized chains.

-axo- is used for an antibody having both rat and mouse chains.

- **Substem A** indicates the target (molecule, cell and organ) class (shown in Table 9).

Table 9: Substem A for target class.

-b(a)-	bacterial
-am(i)-	serum amyloid protein (SAP)/amyloidosis (pre-substem)
-c(i)-	cardiovascular
-f(u)-	fungal
-gr(o)-	skeletal muscle mass related growth factors and receptors (pre-substem)
-k(i)-	interleukin
-l(i)-	immunomodulating
-n(e)-	neural
-s(o)-	bone
-tox(a)-	toxin
-t(u)-	tumour
-v(i)-	viral

In principle, a single letter, e.g. *-b-* for bacterial is used as substem A. Whenever substem B starts with a consonant (e.g. *x* or *z),* to avoid problems in pronunciation, an additional vowel indicated in the table, e.g. *-ba-* is inserted.

Prefix
The prefix should be random, i.e. the only requirement is to contribute to a euphonious and distinctive name.

Second word
If the monoclonal antibody is conjugated to another protein or to a chemical (e.g. chelator), identification of this conjugate is accomplished by use of a separate, second word or acceptable chemical designation. For instance, for mAbs conjugated to a toxin, the suffix *-tox* is used in the second word.

If the monoclonal antibody is radiolabelled, the radioisotope is listed first in the INN, e.g. *technetium (^{99m}Tc) nofetumomab merpentan (81).*

Pegylation
For pegylated monoclonal antibodies see item 2.5: General policy for pegylated substances..

Glycosylation
For glycosylated monoclonal antibodies see item 2.10: General policy for glycosylated substances.

Previous naming scheme for monoclonal antibodies

(up to Proposed INN List 102)

- The common stem for monoclonal antibodies is *-mab*.
- Sub-stems for source of product:

-a-	rat
-axo- *(pre-sub-stem)*	rat-murine hybrid
-e-	hamster
-i-	primate
-o-	mouse
-u-	human
-xi-	chimeric
-zu-	humanized

The distinction between chimeric and humanized antibodies is as follows:

A chimeric antibody is one that contains contiguous foreign-derived amino acids comprising the entire variable region of both heavy and light chains linked to heavy and light constant regions of human origin.

A humanized antibody has segments of foreign-derived amino acids interspersed among variable region segments of human-derived amino acid residues and the humanized heavy-variable and light-variable regions are linked to heavy and light constant regions of human origin.

- Sub-stems for disease or target class:

-ba(c)-	bacterial
-ci(r)-	cardiovascular
-fung-	fungal
-ki(n)- *(pre-sub-stem)*	interleukin
-le(s)-	inflammatory lesions
-li(m)-	immunomodulator
-os-	bone
-vi(r)-	viral

tumours:

-co(l)-	colon
-go(t)-	testis
-go(v)-	ovary
-ma(r)-	mammary
-me(l)-	melanoma
-pr(o)-	prostate
-tu(m)-	miscellaneous

Whenever there is a problem in pronunciation, the final letter of the sub-stems for diseases or targets may be deleted, e.g. *-vi(r)-, -ba(c)-, -li(m)-, -co(l)-*, etc.

Prefix:
Should be random e.g. the only requirement is to contribute to a euphonious and distinctive name.

Second word:
If the product is radiolabelled or conjugated to another chemical, such as toxin, identification of this conjugate is accomplished by use of a separate, second word or acceptable chemical designation.

If the monoclonal antibody is used as a carrier for a radioisotope, the latter will be listed first in the INN, e.g. *technetium (^{99m}Tc) pintumomab (86)*.

-*toxa*- infix
For monoclonals conjugated to a toxin, the infix *-toxa-* can be inserted either into the first (main) name or included in the second word.

ANNEX 6 .

