





# Learning from interdisciplinary research on coronavirus for poxvirus epidemic

Margarita Del Val Centro de Biología Molecular Severo Ochoa (CSIC-UAM), Madrid, Spain









# Interdisciplinary Research Platform on Global Health

An integral approach to pandemics from R+D+I

https://pti-saludglobal-covid19.corp.csic.es/

# CSIC, Spanish National Research Council



Iñaki Comas & Margarita Del Val (Coordinators)





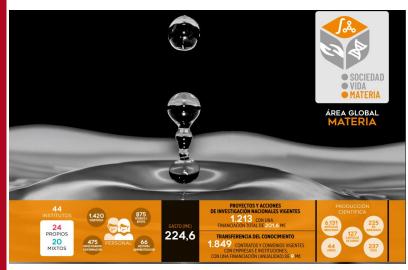






### 125 Research Institutes

Multidisciplinar **Materials** Life Social



# 11 March 2020 Scientific disciplines join forces to fight COVID-19

The Spanish National Research Council (CSIC), the largest research institution in Spain, has created Salud Global/Global Health. An Interdisciplinary Thematic Platform (PTI) to provide answers and solutions to every facet of the pandemic. This initiative includes many of the most innovative research projects happening right now and is backed financially by a range of organisations and companies.







### A 360° approach to contain the virus

The participating research groups are carrying out projects which cover every facet of the pandemic: origin, prevention, disease, containment measures, treatment, social impact, and the need to communicate with society.

 Studies to unravel the virus' genome in patients, the spread of the pandemic and the response to the disease

PREVENTION



 Reservoirs and ecology of SARS-CoV-2, zoonosis and the link with other viruses, environmental impact

·······• Transmission of SARS-CoV-2 during infection

> Availability of prevention equipment and forecasting measures

 Research into the severity of the disease and immunity

> Structure-function of the virus Severity of the disease Immune response Biomarkers Comorbidities Elderly people and nursing homes

Pediatric patients

CONTAINMENT MEASURES

 Studies on virus transmission and new containment, protection and disinfection measures

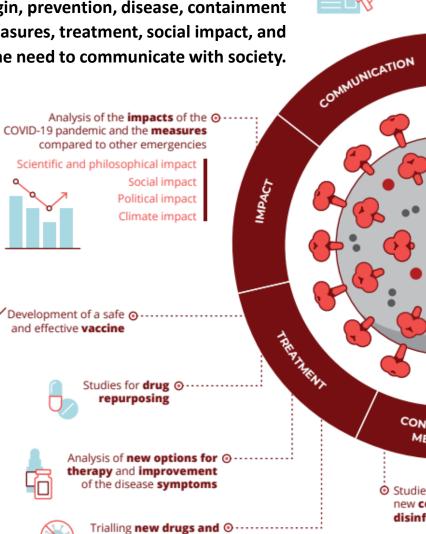
Stopping transmission via surfaces Stopping airborne transmission Spread in wastewater Spread in public transport

Development of effective early detection and diagnosis technologies

Triage of patients by severity Detection and quantification of antibodies Cellular immunity tests for SARS-CoV-2

Sampling devices Portable and on-site Multiplex devices





treatments (antivirals)





### PTI+ SALUD GLOBAL / GLOBAL HEALTH

https://pti-saludglobal-covid19.corp.csic.es/

# MAIN ACHIEVEMENTS IN TECHNOLOGY TRANSFER (I)

### **CONTENTION, PROTECTION AND DISINFECTION MEASURES**

- ✓ Masks of nanofiber filters, fully developed and produced in Spain.
  - CSIC & Bioinicia (spin-off from CSIC) for marketing.

# CSIC X PROVEIL

### **DIAGNOSTIC TECHNOLOGIES**

- ✓ Serological tests to detect antibodies to SARS-CoV-2
  - CSIC & Immunostep for marketing.
  - Agreement with the Medicines Patent Pool (MPP) of the WHO Accelerator ACT → Production in South Africa.
- ✓ Direct detection of viral RNA (PCR-free).



COVID-19 technology access pool







# MAIN ACHIEVEMENTS IN TECHNOLOGY TRANSFER (II)

### THERAPIES: DRUG REPURPOSING AND NEW FAMILIES OF ANTIVIRALS

- ✓ **Drug repurposing** : 2 phase-3 clinical trials
- ✓ **Recombinant antibodies (nanobodies) to SARS-CoV-2** for therapy and diagnostics
- ✓ Oral antiviral spray for SARS-CoV-2
- ✓ New families of antivirals: the CSIC Chemical Library
- ✓ Antiviral screening platforms



### **COVID-19 VACCINES UNDER DEVELOPMENT**

### Needed:

- ✓ Prevent infection
- ✓ Mucosal immunization
- ✓ Lasting immune memory
- ✓ Cheap
- ✓ Stable at room temperature



- ✓ 5 vaccine candidates, using different approaches: MVA, RNA, DNA, protein.
- ✓ Preclinical phases accomplished.

# **TRANSFER TO SOCIETY AND TO STAKEHOLDERS IN GLOBAL HEALTH**



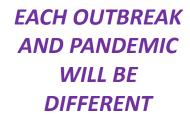














## RAPID AND TAILORED RESPONSE TO NEW THREATS

## **West Nile Virus Encephalitis outbreaks**

in swamps and rice fields close to Doñana National Park

(Taskforce, spring 2021) **stopped** by R+D & agreement with

Junta de Andalucía Government

for yearly controls











### **Monkeypox Virus** outbreak

(Taskforce, 20 May 2022)

Reference virus isolate
Wastewater Diagnostic
Serologic tests
Population immunity
Transmission
Antiviral resistance

Vaccines









