



# IMMUNOWATCH

SPECIAL EDITION - 2ND UPDATE 19/06/20



## COVID-19



# INTRODUCTION

## MabDesign and the COVID-19 pandemic

**T**he French immunotherapy network is facing unprecedented challenges and uncertainties as a result of the COVID-19 pandemic. Now more than ever, there is a need for rapid development of both preventive and curative treatments and facilitated access to information, resources and potential collaborators. Since the beginning of the disease outbreak, MabDesign has been continuously adapting its actions and services to respond to those needs. Our latest and ongoing contribution to the fight against COVID-19 is through this special edition of Immunowatch and its regular updates.

**M**abDesign's Immunowatch is a one-of-a-kind information monitoring newsletter in the field of immunotherapy which aims at providing members of our association with the most recent and relevant data gathered or generated through the key expertise of MabDesign and its collaborators in scientific research, business intelligence, market analysis and intellectual property. Its original format has been modified to cater for the fast evolution of the response to the COVID-19 pandemic and allow rapid and pertinent updates. Immunowatch is done in collaboration with the MAbMapping Unit of the Ambition Recherche & Développement (ARD) Biomédicaments 2020 Phase II programme, funded by the Centre Val de Loire region.



**BIOPHARMACEUTICALS**

*Innovation Dynamics in Health  
IN REGION CENTRE-VAL DE LOIRE*





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## COVID-19: Message from MabDesign president, Francis Carré



*Mankind's history has been marked by various outbreaks of infectious diseases across centuries with several of them reaching global proportions. Amidst this COVID-19 pandemic, the scientific committee at large must once again rise up to the challenge of providing fast solutions to this new health crisis. Since the beginning of the outbreak, various actors from the immunotherapy field have been continuously joining the fight in keeping at bay the severe acute respiratory syndrome coronavirus 2 SARS-CoV-2, causative agent of the current pandemic. All over the world, vaccines and therapies are being researched and developed in the hope of keeping millions safe or saving them. France's immunotherapy network obviously responded to this call of arms against COVID-19. Several pharmaceutical and biotechnology companies are even setting the pace in key aspects of this pandemic response through innovative or repurposed products and services. Others have joined forces with both local and foreign partners to enhance their R&D capabilities. Together, they are working relentlessly towards combatting SARS-CoV-2. In these uncertain times, MabDesign is fully committed to supporting its members and the immunotherapy network in general. All our services have been maintained since the beginning of the lockdown. In parallel, we have adapted our training offers and have modified our forthcoming scientific events. We are monitoring closely the current situation so as to make any necessary amendments to our services and actions. Finally, MabDesign has been actively contributing to the COVID-19 pandemic response which includes this special edition of Immunowatch.*



# COVID-19: Treatment, vaccines and diagnostics\*

## KEY FIGURES

631



Companies developing at least one product

780



Unique molecules in the pipeline

2183



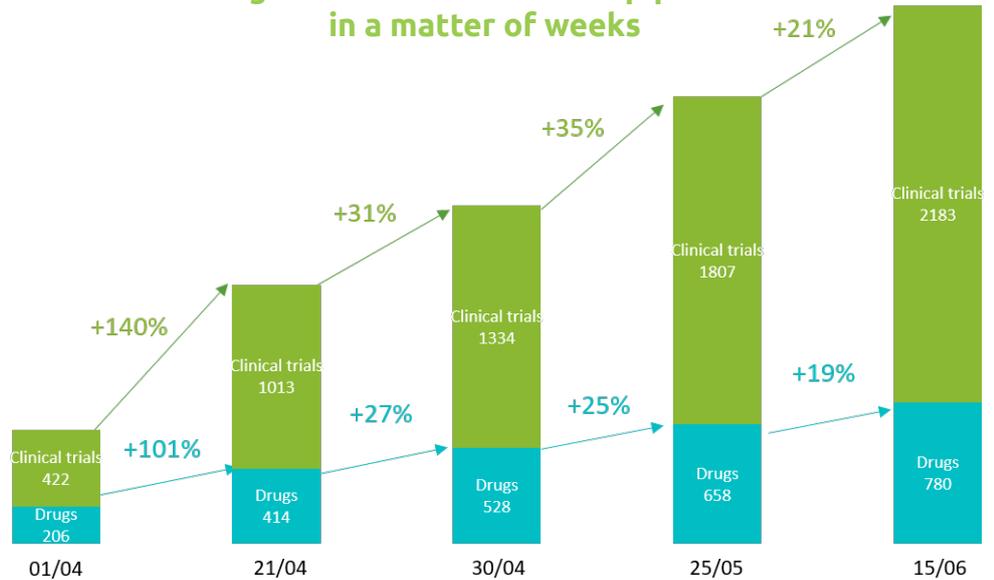
Clinical trials

46%



Ongoing trials

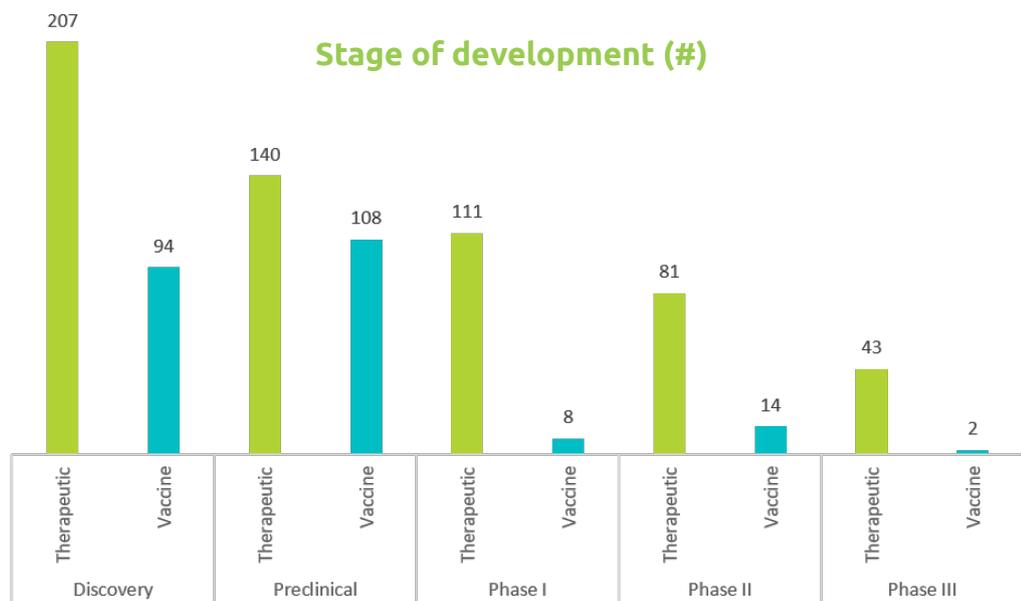
## Significant increase in the pipeline in a matter of weeks



