

DRAFT landscape of COVID-19 candidate vaccines – 3 November 2020

47 candidate vaccines in clinical evaluation

COVID-19 Vaccine developer/manufacturer	Vaccine platform	Type of candidate vaccine	Number of doses	Timing of doses	Route of Administration	Clinical Stage			
						Phase 1	Phase 1/2	Phase 2	Phase 3
Sinovac	Inactivated	Inactivated	2	0,14 days	IM		NCT04383574 NCT04352608 NCT04551547		NCT04456595 669/UN6.KEP/EC/2020 NCT04582344
Wuhan Institute of Biological Products/Sinopharm	Inactivated	Inactivated	2	0,21 days	IM		ChiCTR2000031809 Interim Report		ChiCTR2000034780 ChiCTR2000039000
Beijing Institute of Biological Products/Sinopharm	Inactivated	Inactivated	2	0,21 days	IM		ChiCTR2000032459 Study Report		ChiCTR2000034780 NCT04560881
University of Oxford/AstraZeneca	Non-Replicating Viral Vector	ChAdOx1-S	2	0,28 days	IM		PACTR202006922165132 2020-001072-15 NCT04568031 Interim Report	2020-001228-32	ISRCTN89951424 NCT04516746 NCT04540393 CTRI/2020/08/027170
CanSino Biological Inc./Beijing Institute of Biotechnology	Non-Replicating Viral Vector	Adenovirus Type 5 Vector	1		IM	ChiCTR2000030906 NCT04568811 Study Report		ChiCTR2000031781 NCT04566770 Study Report	NCT04526990 NCT04540419
Gamaleya Research Institute	Non-Replicating Viral Vector	Adeno-based (rAd26-S+rAd5-S)	2	0,21 days	IM		NCT04436471 NCT04437875 Study Report	NCT04587219	NCT04530396 NCT04564716
Janssen Pharmaceutical Companies	Non-Replicating Viral Vector	Ad26COVS1	2	0,56 days	IM		NCT04436276		NCT04505722

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

Novavax	Protein Subunit	Full length recombinant SARS CoV-2 glycoprotein nanoparticle vaccine adjuvanted with Matrix M	2	0,21 days	IM		NCT04368988 Study Report	NCT04533399 (phase 2b)	2020-004123-16 NCT04611802
Moderna/NIAID	RNA	LNP-encapsulated mRNA	2	0,28 days	IM	NCT04283461 Interim Report Final Report		NCT04405076	NCT04470427
BioNTech/Fosun Pharma/Pfizer	RNA	3 LNP-mRNAs	2	0,28 days	IM	NCT04368728 Study Report	2020-001038-36 ChiCTR2000034825 NCT04537949 NCT04588480 Study Report1 Study Report2		NCT04368728
Anhui Zhifei Longcom Biopharmaceutical/Institute of Microbiology, Chinese Academy of Sciences	Protein Subunit	Adjuvanted recombinant protein (RBD-Dimer)	2 or 3	0,28 or 0,28,56 days	IM	NCT04445194	NCT04550351	NCT04466085	
Curevac	RNA	mRNA	2	0, 28 days	IM	NCT04449276		NCT04515147	
Institute of Medical Biology, Chinese Academy of Medical Sciences	Inactivated	Inactivated	2	0, 28 days	IM	NCT04412538	NCT04470609		
Research Institute for Biological Safety Problems, Rep of Kazakhstan	Inactivated	Inactivated	2	0, 21 days	IM		NCT04530357		
Beijing Minhai Biotechnology Co., Ltd.	Inactivated	Inactivated	2		IM	ChiCTR2000038804	ChiCTR2000039462		
Inovio Pharmaceuticals/ International Vaccine Institute	DNA	DNA plasmid vaccine with electroporation	2	0, 28 days	ID		NCT04447781 NCT04336410		
Osaka University/ AnGes/ Takara Bio	DNA	DNA plasmid vaccine + Adjuvant	2	0, 14 days	IM		NCT04463472 NCT04527081		
Cadila Healthcare Limited	DNA	DNA plasmid vaccine	3	0, 28, 56 days	ID		CTRI/2020/07/026352		
Genexine Consortium	DNA	DNA Vaccine (GX-19)	2	0, 28 days	IM		NCT04445389		