Publications containing proposed Lists of INN

List no. and reference

1 *Chron. Wld Hlth Org*. 7: 299 (1953)
2 *Chron. Wld Hlth Org*. 8: 216 (1954)
3 *Chron. Wld Hlth Org.* 8: 313 (1954)
4 *Chron. Wld Hlth Org* 10: 28 (1956)
5 *Chron. Wld Hlth Org.* 11: 231 (1957)
6 *Chron. Wld Hlth Org*. 12: 102 (1958)
7 *WHO chronicle* 13: 105 (1959)
8 *WHO chronicle* 13: 152 (1959)
9 *WHO chronicle* 14: 168 (1960)
10 *WHO chronicle* 14: 244 (1960)
11 *WHO chronicle* 15: 314 (1961)
12 *WHO chronicle* 16: 385 (1962)
13 *WHO chronicle* 17: 389 (1963)
14 *WHO chronicle* 18: 433 (1964)
15 *WHO chronicle* 19: 446 (1965)
16 *WHO chronicle* 20: 216 (1966)
17 *WHO chronicle* 21: 70 (1967)
18 *WHO chronicle* 21: 478 (1967)
19 *WHO chronicle* 22: 112 (1968)
20 *WHO chronicle* 22: 407 (1968)
21 *WHO chronicle* 23: 183 (1969)
22 *WHO chronicle* 23: 418 (1969)
23 *WHO chronicle* 24: 119 (1970)
24 *WHO chronicle* 24: 413 (1970)
25 *WHO chronicle* 25: 123 (1971)
26 *WHO chronicle* 25: 415 (1971)
27 *WHO chronicle* 26: 121 (1972)
28 *WHO chronicle* 26: 414 (1972)
29 *WHO chronicle* 27: 120 (1973)
30 *WHO chronicle* 27: 380 (1973)
31 *WHO chronicle* 28: 133 (1974)
32 *WHO chronicle* 28: No. 9, suppl. (1974)
33 *WHO chronicle* 29: No. 3, suppl. (1975)
34 *WHO chronicle* 29: No. 9, suppl. (1975)
35 *WHO chronicle* 30: No. 3, suppl. (1976)
36 *WHO chronicle* 30: No. 9, suppl. (1976)
37 *WHO chronicle* 3l: No. 3, suppl. (1977)
38 *WHO chronicle* 31: No. 9, suppl. (1977)
39 *WHO chronicle* 32: No. 3, suppl. (1978)
40 *WHO chronicle* 32: No. 9, suppl. (1978)
41 *WHO chronicle* 33: No. 3, suppl. (1979)
42 *WHO chronicle* 33: No. 9, suppl. (1979)
43 *WHO chronicle* 34: No. 3, suppl. (1980)
44 *WHO chronicle* 34: No. 9, suppl. (1980)
45 *WHO chronicle* 35: No. 3, suppl. (1981)

List no. and reference

46 *WHO chronicle* 35: No. 5, suppl. (1981)
47 *WHO chronicle* 36: No. 2, suppl. (1982)
48 *WHO chronicle* 36: No. 5, suppl. (1982)
49 *WHO chronicle* 37: No. 2, suppl. (1983)
50 *WHO chronicle* 37: No. 5, suppl. (1983)
51 *WHO chronicle* 38: No. 2 suppl. (1984)
52 *WHO chronicle* 38: No. 4, suppl. (1984)
53 *WHO chronicle* 39: No. 1, suppl. (1985)
54 *WHO chronicle* 39: No. 4, suppl. (1985)
55 *WHO chronicle* 40: No. l, suppl. (1986)
56 *WHO chronicle* 40: No. 5, suppl. (1986)
57 *WHO drug information* 1: No. 2 (1987)
58 *WHO drug information* 1: No. 3 (1987)
59 *WHO drug information* 2: No. 2 (1988)
60 *WHO drug information* 2: No. 4 (1988)
61 *WHO drug information* 3: No. 2 (1989)
62 *WHO drug information* 3: No. 4 (1989)
63 *WHO drug information* 4: No. 2 (1990)
64 *WHO drug information* 4: No. 4 (1990)
65 *WHO drug information* 5: No. 2 (1991)
66 *WHO drug information* 5: No. 4 (1991)
67 *WHO drug information* 6: No. 2 (1992)
68 *WHO drug information* 6: No. 4 (1992)
69 *WHO drug information* 7: No. 2 (1993)
70 *WHO drug information* 7: No. 4 (1993)
71 *WHO drug information* 8: No. 2 (1994)
72 *WHO drug information* 8: No. 4 (1994)
73 *WHO drug information* 9: No. 2 (1995)
74 *WHO drug information* 9: No. 4 (1995)
75 *WHO drug information* 10: No. 2 (1996)
76 *WHO drug information* 10: No. 4 (1996)
77 *WHO drug information* 11: No. 2 (1997)
78 *WHO drug information* 11: No. 4 (1997)
79 *WHO drug information* 12: No. 2 (1998)
80 *WHO drug information* 12: No. 4 (1998)
81 *WHO drug information* 13: No. 2 (1999)
82 *WHO drug information* 13: No. 4 (1999)
83 *WHO drug information* 14: No. 2 (2000)
84 *WHO drug information* 14: No. 4 (2000)
85 *WHO drug information* 15: No. 2 (2001)
86 *WHO drug information* 16: No. 1 (2002)
87 *WHO drug information* 16: No. 2 (2002)
88 *WHO drug information* 17: No. 1 (2003)
89 *WHO drug information* 17: No. 3 (2003)
90 *WHO drug information* 18: No. 1 (2004)