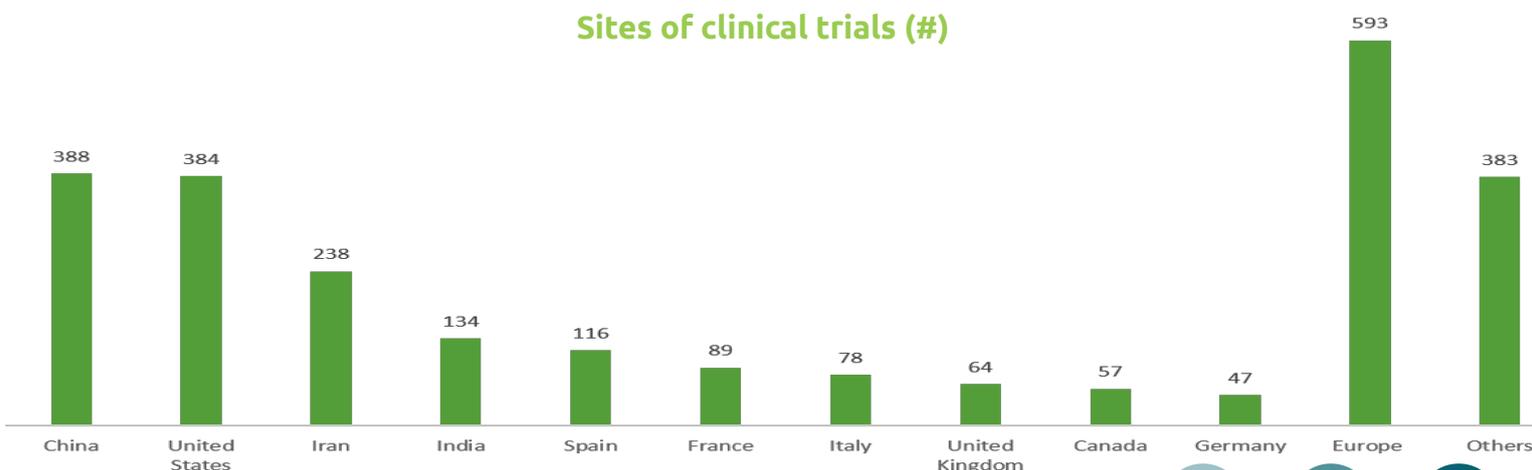
## Type of clinical studies



## Stage of development (#)



## Sites of clinical trials (#)



\* All data has been generated by MabDesign unless stated otherwise

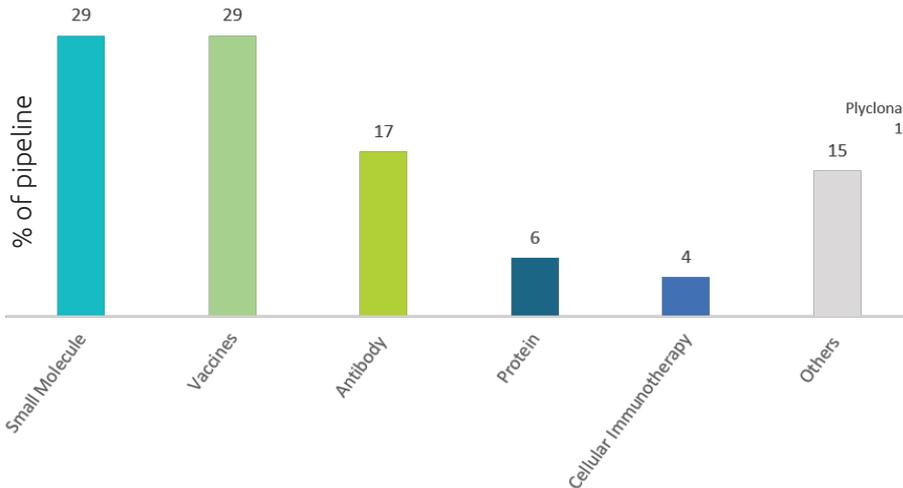


# COVID-19: Treatment, vaccines and diagnostics\*

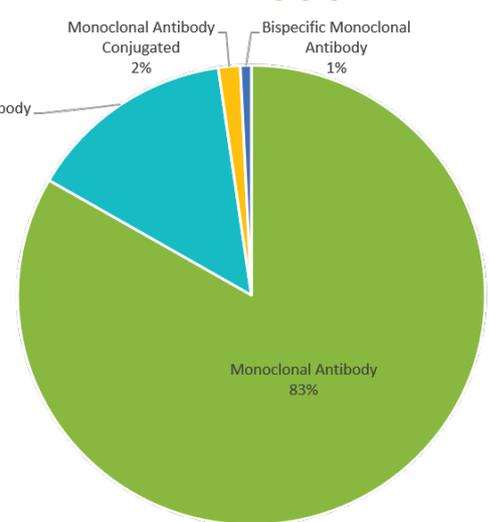
## Immunotherapy as frontline treatment for COVID-19

Several types of immunotherapy are being evaluated in the hope of providing solutions to tackle the COVID19 pandemic.