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

Bharat Biotech	Inactivated	Whole-Virion Inactivated	2	0, 14 days	IM		CTRI/2020/07/026300 CTRI/2020/09/027674		
Kentucky Bioprocessing, Inc	Protein Subunit	RBD-based	2	0, 21 days	IM		NCT04473690		
Sanofi Pasteur/GSK	Protein Subunit	S protein (baculovirus production)	2	0, 21 days	IM		NCT04537208		
Israel Institute for Biological Research/Weizmann Inst. of Science	Replicating Viral Vector	VSV-S	1		IM		NCT04608305		
Arcturus/Duke-NUS	RNA	mRNA			IM		NCT04480957		
SpyBiotech/Serum Institute of India	VLP	RBD-HBsAg VLPs	2	0, 28 days	IM		ACTRN12620000817943		
Symvivo	DNA	bacTRL-Spike	1		Oral		NCT04334980		
ImmunityBio, Inc. & NantKwest Inc.	Non-Replicating Viral Vector	hAd5 S+N 2nd Generation Human Adenovirus Type 5 Vector (hAd5) Spike (S) + Nucleocapsid (N)	2	0, 21 days	SC		NCT04591717		
ReiThera/LEUKOCARE/Univercells	Non-Replicating Viral Vector	Replication defective Simian Adenovirus (GRAd) encoding S	1		IM		NCT04528641		
CanSino Biological Inc/Institute of Biotechnology, Academy of Military Medical Sciences, PLA of China	Non-Replicating Viral Vector	Ad5-nCoV	2	0, 28 days	IM/mucosal		NCT04552366		
Vaxart	Non-Replicating Viral Vector	Ad5 adjuvanted Oral Vaccine platform	2	0, 28 days	Oral		NCT04563702		
Ludwig-Maximilians - University of Munich	Non-Replicating Viral Vector	MVA-SARS-2-S	2	0, 28 days	IM		NCT04569383		
Clover Biopharmaceuticals Inc./GSK/Dynavax	Protein Subunit	Native like Trimeric subunit Spike Protein vaccine	2	0, 21 days	IM		NCT04405908		
Vaxine Pty Ltd/Medytox	Protein Subunit	Recombinant spike protein with Advax™ adjuvant	1		IM		NCT04453852		

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

University of Queensland/CSL/Seqirus	Protein Subunit	Molecular clamp stabilized Spike protein with MF59 adjuvant	2	0, 28 days	IM	ACTRN12620000674932p ISRCTN51232965			
Medigen Vaccine Biologics Corporation/NIAID/Dynavax	Protein Subunit	S-2P protein + CpG 1018	2	0, 28 days	IM	NCT04487210			
Instituto Finlay de Vacunas, Cuba	Protein Subunit	rRBD produced in CHO-cell chemically conjugate to tetanus toxoid	2	0, 28 days	IM	IFV/COR/06			
Instituto Finlay de Vacunas, Cuba	Protein Subunit	RBD + Adjuvant	2	0, 28 days	IM	IFV/COR/04			
FBRI SRC VB VECTOR, Rospotrebnadzor, Koltsovo	Protein Subunit	Peptide	2	0, 21 days	IM	NCT04527575			
West China Hospital, Sichuan University	Protein Subunit	RBD (baculovirus production expressed in Sf9 cells)	2	0, 28 days	IM	ChiCTR2000037518			
University Hospital Tuebingen	Protein Subunit	SARS-CoV-2 HLA-DR peptides	1		SC	NCT04546841			
COVAXX / United Biomedical Inc. Asia	Protein Subunit	Multitope peptide-based S1-RBD-protein vaccine	2	0, 28 days	IM	NCT04545749			
Merck Sharp & Dohme/IAVI	Replicating Viral Vector	Replication-competent VSV delivering the SARS-CoV-2 Spike	1		IM	NCT04569786			
Institute Pasteur/Themis/Univ. of Pittsburg CVR/Merck Sharp & Dohme	Replicating Viral Vector	Measles-vector based	1 or 2	0, 28 days	IM	NCT04497298			
Beijing Wantai Biological Pharmacy/Xiamen University	Replicating Viral Vector	Intranasal flu-based-RBD	1		IM	ChiCTR2000037782			
Imperial College London	RNA	LNP-nCoVsaRNA	2		IM	ISRCTN17072692			
People's Liberation Army (PLA) Academy of Military Sciences/Walvax Biotech.	RNA	mRNA	2	0, 14 or 0, 28 days	IM	ChiCTR2000034112 ChiCTR2000039212			
Medicago Inc.	VLP	Plant-derived VLP adjuvanted with GSK or Dynavax adjs.	2	0, 21 days	IM	NCT04450004			

