Intellectual Property analysis in South-East Asia

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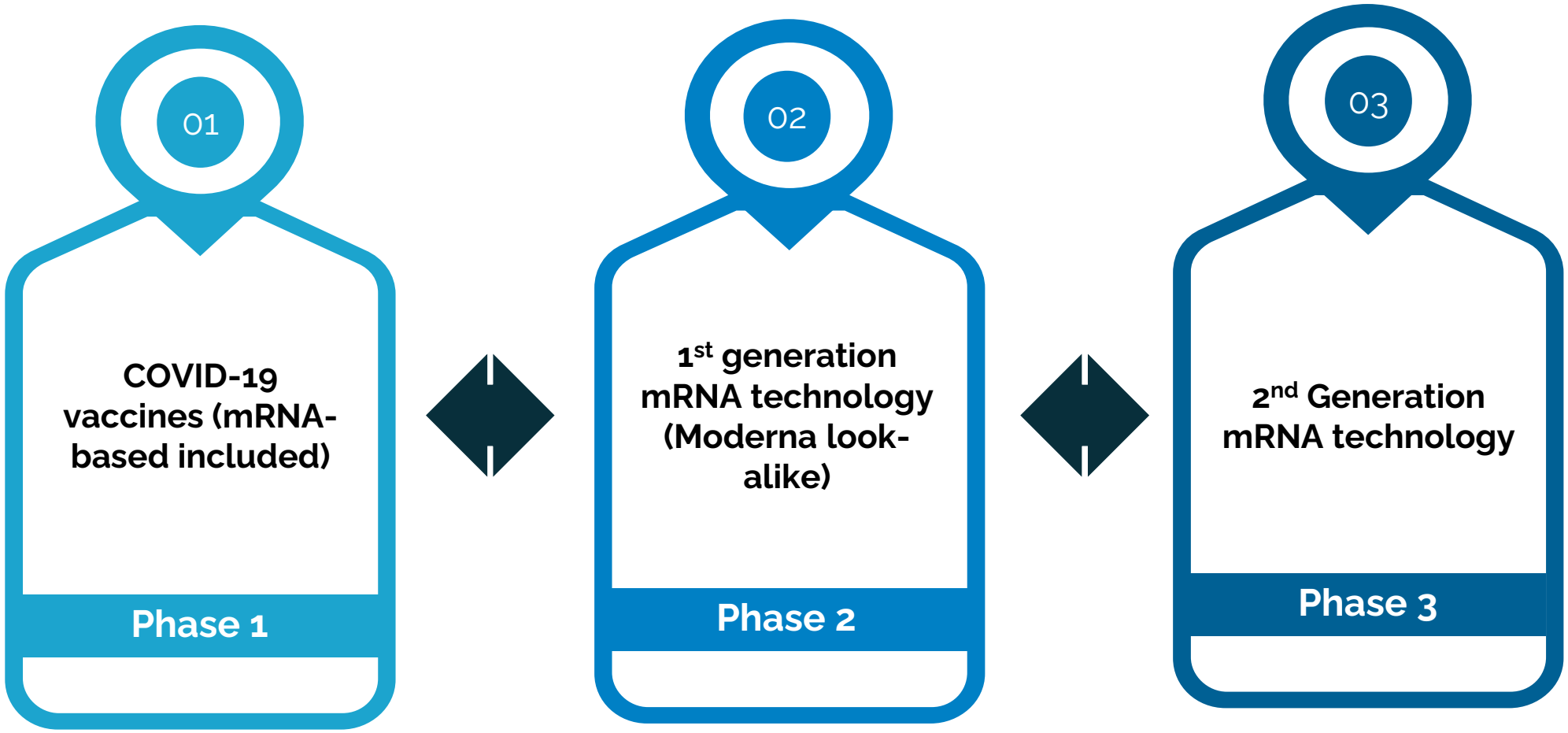
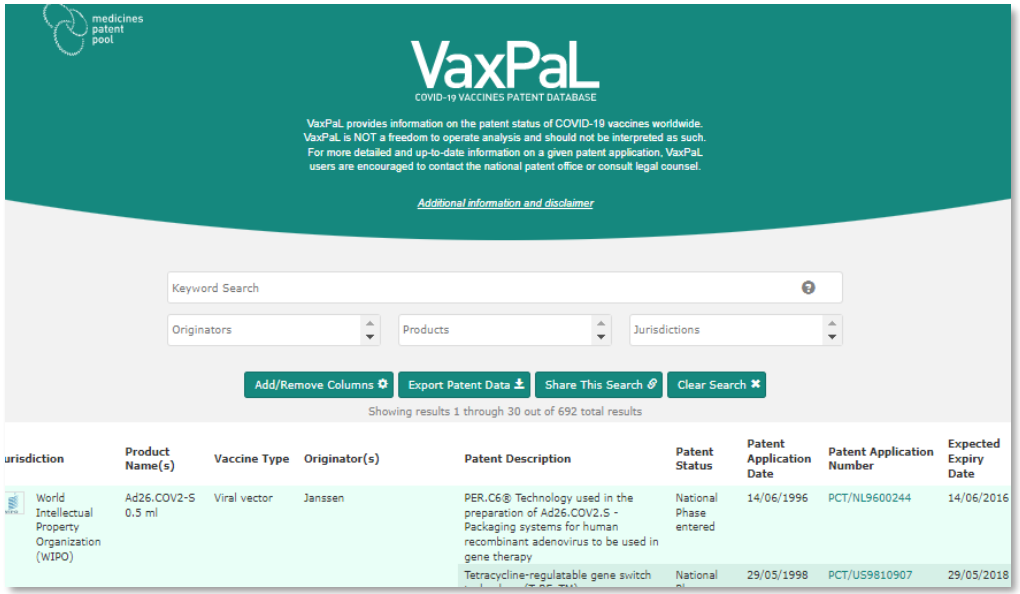
IP landscape strategy



Phase 1: COVID-19 vaccines (mRNA-based included)

VaxPaL, MPP's patent database devoted to COVID-19 vaccines created in June 2021 and released as a searchable DB in Dec 2021.