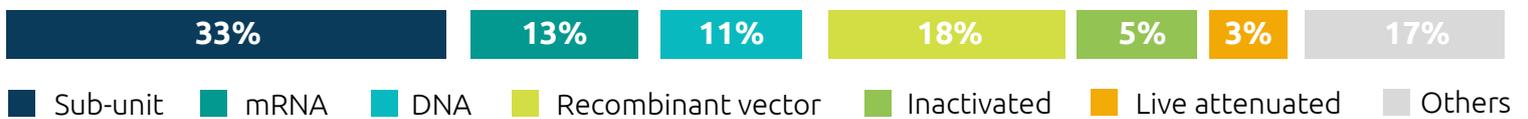
### Type of immunotherapy being developed



### The antibody pipeline



### Vaccine technology used



Majors companies developing: mRNA vaccines- Moderna, CureVac , Translate Bio, BioNtech, ETherNA  
DNA vaccines- Inovio Pharmaceuticals, Linea Rx, AnGes

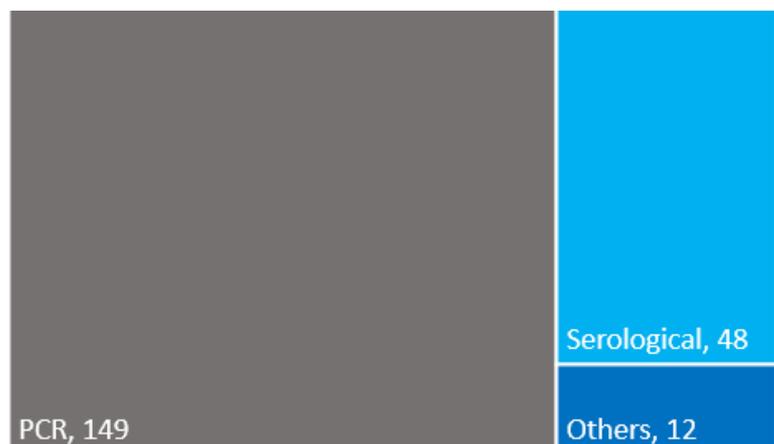
## Several COVID-19 diagnostic tools are already available

Tackling the COVID-19 pandemic does not only involve therapeutic or preventive treatments but also rapid and effective diagnostics tools.



**+209**  
Commercially available tests

### Type of test<sup>1</sup>



\* All data has been generated by MabDesign unless stated otherwise

1. Latest update 16/06/2020 Source : <https://www.360dx.com/coronavirus-test-tracker-launched-covid-19-tests>

PCR: polymerase chain reaction, direct detection of the virus through amplification of its genetic material

Serological: Detection of virus-specific antibodies which are produced by the immune system



# GLOBAL COLLABORATION FOR THE FIGHT AGAINST COVID-19



Partnering agreements between healthcare companies

Companies all over the world are partnering up during this global health crisis in order to develop a treatment. Such collaborative endeavours go beyond the realms of the healthcare sector and include IT companies offering innovative solutions.

## Selection of latest major deals related to COVID-19

ANNOUNCED DATE	DEAL DESCRIPTION	TYPE OF PRODUCT
12/06/20	PeptiDream Enters into Collaboration with Merck for COVID-19 Therapies	peptide
10/06/20	Catalent Enters into Agreement with Spicona to Develop COVID-19 Vaccine	Vaccine
09/06/20	Twist Bioscience and Serimmune Enter into Collaboration to Identify COVID-19 Therapeutic Antibody Candidates	Antibody
05/06/20	AbbVie Enters into Co-Development Agreement with Harbour BioMed, Utrecht University and Erasmus Medical Center for COVID-19	Antibody
26/05/20	Merck acquires Themis Biosciences and partners with IAVI and Ridgeback Biotherapeutics	Vaccine and antiviral products
08/05/20	Sorrento Therapeutics and Mount Sinai Health System to Enter into Partnership to Develop Antibody for COVID-19	Antibody
30/04/20	AstraZeneca Enters into Co-Development Agreement with University of Oxford for COVID-19 vaccine	Vaccine
27/04/20	Merck and Institute for Systems Biology Enter into Research Collaboration for COVID-19	Vaccine and therapeutic
23/04/20	ReiThera Enters into Agreement with LEUKOCARE and Univercells for COVID-19 Vaccine	Vaccine
22/04/20	Precision For Medicine Enters into Partnership with Karyopharm Therapeutics for COVID-19	Small molecule
21/04/20	Bayer to Enter into Research Partnership with Population Health Research Institute (PHRI) to Identify COVID-19 Treatments	Small molecule
16/04/20	Dynavax Technologies and Sinovac Biotech Enter into Collaboration to Develop COVID-19 Vaccine	Vaccine
08/04/20	CSL Behring and SAB Biotherapeutics Enter into Partnership for COVID-19	Antibody
05/04/20	GlaxoSmithKline and Vir Biotech to Enter into Collaboration for COVID-19	Antibody
03/04/20	GlaxoSmithKline Enters into Agreement with Xiamen Inovax Biotech for COVID-19 Vaccine	Vaccine
17/03/20	Pfizer and BioNTech Enters into Co-Development Agreement for Potential COVID-19 Vaccine	Vaccine

Source: GlobalData



# GLOBAL COLLABORATION FOR THE FIGHT AGAINST COVID-19

## Selection of latest major deals involving French companies

ANNOUNCED DATE	DEAL DESCRIPTION	TYPE OF PRODUCT
15/06/20	Novasep will produce AstraZeneca's vaccine in Europe	Vaccine
08/06/20	Cynbiose and the academic laboratory Virpath have partnered up in a R&D collaborative project linked to the COVID-19 pandemic	Unknown
13/05/20	Eurobio Scientific SA, an in vitro medical diagnostics company, has partnered with Hospices Civils de Lyon (HCL), to develop a library of anti-SARS CoV-2 antibodies	Antibody
11/05/20	ABL applies its expertise in custom manufacturing virus-based therapeutics to accelerate the Institut Pasteur and Themis' coalition COVID-19 vaccine development	Vaccine
24/04/20	To fight the Covid-19 pandemic, Owkin launches the Covid-19 Open AI Consortium (COIA), to bring innovative discoveries and concrete results to medical research.	Others
22/04/20	Valneva and Dynavax Technologies Enter into Collaboration to Advance Vaccine Development for COVID-19	Vaccine
15/04/20	LFB and the biotech company Xenothera sign an agreement for the production of the first clinical batch of a drug candidate	Antibody
14/04/20	Sanofi and GlaxoSmithKline to Enter into Co-Development Agreement for Covid-19	Vaccine
06/04/20	CSL Behring Enters into Co Development Agreement with Takeda Pharma, Biotest, Bio Products Laboratory, LFB and Octapharma for Treatment of COVID-19	Antibody
27/03/20	Sanofi Pasteur Enters into Co-Development Agreement with Translate Bio to Develop Novel mRNA Vaccine Candidate Against COVID-19	Vaccine
20/03/20	Smart-Bioscience has been selected by the American company Ligandal as a European partner of its peptide-based vaccine program against Coronavirus SARS-Cov2 (Covid-19)	Vaccine
16/03/20	Sanofi and Regeneron to Enter into Collaboration for COVID-19	Antibody