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

155 candidate vaccines in preclinical evaluation

Platform	Type of candidate vaccine	Developer	Coronavirus target	Current stage of clinical evaluation/regulatory status- Coronavirus candidate	Same platform for non-Coronavirus candidates
DNA	DNA plasmid vaccine	Globe Biotech Limited, Bangladesh	SARS-CoV2	Pre-Clinical	
DNA	Plasmid DNA, nanostructured RBD	National institute of Chemistry, Slovenia	SARS-CoV2	Pre-Clinical	
DNA	DNA, engineered vaccine inserts compatible with multiple delivery systems	DIOSynVax Ltd / University of Cambridge	SARS-CoV-2 and Sarbeco-CoV	Pre-Clinical	
DNA	DNA vaccine	Ege University	SARS-CoV2	Pre-Clinical	
DNA	DNA plasmid vaccine RBD&N	Scancell/University of Nottingham/ Nottingham Trent University	SARS-CoV2	Pre-Clinical	
DNA	DNA plasmid vaccine S,S1,S2,RBD &N	National Research Centre, Egypt	SARS-CoV2	Pre-Clinical	
DNA	DNA with electroporation	Karolinska Institute / Cobra Biologics (OPENCORONA Project)	SARS-CoV2	Pre-Clinical	
DNA	DNA with electroporation	Chula Vaccine Research Center	SARS-CoV2	Pre-Clinical	
DNA	DNA	Takis/Applied DNA Sciences/Evvivax	SARS-CoV2	Pre-Clinical	
DNA	Plasmid DNA, Needle-Free Delivery	Immunomic Therapeutics, Inc./EpiVax, Inc./PharmaJet	SARS-CoV2	Pre-Clinical	SARS
DNA	DNA vaccine	BioNet Asia	SARS-CoV2	Pre-Clinical	
DNA	msDNA vaccine	Mediphage Bioceuticals/University of Waterloo	SARS-CoV2	Pre-Clinical	
DNA	DNA vaccine	Entos Pharmaceuticals	SARS-CoV2	Pre-Clinical	
Inactivated	Inactivated	Kocak Farma Ilac ve Kimya San. A.S.	SARS-CoV2	Pre-Clinical	
Inactivated	Egg-based, inactivated, whole chimeric Newcastle Disease Virus (NDV) expressing membrane-anchored pre-fusion-stabilized trimeric SARS-CoV-2 S protein (Hexapro) + CpG 1018	Institute of Vaccines and Medical Biologicals (IVAC; Vietnam) / Dynavax / PATH	SARS-CoV2	Pre-Clinical	

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

Inactivated	Egg-based, inactivated, whole chimeric Newcastle Disease Virus (NDV) expressing membrane-anchored pre-fusion-stabilized trimeric SARS-CoV-2 S protein (Hexapro) + CpG 1018	Government Pharmaceutical Organization (GPO; Thailand) / Dynavax / PATH	SARS-CoV2	Pre-Clinical	
Inactivated	Egg-based, inactivated, whole chimeric Newcastle Disease Virus (NDV) expressing membrane-anchored pre-fusion-stabilized trimeric SARS-CoV-2 S protein (Hexapro) + CpG 1018	Institute Butantan (Brazil) / Dynavax / PATH	SARS-CoV-2	Pre-clinical	
Inactivated	Inactivated + alum	KM Biologics	SARS-CoV2	Pre-Clinical	JE, Zika
Inactivated	Inactivated	Selcuk University	SARS-CoV2	Pre-Clinical	
Inactivated	Inactivated	Erciyes University	SARS-CoV2	Pre-Clinical	
Inactivated	Inactivated whole virus	National Research Centre, Egypt	SARS-CoV2	Pre-Clinical	
Inactivated	Inactivated		SARS-CoV2	Pre-Clinical	
Inactivated	TBD	Osaka University/ BIKEN/ NIBIOHN	SARS-CoV2	Pre-Clinical	
Inactivated	Inactivated + CpG 1018	Sinovac/Dynavax	SARS-CoV2	Pre-Clinical	
Inactivated	Inactivated + CpG 1018	Valneva/Dynavax	SARS-CoV2	Pre-Clinical	
Live Attenuated Virus	Codon deoptimized live attenuated vaccines	Mehmet Ali Aydinlar University / Acibadem Labmed Health Services A.S.	SARS-CoV2	Pre-Clinical	
Live Attenuated Virus	Codon deoptimized live attenuated vaccines	Codagenix/Serum Institute of India	SARS-CoV2	Pre-Clinical	HAV, InfA, ZIKV, FMD, SIV, RSV, DENV
Live Attenuated Virus	Codon deoptimized live attenuated vaccines	Indian Immunologicals Ltd/Griffith University	SARS-CoV2	Pre-Clinical	
Non Replicating Viral Vector	Ad 5 vector for intranasal administration	University of Helsinki & University of Eastern Finland	SARS-CoV2	Pre-Clinical	
Non Replicating Viral Vector	Adenovirus Type 5 Vector	Globe Biotech Limited, Bangladesh	SARS-CoV2	Pre-Clinical	
Non-Replicating Viral Vector	Sendai virus vector	ID Pharma	SARS-CoV2	Pre-Clinical	
Non-Replicating Viral Vector	Adenovirus-based	Ankara University	SARS-CoV2	Pre-Clinical	
Non-Replicating Viral Vector	Adeno-associated virus vector (AAVCOVID)	Massachusetts Eye and Ear/Massachusetts General Hospital/AveXis	SARS-CoV2	Pre-Clinical	
Non-Replicating Viral Vector	MVA encoded VLP	GeoVax/BravoVax	SARS-CoV2	Pre-Clinical	LASV, EBOV, MARV, HIV
Non-replicating viral vector	MVA-S encoded	DZIF – German Center for Infection Research/IDT Biologika GmbH	SARS-CoV2	Pre-clinical	Many
Non-replicating viral vector	MVA-S	IDIBAPS-Hospital Clinic, Spain	SARS-CoV2	Pre-clinical	
Non-Replicating Viral Vector	adenovirus-based NasoVAX expressing SARS2-CoV spike protein	Altimune	SARS-CoV2	Pre-Clinical	influenza