- Comprises patent information on 13 approved or late-stage COVID-19 vaccines
- Includes 3 vaccines based on mRNA technology: Moderna's Elasomeran/mRNA-1273, Pfizer/BioNtech's Tozinameran/BNT162b2, and CureVAC 's Zorecimeran/CVnCoV- (not approved).
- Includes patents on **underlying technologies.**
- Patent status worldwide.
- Regularly updated.
- Open access : https://www.vaxpal.org/



mRNA Technology Transfer Programme

Phase 2: Patent landscape on 1st generation COVID-19 mRNA vaccine - (Moderna look-alike)

- Critical patents for the vaccine manufacturing technology identified.
- Information on patents linked to the vaccine technology under development at Afrigen with status in LMICs monitored and updated.
- .xls file available for download

TYPE	Applicant/Assignee	Publication No. Link to patentscope	Expected Expiry date (20 years from filing)	Subject Matter	Patent Status LMICs			Patent Status HICs		
					Granted	Pending	Withdrawn	Granted	Pending	Withdrawn
LNPS(&MRNA)	Moderna	WO2015164674	23/04/2035	**Nucleic acid compositions**	RU2746406C2 (WO claims granted)	BR, CN, IN (opposed), EP divisionals filed (AL, BG, MK, RS, TR, BA, ME, MA)		JP, US, EP3134131 (granted, claims restricted to influenza virus),	AU, CA, EP Divs filed (AT, BE, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LI, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM)	
LNPS(&MRNA)	Moderna	WO2020061457	20/09/2039	Method of producing a lipid nanoparticle (LNP) encapsulating a nucleic acid which used in the preparation of mRNA-1273 vaccine.		CN, EP (AL, BG, MK, RS, TR)	EP (BA, ME, KH, MA, MD, TN)		CA, EP (AT, BE, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LI, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM), JP, US	
SARS(&MRNA)	Moderna	WO2021154763	26/01/2041	mRNA comprising an open reading frame (ORF) that encodes a **SARS-CoV-2 spike (S) protein** having a double proline stabilizing mutation		CO, DO, MX, PE, PH, TH	EP (AL, MK, RS, RT, BA, ME, KH, MA, MD, TN), AR, BR, CN, RU, EA, ZA2022/08639 App withdrawn end 2022-early 2023		AE, TW, NZ	AU, CA, EP, IL, KR, SA national filing US17/000,215 allowed in Aug 2021, abandoned by failure to pay final fees due to on-going discussions with NIH (**dispute over inventorship**). Claims restricted to a specific mRNA sequence (assumed to cover mRNA-1273)

Phase 2: 1st generation mRNA technology (Moderna look-alike) - **Landscaping main findings**

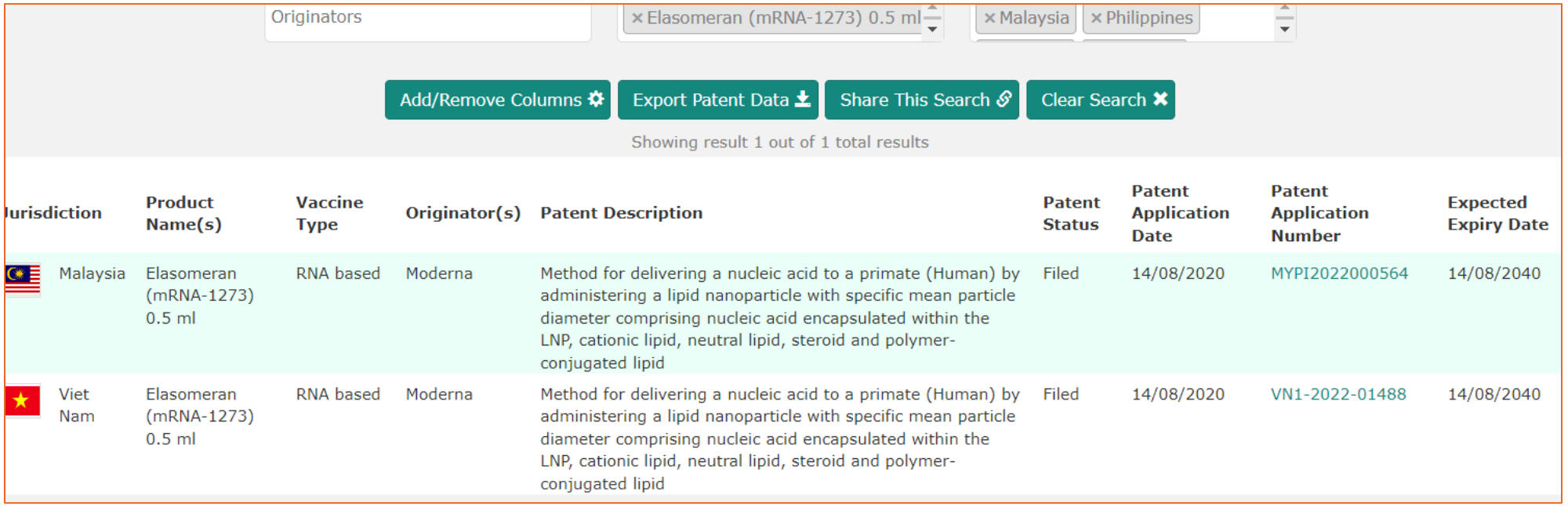
- Due to existing patents, freedom to operate (FTO) in ZA, CN, BR, RS likely more challenging than other LMICs.
- For newer applications, FTO will depend on claims finally granted in each country.
- Deep patent landscape evaluation to be performed to support network partners in making their own FTO for COVID-19, especially if based in countries not included in the Moderna waiver (i.e. BR, AR, RS, ZA), and in relation to other third-party patents
- Monitor newly published applications and on-going litigations