Source: GlobalData



# THE FRENCH RESPONSE TO COVID-19

## The French immunotherapy network

Since the beginning of the outbreak in France, MabDesign has been making an inventory of its members from the French immunotherapy network involved directly in the fight against COVID-19 to showcase their expertise and/or help them identify new collaborators. Below is the latest update of this inventory. The latter and the corresponding database (see below) is updated weekly.

### Companies involved directly in the COVID19 response



### Companies providing solutions and collaborations



MabDesign has also created an online database summarizing the involvement and expertise of every entity listed above. The database can be accessed [here](#) together with the contact list [here](#).



# THE FRENCH RESPONSE TO COVID-19

In France, there has been a rapid mobilization of key actors of the pharmaceutical and healthcare sectors to join this combat against COVID-19 by initiating, pursuing or enhancing their activities to provide innovative solutions and develop efficient treatments. MabDesign has been monitoring and communicating regularly on this pertinent information to our network. We here summarized these latest activities pertaining to the development of therapeutic products and/or diagnostics tools.

## Companies developing diagnostic tests

**New Skiagenics** is providing their expertise in transcriptomic analysis for the development of a blood signature for COVID19.

**New Innobiochips** has received support from the Ministry of Defense to develop COVID19 serological test.

**New Kelindi**, in partnership with Pasteur Institute, Docapost and Allianz, has launched the [maladiecoronavirus.fr](https://maladiecoronavirus.fr) platform for self-evaluation of COVID19 symptoms and eventual orientation to health services.

**New Mobidiag**, in partnership with Autobio Diagnostics, chinese leader of clinical diagnostic, is now providing rapid anti-SARS CoV-2 tests to detect coronavirus infections from serum, plasma or blood samples in less than 15min.

**CLEAN CELLS** is currently developing its own COVID-19 detection tests pour biological products (raw material or end products) in line with regulatory bodies.

**IDvet** has launched a new serological test to detect antibodies against COVID-19 with a specificity of 99.9%, significantly lowering the rate of false positive results. More than a million tests have already been produced.

**AAZ** has developed COVID-PRESTO®, a rapid serological test to identify immunization (apparently protective) against COVID-19.

**Poly-Dtech** has launched several serological tests to identify individuals immunised or not against COVID-19.

**BioSpeedia (spin-off from Institut Pasteur)** has developed a one step rapid test for Novel Coronavirus SARS-CoV-2 IgM/IgG in serum, plasma, fingertip blood or whole blood samples of pneumonitis patients or suspected cases.

**Eurobio Scientific** has announced the CE marking for its EBX 041 SARS CoV2 proprietary test, developed specifically for the clinical diagnosis of COVID-19. This is a multiplex kit with three targets: two for identifying the virus and one target for a control integrated into each patient test.



# THE FRENCH RESPONSE AGAINST COVID-19

## Companies developing treatments or vaccines

**New Vaxinano** is starting collaborations on the rapid development of an anti-Covid-19 vaccine.

**New AIOVA**, the young biotech from Grenoble, has published results of their vaccine technology and is providing its ADN vaccine platform for the development of innovative solutions to protect humans and animals against viral emergencies.

**New Aqemia** is providing screening services for the 3000 drugs on the market which have already been tested in humans and are easily available in sufficient quantities, in hope of repurposing some of them as a COVID19 treatment.

**OSE Immunotherapeutics** has announced a new COVID-19 prophylactic vaccine program.

**Eukariÿs** is making the C3P3 system available to any academic research team working on the biology of the SARS-CoV-2 virus in support of the scientific community mobilized against the 2019 coronavirus pandemic.

**Abivax** receives ANSM and Ethics Committee clearance to test its development candidate ABX464 in 1,034 Covid-19 patients in randomized Phase 2b/3 clinical trial.

**Pasteur Institute** is currently working on three different COVID19 vaccine R&D projects.

**RevImmune** COVID-19 program is proposing the use of IL-7 (CYT107) to prevent patients who are in the hospital for COVID-19 from progressing to having to be treated in the ICU or progressing to needing more than 4L/minute of supplemental oxygen.

**AB Science** has been granted authorization by ANSM to initiate Phase 2 study evaluating masitinib in combination with isoquercetin for the treatment of COVID-19.

**OSIVAX** is currently working on a large spectrum vaccine against coronaviruses.

**Plate-Forme CHEM-Symbiose** has joined the multidisciplinary, large-scale virtual screening project to look at 1.5 billion small molecules in order to identify candidate compounds that are likely to inhibit the SARS-CoV-2 virus.

**Pharnext** and the University Hospital Institute Méditerranée Infection announce a joint effort to evaluate repurposed drugs for potential use against the covid-19 virus.

**Apteus** has decided to share its unique collection of molecules TEE Library®, with several research teams from the Institut Pasteur de Lille are currently working on Covid19 to explore the opportunities for drug repositioning to fight corona viruses.

**Signia Therapeutics** is using its SIGNATURA® platform to repurpose drugs in view of finding new therapeutic solutions against COVID-19.