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

Non-Replicating Viral Vector	Adeno5-based	Erciyes University	SARS-CoV2	Pre-Clinical	
Non-Replicating Viral Vector	Ad5 S (GREVAX™ platform)	Greffex	SARS-CoV2	Pre-Clinical	MERS
Non-Replicating Viral Vector	Oral Ad5 S	Stabilitech Biopharma Ltd	SARS-CoV2	Pre-Clinical	Zika, VZV, HSV-2 and Norovirus
Non-Replicating Viral Vector	adenovirus-based + HLA-matched peptides	Valo Therapeutics Ltd	Pan-Corona	Pre-Clinical	
Non-Replicating Viral Vector		Vaxart	SARS-CoV2	Pre-Clinical	InfA, CHIKV, LASV, NORV; EBOV, RVF, HBV, VEE
Non-Replicating Viral Vector	MVA expressing structural proteins	Centro Nacional Biotecnología (CNB-CSIC), Spain	SARS-CoV2	Pre-Clinical	Multiple candidates
Non-Replicating Viral Vector	parainfluenza virus 5 (PIV5)-based vaccine expressing the spike protein	University of Georgia/University of Iowa	SARS-CoV2	Pre-Clinical	MERS
Non-Replicating Viral Vector	Recombinant deactivated rabies virus containing S1	Bharat Biotech/Thomas Jefferson University	SARS-CoV2	Pre-Clinical	HeV, NiV, EBOV, LASSA, CCHFV, MERS
Non-Replicating Viral Vector	Influenza A H1N1 vector	National Research Centre, Egypt	SARS-CoV2	Pre-Clinical	
Non-Replicating Viral Vector	Newcastle disease virus expressing S	Icahn School of Medicine at Mount Sinai	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant S protein produced in BEVS	Tampere University	SARS-CoV2	Pre-Clinical	
Protein Subunit	RBD protein delivered in mannose-conjugated chitosan nanoparticle	Ohio State University / Kazakh National Agrarian University	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant spike protein with Essai O/W 1849101 adjuvant	Kazakh National Agrarian University	SARS-CoV2	Pre-Clinical	
Protein Subunit	Peptides	Neo7Logic	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant spike protein with Essai O/W 1849101 adjuvant	Kazakh National Agrarian University, Kazakhstan / National Scientific Center for Especially Dangerous Infections	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant S protein	Max-Planck-Institute of Colloids and Interfaces	SARS-CoV2	Pre-Clinical	
Protein Subunit	RBD protein (baculovirus production) + FAR-Squalene adjuvant	Farmacológicos Veterinarios SAC (FARVET SAC) / Universidad Peruana Cayetano Heredia (UPCH)	SARS-CoV2	Pre-Clinical	
Protein Subunit	Protein Subunit	Research Institute for Biological Safety Problems, Rep of Kazakhstan	SARS-CoV2	Pre-Clinical	
Protein Subunit	RBD-protein	Mynvax	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant S protein	Izmir Biomedicine and Genome Center	SARS-CoV2	Pre-Clinical	
Protein Subunit	Peptide + novel adjuvant	Bogazici University	SARS-CoV2	Pre-Clinical	
Protein Subunit	S subunit intranasal liposomal formulation with GLA/3M052 adjs.	University of Virginia	SARS-CoV2	Pre-Clinical	
Protein Subunit	S-Protein (Subunit) + Adjuvant, E coli based Expression	Helix Biogen Consult, Ogbomoso & Trinity Immono-efficient Laboratory, Ogbomoso, Oyo State, Nigeria.	SARS-CoV2	Pre-Clinical	