VaxPaL – elasomeran in South-East Asian countries

Jurisdiction	Product Name(s)	Vaccine Type	Originator(s)	Patent Description	Patent Status	Patent Application Date	Patent Application Number	Expected Expiry Date
India	Elasomeran (mRNA-1273) 0.5 ml	RNA based	Moderna	Lipid nano-particle composition	Withdrawn	15/04/2009	IN4265/KOLNP/2010	
				Method of expressing a polypeptide by administering an isolated mRNA	Withdrawn	03/10/2012	IN2839/DELNP/2014	
				Method of producing a polypeptide in a mammalian cell or tissue with a formulation comprising a modified mRNA encoding the polypeptide; Pharmaceutical compositions comprising modified mRNA formulated in LNPs	Withdrawn	27/05/2014	IN4286/DELNP/2014	
				Nucleic vaccine compositions	Filed (opposed)	23/04/2015	IN201617039870	23/04/2035
				Method for delivering a nucleic acid to a primate (Human) by administering a lipid nanoparticle with specific mean particle diameter comprising nucleic acid encapsulated within the LNP, cationic lipid, neutral lipid, steroid and polymer-conjugated lipid	Filed	14/08/2020	IN202217012332	14/08/2040
Indonesia	Elasomeran (mRNA-1273) 0.5 ml	RNA based	Moderna	Method for delivering a nucleic acid to a primate (Human) by administering a lipid nanoparticle with specific mean particle diameter comprising nucleic acid encapsulated within the LNP, cationic lipid, neutral lipid, steroid and polymer-conjugated lipid	Filed	14/08/2020	IDP00202203121	14/08/2040
Sri Lanka	Elasomeran (mRNA-1273) 0.5 ml	RNA based	Moderna	Method for delivering a nucleic acid to a primate (Human) by administering a lipid nanoparticle with specific mean particle diameter comprising nucleic acid encapsulated within the LNP, cationic lipid, neutral lipid, steroid and polymer-conjugated lipid	Filed	14/08/2020	LK22167	14/08/2040
Thailand	Elasomeran (mRNA-1273) 0.5 ml	RNA based	Moderna	Method for delivering a nucleic acid to a primate (Human) by administering a lipid nanoparticle with specific mean particle diameter comprising nucleic acid encapsulated within the LNP, cationic lipid, neutral lipid, steroid and polymer-conjugated lipid	Filed	14/08/2020	TH2201000939	14/08/2040
				mRNA comprising an open reading frame (ORF) that encodes a SARS-CoV-2 spike (S) protein having a double proline stabilizing mutation	Filed	26/01/2021	TH2201004674	26/01/2041

- One pending application in India from Moderna.
- A recent filing from Acuitas to be monitored to understand if relevant or not

VaxPaL – elasomeran in countries of the Western Pacific Region



Jurisdiction	Product Name(s)	Vaccine Type	Originator(s)	Patent Description	Patent Status	Patent Application Date	Patent Application Number	Expected Expiry Date
Malaysia	Elasomeran (mRNA-1273) 0.5 ml	RNA based	Moderna	Method for delivering a nucleic acid to a primate (Human) by administering a lipid nanoparticle with specific mean particle diameter comprising nucleic acid encapsulated within the LNP, cationic lipid, neutral lipid, steroid and polymer-conjugated lipid	Filed	14/08/2020	MYPI2022000564	14/08/2040
Viet Nam	Elasomeran (mRNA-1273) 0.5 ml	RNA based	Moderna	Method for delivering a nucleic acid to a primate (Human) by administering a lipid nanoparticle with specific mean particle diameter comprising nucleic acid encapsulated within the LNP, cationic lipid, neutral lipid, steroid and polymer-conjugated lipid	Filed	14/08/2020	VN1-2022-01488	14/08/2040

Search for Vietnam, Philippines, Malaysia and Thailand: only the recent filing by Acuitas in Malaysia and Viet Nam

Phase 3: 2nd Generation mRNA technology – **Monitoring of newly published patent applications**

- IP landscape strategy redefined to be aligned with the 2nd generation mRNA technology strategy discussions
- IP search strategy was broadened in scope to account for:
  - Formulation based on lipid nanoparticles (especially when including cationic lipids).
  - Modified mRNA (at nucleotide, capping, terminal, construct level) for improved expression.
  - mRNA vaccines specific for high/medium priority infections (beyond COVID-19)
- Monitoring initiated in June 2022 and .xls file available for download with 1088 records
- 300 additional patent publications retrieved since June 2023 are being reviewed.