Our team will be communicating regularly on all the French companies and institutions involved directly or indirectly in the pandemic response. To join the inventory, please fill in the online questionnaire [here](#) or send your latest news to our communication department (laure.delhon@mabdesign.fr)



# FUNDING AND AID FOR THE COVID-19 RESPONSE

## Funding schemes

### International

National Institutes of Health (NIH) R34 Clinical Trial Planning Grants - Deadline: 07/09/2020

<https://www.niams.nih.gov/grants-funding/conducting-clinical-research/grants/planning-grants>

The 2020 Call for Code Global Challenge by IBM - Deadline: 31/07/2020

<https://callforcode.org/>

Research Grant for pandemic preparedness by MERCK - Deadline: none

<https://www.merckgroup.com/en/research/open-innovation/2020-research-grants.html>

### European

Coronavirus research and innovation Deadline: 01/09/2020

[https://ec.europa.eu/info/research-and-innovation/research-area/health-research-and-innovation/coronavirus-research-and-innovation\\_en](https://ec.europa.eu/info/research-and-innovation/research-area/health-research-and-innovation/coronavirus-research-and-innovation_en)

AI and robotics solutions for the COVID-19 crisis. Deadline: 31/12/2020

<https://ec.europa.eu/eusurvey/runner/15e8809f-a702-fff6-b68d-9b69f98cdc2b>

Fast-track co-creation funding for COVID-19 related activities. Deadline: 30/06/2020

<https://www.eosc-portal.eu/fast-track-co-creation-funding-covid-19-related-activities>

AMable Call for Solution Ideas to COVID-19 challenges. Deadline: 01/10/2020

<https://www.amable.eu/calls/call-for-proposals>

PRACE support to mitigate impact of COVID-19 pandemic. Deadline: not specified

<https://prace-ri.eu/>

Space Based Services-Applications Addressing COVID-19 Outbreak.  
Deadline: 15/11/2020

<https://business.esa.int/funding/invitation-to-tender/space-based-services-applications-addressing-covid-19-outbreak>



# FUNDING AND AID FOR THE COVID-19 RESPONSE

## Funding schemes

### French

Programme d'investissements d'avenir (PIA) : appel à projets pour développer des solutions thérapeutiques préventives ou curatives contre le Covid-19.  
Deadline : 30/09/2020

<https://www.gouvernement.fr/programme-d-investissements-d-avenir-un-appel-a-projets-pour-developper-des-solutions-therapeutiques>

RAPID (régime d'appui à l'innovation duale). Deadline : none

<https://www.defense.gouv.fr/aid/deposer-vos-projets/subventions/rapid>

Appel à Projets Structurants Pour la Compétitivité spécifique à la crise sanitaire COVID-19. Deadline : 30/09/2020

<https://www.bpifrance.fr/A-la-une/Appels-a-projets-concours/PSPC-COVID-19-49161>

Appel à projets thématique Covid-19 - Accélérateur 21 La Croix Rouge

<https://21-croix-rouge.fr/programme-entrepreneuriat/>

L'intelligence artificielle pour une expérience améliorée du système de santé.  
Deadline : 01/07/2020

<https://www.health-data-hub.fr/appel-a-projets>

Appel à projets Recherche-Action sur COVID-19 (coronavirus disease 2019) RA-COVID-19. Deadline : 28/10/2020

<https://anr.fr/fr/detail/call/appel-a-projets-ra-covid-19/>

L'appel à projet TOUS UNIS CONTRE LE VIRUS de Fondation France. Deadline : not specified

<https://www.fondationdefrance.org/fr/tous-unis-contre-le-virus-la-fondation-de-france-lap-hp-et-linstitut-pasteur-lancet-un-appel-la>



# FUNDING AND AID FOR THE COVID-19 RESPONSE

## Funding schemes

**Regional** (More information on the websites of the various French health clusters)

DIM ELICIT projets mettant en œuvre des technologies ou des méthodes innovantes en lien avec l'analyse, le diagnostic et/ou le traitement pour combattre le SARS-CoV2 en Ile de France. Deadline : 31 décembre 2020.

<https://www.defense.gouv.fr/aid/deposer-vos-projets/subventions/rapid>

STOP COVID 2nde édition - Appel à projets régional flash Etat-Bpifrance/Région Centre-Val de Loire. Deadline: 22/07/2020

<https://www.devup-centrevaldeloire.fr/actualites/stop-covid-2nde-appel-projets-regional-etat-bpifrance-centre-loire-237.html>

Appel à projets santé exceptionnel 2020 en Alpes-Maritimes. Dealine : 20/07/2020

<https://www.departement06.fr/appels-a-projets/soutien-aux-equipes-medicales-et-scientifiques-du-departement-pour-des-innovations-techniques-dans-le-domaine-de-la-sante-35665.html>

## Results of previous funding schemes

37 projects has been selected following the call for proposal launched by the Ministry of the Armed Forces to fight against COVID-19

<https://www.defense.gouv.fr/aid/actualites/pres-de-quarante-projets-selectionnes-dans-le-cadre-de-l-appel-a-projets-lance-par-le-ministere-des-armees-pour-lutter-contre-le-covid-19>

## National mapping of the different initiatives linked to the French response to COVID-19

The **six French Health Clusters** namely, Atlanpole Biotherapies, BioValley France, Eurobiomed, Lyonbiopôle, Medicen and Clubster NSL have joined forces to create this national mapping. Read the press release [here](#) and access the mapping [here](#).



# SCIENTIFIC LITERATURE ON COVID-19

As of going to press, more than 7000<sup>1</sup> scientific articles on the current COVID19 pandemic have been published in 2020 worldwide. The aim of this section is obviously not to cite all of them but rather to provide an overview of the translational nature of the research work being conducted on the virus and the outbreak.

## **A Novel Coronavirus from Patients with Pneumonia in China, 2019.**

Zhu N, Zhang D et al. N Engl J Med. 2020 doi: [10.1056/NEJMoa2001017](https://doi.org/10.1056/NEJMoa2001017).



## **Structure-based design of antiviral drug candidates targeting the SARS-CoV-2 main protease.**

Dai W, Zhang B et al. Science. 2020 doi: [10.1126/science.abb4489](https://doi.org/10.1126/science.abb4489).



## **COVID-19 and artificial intelligence: protecting health-care workers and curbing the spread.**

Mcall B. Lancet Digit Health. 2020 doi: [10.1016/S2589-7500\(20\)30054-6](https://doi.org/10.1016/S2589-7500(20)30054-6).



## **SARS-CoV-2: a storm is raging.**

Pedersen SF, Ho YC. J Clin Invest. 2020 doi: [10.1172/JCI137647](https://doi.org/10.1172/JCI137647).