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

Protein Subunit	Protein Subunit S,N,M&S1 protein	National Research Centre, Egypt	SARS-CoV2	Pre-Clinical	
Protein Subunit	Protein Subunit	University of San Martin and CONICET, Argentina	SARS-CoV2	Pre-Clinical	
Protein Subunit	RBD protein fused with Fc of IgG + Adj.	Chulalongkorn University/GPO, Thailand	SARS-CoV2	Pre-Clinical	
Protein Subunit	Capsid-like Particle	AdaptVac (PREVENT-nCoV consortium)	SARS-CoV2	Pre-Clinical	
Protein Subunit	Drosophila S2 insect cell expression system VLPs	Expres2ion	SARS-CoV2	Pre-Clinical	
Protein Subunit	Peptide antigens formulated in LNP	IMV Inc	SARS-CoV2	Pre-Clinical	
Protein Subunit	S protein	WRAIR/USAMRIID	SARS-CoV2	Pre-Clinical	
Protein Subunit	S protein +Adjuvant	National Institute of Infectious Disease, Japan/Shionogi/UMN Pharma	SARS-CoV2	Pre-Clinical	Influenza
Protein Subunit	VLP-recombinant protein + Adjuvant	Osaka University/ BIKEN/ National Institutes of Biomedical Innovation, Japan	SARS-CoV2	Pre-Clinical	
Protein Subunit	microneedle arrays S1 subunit	Univ. of Pittsburgh	SARS-CoV2	Pre-Clinical	MERS
Protein Subunit	Peptide	Vaxil Bio	SARS-CoV2	Pre-Clinical	
Protein Subunit	Adjuvanted protein subunit (RBD)	Biological E Ltd	SARS-CoV2	Pre-Clinical	
Protein Subunit	Peptide	Flow Pharma Inc	SARS-CoV2	Pre-Clinical	Ebola, Marburg, HIV, Zika, Influenza, HPV therapeutic vaccine, BreastCA vaccine
Protein Subunit	S protein	AJ Vaccines	SARS-CoV2	Pre-Clinical	
Protein Subunit	Ii-Key peptide	Generex/EpiVax	SARS-CoV2	Pre-Clinical	Influenza, HIV, SARS-CoV
Protein Subunit	S protein	EpiVax/Univ. of Georgia	SARS-CoV2	Pre-Clinical	H7N9
Protein Subunit	Protein Subunit EPV-CoV-19	EpiVax	SARS-CoV2	Pre-Clinical	
Protein Subunit	gp-96 backbone	Heat Biologics/Univ. Of Miami	SARS-CoV2	Pre-Clinical	NSCLC, HIV, malaria, Zika
Protein Subunit	Subunit vaccine	FBRI SRC VB VECTOR, Rospotrebnadzor, Koltsovo	SARS-CoV2	Pre-Clinical	
Protein Subunit	S1 or RBD protein	Baylor College of Medicine	SARS-CoV2	Pre-Clinical	SARS
Protein Subunit	Subunit protein, plant produced	iBio/CC-Pharming	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant protein, nanoparticles (based on S-protein and other epitopes)	Saint-Petersburg scientific research institute of vaccines and serums	SARS-CoV2	Pre-Clinical	
Protein Subunit	COVID-19 XWG-03 truncated S (spike) proteins	Innovax/Xiamen Univ./GSK	SARS-CoV2	Pre-Clinical	HPV
Protein Subunit	Adjuvanted microsphere peptide	VIDO-InterVac, University of Saskatchewan	SARS-CoV2	Pre-Clinical	
Protein Subunit	Synthetic Long Peptide Vaccine candidate for S and M proteins	OncoGen	SARS-CoV2	Pre-Clinical	
Protein Subunit	Oral E. coli-based protein expression system of S and N proteins	MIGAL Galilee Research Institute	SARS-CoV2	Pre-Clinical	