Back to Introduction		mRNA Vaccines						mRNA Therapeutics			
Update	Pub. Number (Patentscope link)	RNA/DNA	Lipid Nanoparticles	Other Delivery Vehicles	Manufacturing/ Analysis/Devices	Administration	Target(s)		Title	Abstract	Applicants (NORMALIZE
										for the preparation,	
Jun-22	WO2013174409		Polymers						REVERSIBLE IMMOBILIZATION AND/OR CONTROLLED RELEASE OF NUCLEIC ACID CONTAINING NANOPARTICLES	The present invention relates to nanoparticles comprising nucleic acids	CUREVAC
Jun-22	WO2013182683		(Main)			Route of administration	Multiple targets		PULMONARY DELIVERY OF MESSENGER RNA	The invention discloses a method for expressing an mRNA in lung wherein - the	ETHRIS GMBH
Jun-22	WO2013185069		(Main)			Route of administration			PULMONARY DELIVERY OF MRNA TO NON-LUNG TARGET CELLS	Compositions comprising mRNA formulated for pulmonary administration	ETHRIS GMBH; SH HUMAN GENETIC THERAPIES
Jun-22	WO2014005958	Self-amplifying/ replicating					Retroviridae (HIV)		IMMUNOGENIC COMPOSITIONS AND USES THEREOF	This invention generally relates to immunogenic compositions that	NOVARTIS

Monitoring – Dengue (10 results)

Players Geo scope

Back to Introduction

		mRNA Vaccines						mRNA Therapeu			
Update	Pub. Number (Patentscope link)	RNA/DNA	Lipid Nanoparticles	Other Delivery Vehicles	Manufacturing/ Analysis/Devices	Administration	Target(s)		Title	Applicants (NORMALIZED)	Related patent documents (Patentscope accessed on 27.06.2023 Espacen
Jun-22	WO2013059493	RNA/DNA					Flaviviridae/ Dengue virus		DENGUE VIRUS E-GLYCOPROTEIN POLYPEPTIDES CONTAINING MUTATIONS THAT ELIMINATE IMMUNODOMINANT CROSS-REACTIVE EPITOPES	US DEPARTMENT OF HEALTH AND HUMAN SERVICES; TRUSTEES OF	CA2852684; EP2768847; US20140286983; AU2012326079; EP3269728; EP3819306; IN3739/DELNP/2014; US20160375123; US20180353593;
Jun-22	WO2014150939	RNA/DNA					Flaviviridae/ Dengue virus		COMPOSITIONS AND METHODS FOR DENGUE VIRUS CHIMERIC CONSTRUCTS IN VACCINES	US DEPARTMENT OF HEALTH AND HUMAN SERVICES; TRUSTEES OF	CA3166063; CA3177572; CA3177574; SG10201802192V; SG10201913387X; SG10201913435T; CA2903231; SG11201507460P; EP2968516;
Jun-22	WO2020014658	mRNA					Flaviviridae/ Dengue virus		BROADLY REACTIVE IMMUNOGENS OF DENGUE VIRUS, COMPOSITIONS, AND METHODS OF USE THEREOF	UNIV. GEORGIA RES.	US20220001001
May-23	WO2011138586	RNA/DNA					Flaviviridae/ Dengue virus		DENGUE VIRUS VACCINE	IMPERIAL INNOVATIONS NATIONAL CENTER FOR	-
May-23	WO2014016362	RNA/DNA					Flaviviridae/		VACCINE COMPOSITIONS FOR PREVENTION AGAINST DENGUE VIRUS	SANOFI PASTEUR	KR1020157003822; SG11201500439R; EP2877207;
May-23	WO2014074912	RNA/DNA					Flaviviridae/ Dengue virus		COMPOSITIONS, METHODS AND USES FOR DENGUE VIRUS SEROTYPE-4 CONSTRUCTS	TAKEDA VACCINES US DEPARTMENT OF HEALTH &	EP2916864; UY0001035131; AR093421; JP2016501015; NZ630839
May-23	WO2014083194	RNA/DNA					Flaviviridae/		METHODS FOR INDUCING ANTIBODIES	SANOFI PASTEUR	BR112015012515
May-23	WO2014144786	RNA/DNA					Flaviviridae/ Dengue virus		NOVEL VACCINES AGAINST MULTIPLE SUBTYPES OF DENGUE VIRUS	UNIV PENNSYLVANIA; INOVIO PHARMACEUTICA	CN110055265; CA2906082; EP2968394; US20160022802; KR1020160004267; AU2014228497; CN105246491;
May-23	WO2015019253	RNA/DNA					Flaviviridae/ Dengue virus		ANTI-DENGUE VIRUS GENETIC VACCINE BASED ON THE ENVELOPE PROTEIN ECTODOMAINS	INTERNATIONAL CENTER FOR GENETIC ENGINE	-
May-23	WO2017023839	RNA/DNA					Flaviviridae/ Dengue virus		IMMUNE ENHANCING RECOMBINANT DENGUE PROTEIN	US NAVY US ARMY	EP3331559

Monitoring – Dengue – Sanofi

Pub. Number (Patentscope link)	Abstract	Application Date	Related patent documents (Patentscope accessed on 27.06.2023 Espacenet on 28.06.2023)
WO2014016362	The present invention relates to vaccine compositions that are useful in a method of protecting a human subject against dengue disease.	24/07/2013	KR1020157003822; SG11201500439R; EP2877207; US20150265695; AU2013295016; **ID2017/01302; MYPI; 2014003521; PH1/2014/502875**; **VN42584**; BR112015001313; **TH172458**; JP2015524422; PE2015-0356; CA2878599; MXMX/a/2015/000446; CO7390785; **IN988/CHENP/2015**
WO2014083194	The present invention provides agents for use in methods of inducing neutralising antibodies against the four serotypes of dengue virus, wherein said agents are administered in conjunction with a measles vaccine, a mumps vaccine and a rubella vaccine.	29/11/2013	BR112015012515