## **Early dynamics of transmission and control of COVID-19: a mathematical modelling study.**

Kucharski AJ, Russell TW et al. Lancet Infect Dis. 2020 doi: [10.1016/S1473-3099\(20\)30144-4](https://doi.org/10.1016/S1473-3099(20)30144-4).



## **Molecular Mechanism for Antibody-Dependent Enhancement of Coronavirus Entry**

Wan Y, Shang J et al. J Virol . 2020 doi: [10.1128/JVI.02015-19](https://doi.org/10.1128/JVI.02015-19).



## **SARS-CoV-2 Cell Entry Depends on ACE2 and TMPRSS2 and Is Blocked by a Clinically Proven Protease Inhibitor.**

Hoffmann M, Kleine-Weber H et al. Cell. 2020 doi: [10.1016/j.cell.2020.02.052](https://doi.org/10.1016/j.cell.2020.02.052).



## **Insights from immuno-oncology: the Society for Immunotherapy of Cancer Statement on access to IL-6-targeting therapies for COVID-19.**

Ascierto PA, Fox B et al. J Immunother Cancer. 2020 doi: [10.1136/jitc-2020-000878](https://doi.org/10.1136/jitc-2020-000878).

1. Keyword search on Pubmed.gov on 26/04/20 for 'COVID19' OR 'Sars Cov 2' OR '219-nCOV' OR 'novel coronavirus' with 2020 as year of publication



# SCIENTIFIC LITERATURE ON COVID19

## **Estimates of the severity of coronavirus disease 2019: a model-based analysis.**

Verity R, Okell LC et al. Lancet Infect Dis. 2020 Mar 30. doi: 10.1016/S1473-3099(20)30243-7.



## **Clinical and immunological features of severe and moderate coronavirus disease 2019.**

Chen G, Wu D et al. J Clin Invest. 2020 doi: 10.1172/JCI137244.



## **A highly conserved cryptic epitope in the receptor-binding domains of SARS CoV-2 and SARS-CoV.**

Yuan M, Wu NC et al. Science. 2020 doi: 10.1126/science.abb7269.



## **Genomic Characterisation and Epidemiology of 2019 Novel Coronavirus: Implications for Virus Origins and Receptor Binding.**

Lu R, Zhao X et al. Lancet 2020 doi: 10.1016/S0140-6736(20)30251-8.



## **The COVID-19 pandemic and research shutdown: staying safe and productive.**

Omary MB, Eswaraka J et al. J Clin Invest. 2020 doi: 10.1172/JCI138646.



## **Cytokine release syndrome in severe COVID-19.**

Moore BJB, June CH. Science. 2020 Apr 17. doi: 10.1126/science.abb8925.



## **Structure of Mpro from COVID-19 virus and discovery of its inhibitors.**

Jin Z, Du X. Nature. 2020 doi: 10.1038/s41586-020-2223-y.



## **Pathological Inflammation in Patients With COVID-19: A Key Role for Monocytes and Macrophages.**

Merad M, Martin J C. Nat Rev Immunol. 2020 doi: 10.1038/s41577-020-0331-4.



## **Neutralizing Antibodies Against SARS-CoV-2 and Other Human Coronaviruses.**

Jiang S, Hillyer C et al. Trends Immunol; 2020 doi: 10.1016/j.it.2020.03.007



# SCIENTIFIC LITERATURE ON COVID19

## **A Structural View of SARS-CoV-2 RNA Replication Machinery: RNA Synthesis, Proofreading and Final Capping.**

Romano M, Ruggiero A et al. *Cells*. 2020 doi: [10.3390/cells9051267](https://doi.org/10.3390/cells9051267).



## **Immunogenicity of a DNA Vaccine Candidate for COVID-19.**

Smith T R F, Patel A et al. *Nat Commun*. 2020 doi: [10.1038/s41467-020-16505-0](https://doi.org/10.1038/s41467-020-16505-0).



## **Viral and Host Factors Related to the Clinical Outcome of COVID-19.**

Zhang X, Tan Y et al. *Nature* 2020, doi: [10.1038/s41586-020-2355-0](https://doi.org/10.1038/s41586-020-2355-0).



## **The Sinai Immunology Review Project, Immunology of COVID-19: current state of the science.**

Vabret N, Britton G J et al. *Immunity* 2020, doi: [10.1016/j.immuni.2020.05.002](https://doi.org/10.1016/j.immuni.2020.05.002)



## **Chemistry and Biology of SARS-CoV-2.**

Domling P, Chao C et al. *Chem* 2020, doi : [10.1016/j.chempr.2020.04.023](https://doi.org/10.1016/j.chempr.2020.04.023)



## **Proteomics of SARS-CoV-2-infected Host Cells Reveals Therapy Targets.**

Bojkova D, Klann K et al. *Nature*. 2020, doi: [10.1038/s41586-020-2332-7](https://doi.org/10.1038/s41586-020-2332-7).



## **Type I and Type III Interferons – Induction, Signaling, Evasion, and Application to Combat COVID-19.**

Park H, Iwasaki Y. *Cell Host & Microbe* (2020), doi: [10.1016/j.chom.2020.05.00](https://doi.org/10.1016/j.chom.2020.05.00).



## **Spiking Pandemic Potential: Structural and Immunological aspects of SARS-CoV-2.**

Wang Y T, Landeras-Bueno S et al. *Trends in Microbiology* 2020, doi :[10.1016/j.tim.2020.05.012](https://doi.org/10.1016/j.tim.2020.05.012)



# SCIENTIFIC LITERATURE ON COVID19

## **Respiratory virus infections: Understanding COVID-19.**

Subbarao K , Mahanty S et al. Immunity 2020, doi: 10.1016/j.immuni.2020.05.004.



## **The Many Faces of the anti-COVID Immune Response.**

Vardhana S A, Wolchok J D et al. J Exp Med. 2020, doi: 10.1084/jem.20200678.



## **Replication of SARS-CoV-2 in Human Respiratory Epithelium.**

Milewska A, Kula-Pacurar A et al. J Virol 2020, doi: 10.1128/JVI.00957-20.