List no. and reference

91 *WHO drug information* 18: No. 2 (2004)
92 *WHO drug information* 18: No. 4 (2004)
93 *WHO drug information* 19: No. 2 (2005)
94 *WHO drug information* 19: No. 4 (2005)
95 *WHO drug information* 20: No. 2 (2006)
96 *WHO drug information* 20: No. 4 (2006)
97 *WHO drug information* 21: No. 2 (2007)
98 *WHO drug information* 21: No. 4 (2007)
99 *WHO drug information* 22: No. 2 (2008)
100 *WHO drug information* 22: No. 4 (2008)
101 *WHO drug information* 23: No. 2 (2009)
102 *WHO drug information* 23: No. 4 (2009)
103 *WHO drug information* 24: No. 2 (2010)
104 *WHO drug information* 24: No. 4 (2010)
105 *WHO drug information* 25: No. 2 (2011)
106 *WHO drug information* 25: No. 4 (2011)
107 *WHO drug information* 26: No. 2 (2012)
108 *WHO drug information* 26: No. 4 (2012)
109 *WHO drug information* 27: No. 2 (2013)
110 *WHO drug information* 27: No. 4 (2013)
111 *WHO drug information* 28: No. 2 (2014)
112 *WHO drug information* 28: No. 4 (2014)
113 *WHO drug information* 29: No. 2 (2015)
114 *WHO drug information* 29: No. 4 (2015)
115 *WHO drug information* 30: No. 2 (2016)
116 *WHO drug information* 30: No. 4 (2016)
117 *WHO drug information* 31: No. 2 (2017)
118 *WHO drug information* 31: No. 4 (2017)
119 *WHO drug information* 32: No. 2 (2018)
120 *WHO drug information* 32: No. 4 (2018)
121 *WHO drug information* 33: No. 2 (2019)
122 *WHO drug information* 33: No. 4 (2019)
123 *WHO drug information* 34: No. 2 (2020)
124 – COVID-19 (Special Edition) *WHO drug information* 34: No. 3 (2020)
124 *WHO drug information* 34: No. 4 (2020)
125 *WHO drug information* 35: No. 2 (2021)
126 *WHO drug information* 35: No. 4 (2021)
127 *WHO drug information* 36: No. 2 (2022)
128 – COVID-19 (Special Edition) *WHO drug information* 36, No. 3 (2022)

ANNEX 7 .

Alphabetical list of gene infixes and their definitions

-ada-	adenosine deaminase (ADA)
-adc-	aromatic L-amino-acid decarboxylase (AADC)
-ald-	adrenoleukodystrophy (ALD)
-alga-	alpha-galactosidase (Fabry disease)
-arsa-	arylsulfatase A (ARSA)
-atpa-	ATPase
-bega-	beta-galactosidase
-beglo-	beta-globin
-bero-	vascular endothelial growth factor receptor (VEGFR)
-bermin(o)-	vascular endothelial growth factor
-bexa-	beta-hexosaminidase genes
-cabna-	cell expressed antibody and NK cell activation
-cabta-	cell expressed antibody* and T cell activation **includes antibody mimetics*
-cima-	cytosine deaminase
-cin-	cyclic nucleotide gated channel beta 3 (CNGB3) (achromatopsia)
-clene-	ceroid lipofuscinosis, neuronal (Batten disease)
-difta-	diphtheria toxin A (DT-A)
-distro-	dystrophin glycoprotein complex / Duchenne muscular dystophy
-doca-	Dopa decarboxylase
-ema-	extracellular matrix genes
-etid-	WAS (Wiskott-Aldrich syndrome), eczema-thrombocytopenia-immunodeficiency syndrome
-fanc(o)-	Fanconi anaemia complementation group genes
-far-	interferon receptor molecules
-feno-	phenylalanine hydroxylase (PAH)
-fermin(o)-	fibroblast growth factor
-galc(o)-	galactosylceramidase (GALC)
-gamgl(o)-	gamma globin
-ged(i)-	gene editing
-gix(a)-	gigaxonin (GAN)
-glas-	glucose-6-phosphatase
-glusa-	acid alpha-glucosidase (Pompe disease)
-gran(o)-	granulin

-ids(o)-	iduronate 2-sulfatase (IDS)
-idu-	alpha-L-iduronidase (IDUA)
-kin(o)-	interleukin
-kinra-	interleukin receptor antagonist
-lect(o)-	lectin
-lim(o)-	immunomodulator
-lip(o)-	lipoprotein lipase
-memu-	methylmalonyl-CoA mutase
-miri-	MTM1 gene/myotubularin
-mul(o)-	multiple genes
-naco-	coagulation factor IX
-nad(o)-	NADH dehydrogenase
-ner-	tumor necrosis factor receptor
-nermin(o)-	tumor necrosis factor
-octoco-	coagulation factor VIII
-otca-	ornithine carbamoyltransferase (OTC)
-pap(o)-	HPV
-permin(o)-	hepatocyte growth factor
-rela-	relaxin genes
-refta-	receptor of Fc and T cell activation
-repi-	Rab escort protein 1 (REP-1)
-reti-	retinal dystrophies
-rubi-	UDP-glucuronosyltransferase 1A1 (bilirubin-UGT)
-covto-	SARS CoV-2
-semn(o)-	survival of motor neuron (SMN)
-stim(o)-	granulocyte macrophage colony stimulating factor (GM-CSF)
-sufli-	N-sulfoglucosamine sulfohydrolase, (Sanfillipo syndrome)
-tagu-	transglutaminase (TGM)
-tegr(a)-	integrin superfamily
-tifa-	trefoil factor 1 (hTFF1)
-tima-	thymidine kinase
-tres-	T cell receptor engineered for specificity
-tusu-	tumour suppression
-unti-	huntingtin
-zifi-	zinc-finger nuclease