- Equivalent patents filed in East Asia & Pacific in: Indonesia, Malaysia, Philippines, Vietnam, Thailand and India
- Expected expiry in 2033 : 20 years from filing date 24/07/2013
- Status and scope of claims/patent to be checked monitored (e.g. refused in Vietnam)

Monitoring – Malaria (6 results)

Pub. Number (Patentscope link)	RNA/DNA	Administration	Target(s)	Title	Applicants (NORMALIZED)	Application Date	Related patent documents (Patentscope accessed on 27.06.2023 Espacenet on 28.06.2023)
WO2019140136	mRNA		Malaria	MALARIAL VACCINATION METHODS AND REGIMENS	UNIV WASHINGTON	10/01/2019	US20200338178; **IN202047034174**
WO2020128031	mRNA		Malaria	RNA FOR MALARIA VACCINES	CUREVAC	20/12/2019	AU2019410737; CA3118034; CN113453707; EP3897702; BR112021009422; US20220040281; **IN202117021863**
WO2004037189	RNA/DNA	Boost; Route of administration	Malaria	METHODS FOR VACCINATING AGAINST MALARIA	GLAXOSMITHKLINE BIOLOGICALS; US NAVY	22/10/2003	US20040214938; EP2277533; EP1569515; RU02356577; US20060188527; CN1713817; CA2502268; AU2003285932; CN101077416; ES2594758; JP2006512405; PL376792; CA2464253; BRPI0401625; EP1471043; JP2004323976; SG2004021812; US20050118331; NZ539509; **IN1983/DELNP/2005;** NO20052426; NO20052426; RU2005115837; US2006188527; **IN4821/DELNP/2008;** AU2010200177; JP2011068671
WO2007003384	RNA/DNA		Malaria	ANTI-MALARIA VACCINE	GLAXOSMITHKLINE BIOLOGICALS	30/06/2005	AR055069; PE2007-0203; EP1896060; US20080317787; BRPI0613087; CN101208100; CA2613057; EA200702633; ES2529577; KR1020130111648; AU2006265329; **ID048.0940; MYPI; 20063121;** JP2008544969; VN1200800271; NZ591300; MTP3616; IL187769; NO20076200; ZA2007/10615; **IN4730/KOLNP/2007**; CO07128783; NZ564156; MXMX/a/2007/016240; **PH12007502907**; MA29601; DZDZP2008000046; **VN17309;** KR1020080030640; NO20076200
WO2012047679	RNA/DNA		Malaria	CONSENSUS ANTIGEN CONSTRUCTS AND VACCINES MADE THERE FORM, AND METHODS OF USING SAME TO TREAT MALARIA	UNIV PENNSYLVANIA	27/09/2011	CN110195069; EP2621540; US20130273112; CA2812789; KR1020130138790; AU2011312465; KR1020180096814; BR112013007051; JP2013543721; MX355501; **IN2776/DELNP/2013**
WO2022027107	RNA/DNA		Malaria	IMMUNOGENIC COMPOSITIONS	MACFARLANE BURNET INSTITUTE FOR MEDICAL RESEARCH & PUBLIC HEALTH	06/08/2021	AU2021322831; EP4192498; KR1020230080396; **TH2301000640; IN202347014090**

- Earlier applications filed in 2003 (expected to expire in 2023)
- Latest filing in 2021
- Main players: Curevac, GSK
- GSK filings in a large number of countries

Monitoring – Malaria (6 results)