## **Preventing Cytokine Storm Syndrome in COVID-19 Using $\alpha$ -1 Adrenergic Receptor Antagonists.**

Konig M F, Powell M et al. J Clin Invest. 2020, doi: 10.1172/JCI139642.



## **Herd Immunity: Understanding COVID-19.**

Randolph H E, Barreiro L B et al. Immunity. 2020, doi: 10.1016/j.immuni.2020.04.012.



## **False Negative Tests for SARS-CoV-2 Infection —Challenges and Implications**

Woloshin S, Patel N et al. N Engl J Med 2020, doi: 10.1056/NEJMp2015897



## **Ultra-high-throughput clinical proteomics reveals classifiers of COVID-19 infection**

Messner C.B, Demichev V et al. Cell Systems 2020, doi: <https://doi.org/10.1016/j.cels.2020.05.012>



## **Global supply-chain effects of COVID-19 control measures**

Guan D, Wang D, et al. Nat Hum Behav 2020, doi:10.1038/s41562-020-0896-8



# SCIENTIFIC LITERATURE ON COVID19

## **A SARS-CoV-2 infection model in mice demonstrates protection by neutralizing antibodies**

Hassan O.A, Case J.B et al. Cell 2020, doi: 10.1016/j.cell.2020.06.011



## **Deciphering the TCR repertoire to solve the COVID-19 mystery**

Gutierrez L, Beckford J et al. Trends in Pharmacological Sciences 2020,doi: 10.1016/j.tips.2020.06.001



## **Studies in humanized mice and convalescent humans yield a SARS-CoV-2 antibody cocktail**

Johanna Hansen J, Baum A et al. Science 2020, doi: 10.1126/science.abd0827



## **Identification of SARS-CoV-2 Vaccine Epitopes Predicted to Induce Long-term Population-Scale Immunity**

Yarmarkovich M, Warrington J.M et al. Cell Reports Medicine 2020, doi:10.1016/j.xcrm.2020.100036.



## **Novel Immunoglobulin Domain Proteins Provide Insights into Evolution and Pathogenesis of SARS-CoV-2-Related Viruses**

Tan Y.J, Theresa Schneider T et al. mBio 2020, doi:10.1128/mBio.00760-20 xcrm.2020.100036.



## **Analysis of a SARS-CoV-2 infected individual reveals development of potent neutralizing antibodies to distinct epitopes with limited somatic mutation**

Seydoux E, Homad L.J et al. Immunity 2020, doi: https:10.1016/j.immuni.2020.06.001.



## **Broad neutralization of SARS-related viruses by human monoclonal antibodies**

Wec Z.A, Wrapp D et al. Science 2020, doi : 10.1126/science.abc7424



# COVID-19 AND INTELLECTUAL PROPERTY

Both innovative and routine approaches are being used in this global involvement of developing effective diagnostics tools and treatment for COVID-19. These rely partly or solely on proprietary technologies, expertise, scientific know-how and molecules whether serving their intended use or having being repurposed. In parallel, we are already observing the appearance of a COVID19-specific patent landscape within months only of the outbreak at its epicenter in Wuhan. We here provide a summary of these patent applications.

TITLE	TECHNOLOGY DOMAINS	PATENT NUMBER	APPLICATION DATE
Kit for detecting novel coronavirus and influenza virus	Biotechnology	CN111254228	2020-05-06
E-visor and electrically charged personal protective equipment (ppe)	Biotechnology, Chemical engineering, Electrical machinery, apparatus, energy, Medical technology	IN202041019191	2020-05-06
Preventing and treating a coronavirus	Pharmaceuticals	KR10-2020-0063275	2020-05-02
FISH Probe set for detecting novel coronavirus SARS-CoV-2, and preparation method and application thereof"	Biotechnology	CN111254227	2020-04-27
Nucleic acid compositions and kits for blood screening	Biotechnology	CN111206123	2020-04-21
Traditional Chinese medicine composition for treating viral influenza and preparation and application thereof	Pharmaceuticals	CN111228432	2020-04-16
Novel coronavirus 2019-nCoV nucleic acid detection kit	Biotechnology	CN111235320	2020-04-10
TOV 770 - An innovative ethyl alcohol, chlorite, hydrogen peroxide, tea tree oil extract (Melaleuca alternifolia) based anti- SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) viral surface sanitizer	Basic materials chemistry Medical technology	AU2020100545	2020-04-10
Integrated system and method for sterilizing an area	Electrical machinery, apparatus, energy, Handling Medical technology	IN202041015459	2020-04-08
Novel virus cold tablet	Pharmaceuticals	CN111214624	2020-04-08
Primer for amplifying nucleotide fragment of novel coronavirus (SARS-CoV-2) gene and application thereof	Biotechnology	CN111154923	2020-04-07
Method for high-throughput detection of respiratory viruses by using second-generation sequencing and application	Biotechnology	CN111139315	2020-04-03



# COVID-19 and Intellectual Property

TITLE	TECHNOLOGY DOMAINS	PATENT NUMBER	APPLICATION DATE
Small interfering nucleic acid for inhibiting novel coronavirus, composition and application	Pharmaceuticals	CN111139241	2020-04-03
Microfluidic immunofluorescence kit for novel coronavirus excrement detection	Analysis of biological materials	CN210534159U	2020-03-31
Medical image detection method, device, equipment and storage medium	Computer technology	CN111127466	2020-03-31
COVID-19 nucleic acid detection kit for novel coronavirus and use method thereof	Biotechnology	CN111118228	2020-03-31
Medicinal composition for strengthening body resistance and rescuing lung and application	Pharmaceuticals	CN111110824	2020-03-26
Hospital building epidemic prevention system based on 5G Internet of things	Digital Communication	CN111121976	2020-03-26
Coating liquid of novel coronavirus recombinant antigen, pretreatment method, application and product	Analysis of biological materials	CN111122879	2020-03-26
A novel and reliable rt pcr based detection method for corona virus (2019) infection	Biotechnology	IN202011013176	2020-03-25
Novel coronavirus whole genome capture method, primer group and kit	Biotechnology	CN111118226	2020-03-25
Novel coronavirus IgG antibody enzyme-linked immunoassay kit and detection method thereof	Pharmaceuticals	CN111122864	2020-02-06
Colloidal gold kit for joint detection of novel coronavirus IgM/IgG antibody and preparation method thereof	Analysis of biological materials	CN111089962	2020-03-25
Inactivated virus sample RNA preservation solution and preparation method thereof	Biotechnology	CN111088319	2020-03-25
Method and device for screening new coronary pneumonia candidate drugs	Pharmaceuticals	CN111081316	2020-03-25
Kawach: an iot based covid-19 precaution and hygiene alert device	Digital Communication	IN202011012796	2020-03-24