oduction

Pub. Number (Patentscope link)	mRNA Vaccines: RNA/DNA	mRNA Vaccines: Administration	mRNA Vaccines: Target(s)	Title	Abstract	Applicants (NORMALIZED)	Application Date	Related patent documents (Patentscope accessed on 27.06.2023 Espacenet on 28.06.2023)
WO2019140136	mRNA		Malaria	MALARIAL VACCINATION METHODS AND REGIMENS	Compositions, methods, and regimens for vaccinating subjects against malaria parasites are provided herein. The compositions include first and second compositions having priming and/or trapping components. The priming components include, but are not limited to, DNA or RNA polynucleotides, and the trapping components include, but are not limited to, DNA or RNA polynucleotides, one or more attenuated sporozoites and/or other liver-specific antigens as viral or other formulations. Following administration of one or more of the compositions provided herein using one or more of the vaccination regimens and/or methods, high levels of liver resident memory CD8+ T cells are induced in the subjects leading to protection against sporozoite challenge.	UNIV WASHINGTON	10/01/2019	US20200338178; **IN202047034174**
WO2020128031	mRNA		Malaria	RNA FOR MALARIA VACCINES	The present invention is directed to a coding RNA for a Malaria vaccine. The coding RNA comprises at least one heterologous untranslated region (UTR), preferably a 3'-UTR and/or a 5'-UTR, and a coding region encoding at least one antigenic peptide or protein derived from a Malaria parasite, in particular at least one antigenic protein derived from circumsporozoite protein (CSP) of a Malaria parasite (e.g. Plasmodium falciparum). The present invention is also directed to compositions and vaccines comprising said coding RNA in association with a polymeric carrier, a polycationic protein or peptide, or a lipid nanoparticle (LNP). Further, the invention concerns a kit, particularly a kit of parts comprising the coding RNA, or the composition, or the vaccine. The invention is also directed to a method of treating or preventing Malaria, and the first and second medical uses of the coding RNA, the composition, the vaccine, and the kit.	CUREVAC	20/12/2019	AU2019410737; CA3118034; CN113453707; EP3897702; BR112021009422; US20220040281; **IN202117021863**
WO2004037189	RNA/DNA	Boost; Route of administration	Malaria	METHODS FOR VACCINATING AGAINST MALARIA	The invention pertains to methods for protecting against malaria infection by vaccination. The method of the invention involves priming an anti-malaria immune response with a DNA-based vaccine and boosting that response with a protein-based vaccine. The method of the invention also relates to broadening the resulting immune response by boosting with a protein-based vaccine.	GLAXOSMITHKLINE BIOLOGICALS; US NAVY	22/10/2003	US20040214938; EP2277533; EP1569515; RU02356577; US20060188527; CN1713817; CA2502268; AU2003285932; CN101077416; ES2594758; JP2006512405; PL376792; CA2464253; BRPI0401625; EP1471043; JP2004323976; SG2004021812; US20050118331; NZ539509;
WO2007003384	RNA/DNA		Malaria	ANTI-MALARIA VACCINE	There is provided, inter alia, a method for the prophylaxis of productive malaria infection in travelers to endemic regions comprising the administration of suitable amounts of a formulation comprising a Plasmodium antigen or an immunogenic fragment or derivative thereof and an adjuvant, comprising a lipid A derivative and a saponin in a liposome formulation.	GLAXOSMITHKLINE BIOLOGICALS	30/06/2005	AR055069; PE2007-0203; EP1896060; US20080317787; BRPI0613087; CN101208100; CA2613057; EA200702633; ES2529577; KR1020130111648; AU2006265329; **ID048.0940; MYPI; 20063121;** JP2008544969; VN1200800271; NZ591300; MTP3616; IL187769; NO20076200;
WO2012047679	RNA/DNA		Malaria	CONSENSUS ANTIGEN CONSTRUCTS AND VACCINES MADE THERE FORM, AND METHODS OF USING SAME TO TREAT MALARIA	Provided herein is consensus amino acid sequences of P. falciparum (P.f.) proteins and their encoding sequences, as well as expression constructs expressing the sequences. Also provided herein are methods for generating an immune response against P. falciparum using the expression constructs provided herein.	UNIV PENNSYLVANIA	27/09/2011	CN110195069; EP2621540; US20130273112; CA2812789; KR1020130138790; AU2011312465; KR1020180096814; BR112013007051; JP2013543721; MX355501; **IN2776/DELNP/2013**
WO2022027107	RNA/DNA		Malaria	IMMUNOGENIC COMPOSITIONS	Immunogenic or vaccine compositions for preventing malaria, comprising or encoding CSP N-terminal (NT) sequences capable of presenting NT epitopes to a subject, and methods of administering same.	MACFARLANE BURNET INSTITUTE FOR MEDICAL RESEARCH & PUBLIC HEALTH	06/08/2021	AU2021322831; EP4192498; KR1020230080396; **TH2301000640; IN202347014090**

- **I**nternational **P**atent **C**lassifications used to search is A61K39/015 : Hemosporidia antigens, e.g. Plasmodium antigens
- In depth review of the patent applications required
- Abstract. Description and claims accessible through external links to full documents
- The last two records are specific to P. falciparum, the others cover P. vivax

Monitoring – Papillomaviridae (HPV) (17 results)

Pub. Number (Patentsc	RNA/DNA	Target(s)	Title	Applicants (NORMALIZED)	Applicatio n Date	Related patent documents (Patentscope accessed on 27.06.2023 Espacenet on 28.06.2023)
WO2005089164	RNA/DNA	Papillomaviridae (HPV)	INDUCING CELLULAR IMMUNE RESPONSES TO HUMAN PAPILLOMAVIRUS USING PEPTIDE AND NUCLEIC ACID COMPOSITIONS	EPIMMUNE	03/01/2005	EP1732598; CA2552508; AU2005222776
WO2008145745	RNA/DNA	Papillomaviridae (HPV)	VACCINE AGAINST HPV	SMITHKLINE BEECHAM	01/06/2007	-
WO2010085697	RNA/DNA	Papillomaviridae (HPV)	IMPROVED VACCINES FOR HUMAN PAPILLOMA VIRUS AND METHODS FOR USING THE SAME	UNIV PENNSYLVANIA	21/01/2010	CA2653478; US20100189730; CN107267530; PT2393496; EP2393496; CN102292089; CA2749120; EA201170965; KR1020110106901; ES2592204; AU2010206611; JP2012515557; PL2393496; **IN2532/KOLNP/2011**; MX2011007692; MXMX/a/2011/007692; JP2015192673
WO2011128247	RNA/DNA	Papillomaviridae (HPV)	N-TERMINAL HPV E7 FUSION PROTEINS	DKFZ DEUTSCHES KREBSFORSCHUNGSZE NTRUM	14/04/2010	EP2377879
WO2013055326	RNA/DNA	Papillomaviridae (HPV)	VACCINES FOR HUMAN PAPILLOMA VIRUS AND METHODS FOR USING THE SAME	THE TRUSTEES OF THE UNIV PENNSYLVANIA	12/10/2011	CA2848658; EP2750703; CN103889450; EA201490758; KR1020140076613; AU2011378812; KR1020190056450; JP2014530610; KR1020210019133; KR1020220035279; MX360449; **IN3777/DELNP/2014**; JP2018029579; AU2017265076; JP2020039341; JP2022068160
WO2013092875	RNA/DNA	Papillomaviridae (HPV)	VACCINES AGAINST HPV	NYKODE THERAPEUTICS	20/12/2012	CN104039833; CA2858963; EP2793937; US20150306217; KR1020140107569; RU2014129788; AU2012356969; BR112014015016; RU0002644201; DK2793937; EP3533462; JP2015508284; ES2730718; PT2793937; NZ626124; IL233217; **IN4813/CHENP/2014**; ZA201404516
WO2014165291	RNA/DNA	Papillomaviridae (HPV)	IMPROVED VACCINES FOR HUMAN PAPILLOMA VIRUS AND METHODS FOR USING THE SAME	UNIV PENNSYLVANIA; INOVIO PHARMACEUTICALS	12/03/2014	EP3586870; CA2898522; KR1020150130438; EP2968527; US20160038584; CN105307678; EA201591688; AU2014248535; JP2016512553; EA201992282; CN114181961; KR1020220140025; MX2020011299; MXMX/a/2015/011484; IN7923/DELNP/2015; AU2017204518; ZA201506879