# COVID-19 and Intellectual Property

TITLE	TECHNOLOGY DOMAINS	PATENT NUMBER	APPLICATION DATE
Compositions, kits, methods and uses for detecting and typing viruses causing respiratory tract infections	Biotechnology	CN111074011	2020-03-23
Detection kit for new coronavirus, influenza A and influenza B and respiratory syncytial virus	Biotechnology	CN111088408	2020-03-20
Novel coronavirus detection kit based on visual lamp and detection method thereof	Biotechnology	CN111154921	2020-03-19
Fluorescence immunochromatography device for detecting COVID-19 and using method thereof	Analysis of biological materials	CN111060691	2020-03-17
Application of LTX-315 in preparation of products for inhibiting coronavirus	Pharmaceuticals	CN111150833	2020-03-16
Multiplex fluorescent quantitative PCR detection kit and detection method for SARS-COV-2 virus	Biotechnology	CN111139317	2020-03-13
Primer-probe combination for detecting 6 respiratory viruses, kit and application	Biotechnology	CN111041129	2020-03-13
Rapid detection 2019-nCoV replication kit and application	Biotechnology	CN111074009	2020-03-10
Novel nucleic acid kit for rapidly detecting 2019-nCoV and application thereof	Biotechnology	CN111074010	2020-03-10
Novel coronavirus ORF1ab gene nucleic acid detection kit	Biotechnology	CN111020064	2020-03-10

Source: Orbit patent database. Keyword search for 'novel coronavirus' Or 'COVID19' or 'SARS-CoV-2' under independent claims, title or abstract. Patents were then analysed individually for pertinence. Patents with no abstract or description were excluded.



# MABDESIGN UPCOMING EVENTS ON COVID-19

 **Immunotherapies & Innovations  
for Infectious Diseases**  
4<sup>th</sup> Congress 2020 – 9 & 10 December 2020 - LYON

 **BIOASTER**  
MICROBIOLOGY TECHNOLOGY INSTITUTE

 **MABDESIGN**

 **LYONBIOPOLE**  
Auvergne - Rhône - Alpes



Informations and Registrations: [WWW.I4ID.ORG](http://WWW.I4ID.ORG)

The 4th Edition of the Immunotherapies & Innovations for Infectious Diseases Congress (I4ID2020) will be held in Lyon, France on December 9-10, 2020 and will largely address the current COVID-19 pandemic as well as other infectious diseases. The I4ID2020 will include keynote lectures, pitch talks of new innovative projects, industrial talks from pharmaceutical companies and poster presentations. Moreover, there will be several opportunities for networking, companies to showcase their new products and technologies as well as dedicated time for business partnering, through an online B2B platform. So go to the website or contact us ([laure.delhon@mabdesign.fr](mailto:laure.delhon@mabdesign.fr)) to subscribe or to know more about the event and the sponsoring offers.

<https://www.i4id.org/>



# MABDESIGN'S REPOSENSE DURING THE COVID19 PANDEMIC

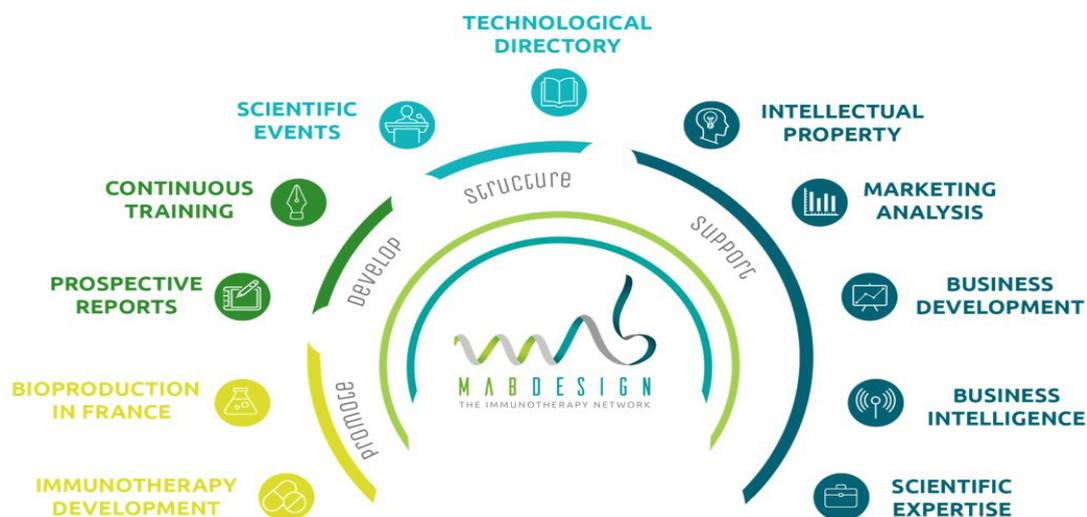
## MORE NEWS ARE ON THE WAY!

### To be kept in the loop, register to our newsletter

Our different departments will be providing regular updates of the COVID-19 pipeline, the inventory of companies involved in the response, the latest French news and the patent landscape through our newsletter. Register [here](#).

## About MabDesign

- **MABDESIGN** is a French membership organization in the field of immunotherapy. Created in 2014 MABDESIGN is managed by four competitiveness clusters (Atlanpole Biotherapies, Eurobiomed, Lyonbiopole, Medicen) and three pharmaceutical companies (LFB, Pierre Fabre and Sanofi), and one biotech (DBV Technologies).



- **Operational since September 2015**, MABDESIGN has over 170 members, including pharmaceutical and biotechnology companies, service providers, training organizations, and equipment suppliers at the cutting edge of technology.



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