- Sorting by filing date shows continuous interest and patenting since 2005 (until 2022)
- Important player: Uni Pennsylvania
- Patenting, at least in India and South Africa in addition to HICs

Monitoring – Papillomaviridae (HPV) (17 results)

Pub. Number (Patentsc	RNA/DNA	Target(s)	Title	Applicants (NORMALIZED)	Applicatio n Date	Related patent documents (Patentscope accessed on 27.06.2023 Espacenet on 28.06.2023)
WO2016071306	RNA/DNA	Papillomaviridae (HPV)	THERAPEUTIC HPV16 VACCINES	JANSSEN PHARMACEUTICALS	03/11/2015	EP3421046; MA40902; LT3215187; PT3215187; AU2015341926; CA2965562; SG11201702997Y; KR1020170083562; **MYPI; 2017701524;** EP3215187; CN107075521; EA201790976; ID2018/03330; DK3215187; BR112017009177; ES2697903; **TH180279;** JP2017534286; **VN1/053875**; RS58080; PL3215187; US20160122396; AR102527; NZ730802; **IN201717013532;** IL251895; CL2017001089; CL2017-1089; MX2017005788; SA517381457; CN201580060062.4; CO2170004838; CO20170004838; CONC2017/0004838; US20170281747; JP2018148890; US20180344841; AU2018282463; US20200164057; ZA201703055
WO2017029360	RNA/DNA	Papillomaviridae (HPV)	THERAPEUTIC HPV18 VACCINES	JANSSEN PHARMACEUTICALS	18/08/2016	**MYPI; 2018700619**; SG102020015O1Q; AU2016309743; CA2995740; CN107921110; KR1020180042295; EP3337500; **ID2018/08219**; BR112018003019; EA201890527; JP2018523486; **TH1801000954A**; US20170051019; AR105775; JOP/2016/0189; US20170369534; **IN201817003985**; SG11201800943Y; CL2018000432; CL2018-432; MX2018002106; IL257604; SA518390954; CO2018001623; NZ740514; **VN1/074525**;
WO2017070616	mRNA	Papillomaviridae (HPV)	Sexually transmitted disease vaccines	MODERNATX	21/10/2016	CA3002819; AU2016342376; EP3364982; US20180289792; JP2018531290; US20180296662
WO2017096432	New construct	Papillomaviridae (HPV)	IMMUNOMODULATING COMPOSITION FOR TREATMENT	JINGANG MEDICINE	09/12/2016	AU2015905099; AU2016367712; CA3006779; KR1020180083437; CN108601951; EP3386593; US20190134181; JP2019505567
WO2018060288	RNA/DNA	Papillomaviridae (HPV)	COMPOSITIONS AND METHODS OF TREATMENT OF PERSISTENT HPV INFECTION	GLAXOSMITHKLINE BIOLOGICALS	27/09/2017	EP3518966; US20200123571; BE1024774
WO2021081480	RNA/DNA	Papillomaviridae (HPV)	IMPROVED VACCINES FOR RECURRENT RESPIRATORY PAPILLOMATOSIS AND METHODS FOR USING THE SAME	INOVIO PHARMACEUTICALS	26/10/2020	AU2020371792; CA3155370; BR112022007615; EP4048682; KR1020220114531; CN115443287; US20230000969; JP2022554132; MXMX/a/2022/004836; BR112022007615; IN202217028514

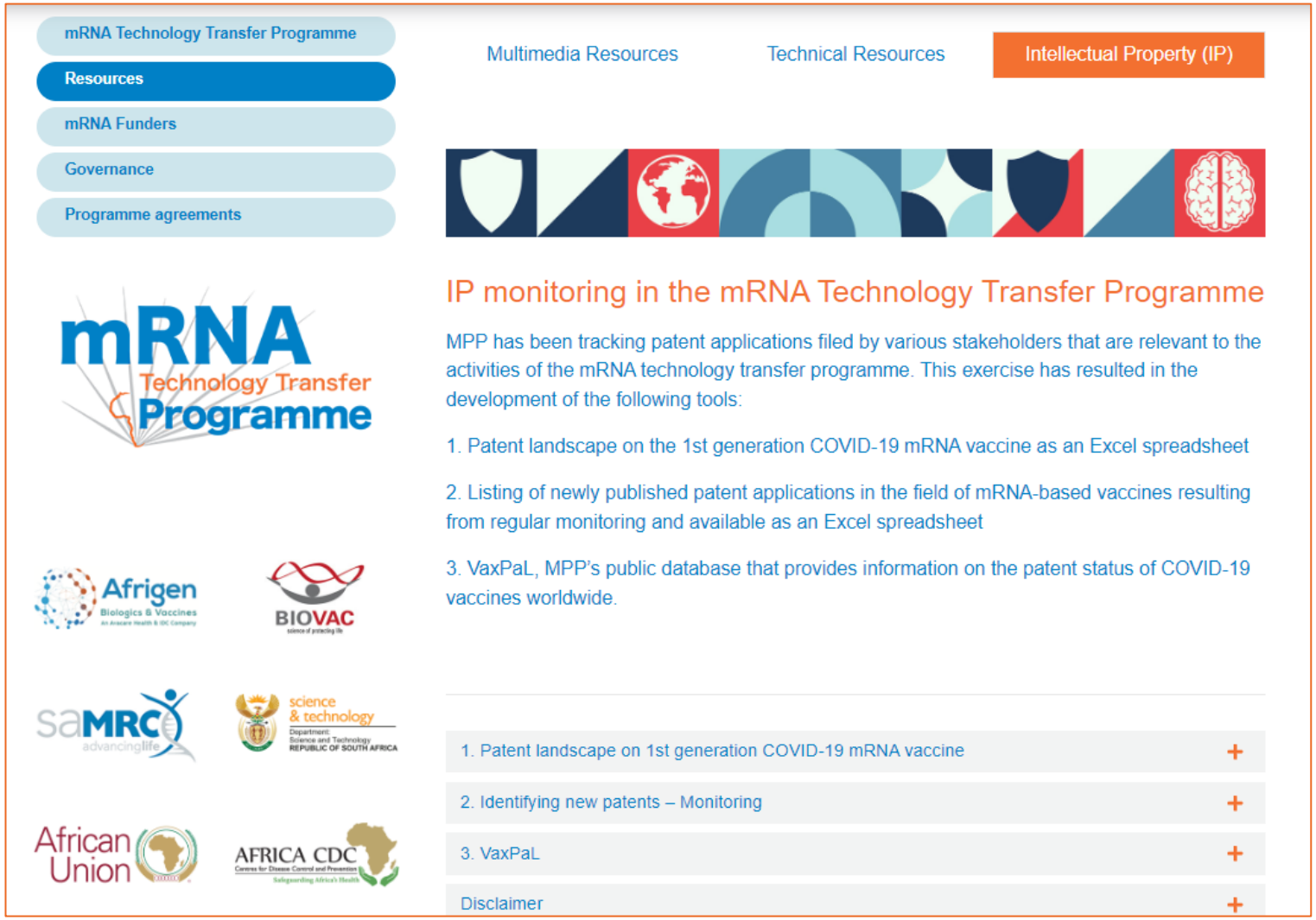
- Janssen, as a new player in 2015 and filing in a large number of countries including Malaysia, Indonesia Vietnam and Thailand
- Moderna filing in 2016, only in HICs

Monitoring – Target : Papillomaviridae (HPV) (17 results)

Pub. Number (Patentsc	RNA/DNA	Target(s)	Title	Applicants (NORMALIZED)	Applicatio n Date	Related patent documents (Patentscope accessed on 27.06.2023 Espacenet on 28.06.2023)	National phase entry deadline (
WO2021095838	mRNA	Papillomaviridae (HPV)	NUCLEIC ACID LIPID PARTICLE VACCINE ENCAPSULATING HPV MRNA	DAIICHI SANKYO NATIONAL INSTITUTES OF BIOMEDICAL INNOVATION HEALTH & NUTRITION	13/11/2020	CA3160839; AU2020382378; CN114650841; JPWO2021095838; BR112022009429; KR1020220102617; EP4059515; US20220409540; IL292989; BR112022009429; **IN202247031874**	15/05/2022
WO2021231925	RNA/DNA	Papillomaviridae (HPV)	VACCINES FOR RECURRENT RESPIRATORY PAPILLOMATOSIS AND METHODS OF USING THE SAME	INOVIO PHARMACEUTICALS	14/05/2021	AU2021271860; CA3177949; KR1020230011335; EP4149536; CN115803051; EA202293315; PE2023-0349; IL297903; **TH2201007261**; JP2022568868; MXMX/a/2022/014248; **PH12022553102**; CO20220017989; SA522441314	14/11/2022
WO2023021116	RNA/DNA	Papillomaviridae (HPV)	THERAPEUTIC PAPILLOMA VIRUS VACCINES	SIRION BIOTECH UNIVERSITAET REGENSBURG INPROTHER PROBIOGEN	18/08/2021	International phase	18/02/2024
WO2022204597	RNA/DNA	Papillomaviridae (HPV)	DNA ENCODED NANOPARTICLE VACCINE AGAINST HUMAN PAPILLOMAVIRUS, AND METHODS OF USE THEREOF	THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY	28/03/2022	International phase	26/09/2023

Recently filed international patent applications need to be monitored until the national phase entry deadline to understand geographical filing scope. This covers the countries bound by the Patent Cooperation Treaty (PCT).

mRNA TT Programme IP resources



https://medicinespatentpool.org/what-we-do/mrna-technology-transfer-program/resources#pills-Intellectual-Property-IP

mRNA Technology Transfer Hub Programme

Thank you!!