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

Protein Subunit	Nanoparticle vaccine	LakePharma, Inc.	SARS-CoV2	Pre-Clinical	
Protein Subunit	Plant-based subunit (RBD-Fc + Adjuvant)	Baiya Phytopharm/ Chula Vaccine Research Center	SARS-CoV2	Pre-Clinical	
Protein Subunit	OMV-based vaccine	Quadram Institute Biosciences	SARS-CoV2	Pre-Clinical	Flu A, plague
Protein Subunit	OMV-based vaccine	BiOMViS Srl/Univ. of Trento	SARS-CoV2	Pre-Clinical	
Protein subunit	structurally modified spherical particles of the tobacco mosaic virus (TMV)	Lomonosov Moscow State University	SARS-CoV2	Pre-Clinical	rubella, rotavirus
Protein Subunit	Spike-based	University of Alberta	SARS-CoV2	Pre-Clinical	Hepatitis C
Protein Subunit	Recombinant S1-Fc fusion protein	AnyGo Technology	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant protein	Yisheng Biopharma	SARS-CoV2	Pre-Clinical	
Protein Subunit	Recombinant S protein in IC-BEVS	Vabiotech	SARS-CoV2	Pre-Clinical	
Protein Subunit	Orally delivered, heat stable subunit	Applied Biotechnology Institute, Inc.	SARS-CoV2	Pre-Clinical	
Protein Subunit	Peptides derived from Spike protein	Axon Neuroscience SE	SARS-CoV2	Pre-Clinical	
Protein Subunit	Protein Subunit	MOGAM Institute for Biomedical Research, GC Pharma	SARS-CoV2	Pre-Clinical	
Protein Subunit	RBD-based	Neovii/Tel Aviv University	SARS-CoV2	Pre-Clinical	
Protein Subunit	Outer Membrane Vesicle (OMV)-subunit	Intravacc/Epivax	SARS-CoV2	Pre-Clinical	
Protein Subunit	Outer Membrane Vesicle(OMV)-peptide	Intravacc/Epivax	SARS-CoV2	Pre-Clinical	
Protein Subunit	Spike-based (epitope screening)	ImmunoPrecise/LiteVax BV	SARS-CoV2	Pre-Clinical	
Replicating Bacteria Vector	Oral Salmonella enteritidis (3934Vac) based protein expression system of RBD	Farmacológicos Veterinarios SAC (FARVET SAC) / Universidad Peruana Cayetano Heredia (UPCH)	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	Intranasal Newcastle disease virus vector (rNDV-FARVET) expressing RBD	Farmacológicos Veterinarios SAC (FARVET SAC) / Universidad Peruana Cayetano Heredia (UPCH)	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	YF17D Vector	KU Leuven	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	Measles Vector	Cadila Healthcare Limited	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	Measles Vector	FBRI SRC VB VECTOR, Rospotrebnadzor, Koltsovo	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	Measles Virus (S, N targets)	DZIF – German Center for Infection Research/CanVirex AG	SARS-CoV2	Pre-clinical	Zika, H7N9, CHIKV
Replicating Viral Vector	Horsepox vector expressing S protein	Tonix Pharma/Southern Research	SARS-CoV2	Pre-Clinical	Smallpox, monkeypox
Replicating Viral Vector	Live viral vectored vaccine based on attenuated influenza virus backbone (intranasal)	BiOCAD and IEM	SARS-CoV2	Pre-Clinical	Influenza
Replicating Viral Vector	Recombinant vaccine based on Influenza A virus, for the prevention of COVID-19 (intranasal)	FBRI SRC VB VECTOR, Rospotrebnadzor, Koltsovo	SARS-CoV2	Pre-Clinical	Influenza

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

Replicating Viral Vector	Attenuated Influenza expressing an antigenic portion of the Spike protein	Fundação Oswaldo Cruz and Instituto Buntantan	SARS-CoV2	Pre-Clinical	Influenza
Replicating Viral Vector	Influenza vector expressing RBD	University of Hong Kong	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	Replicating VSV vector-based DC-targeting	University of Manitoba	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	VSV-S	University of Western Ontario	SARS-CoV2	Pre-Clinical	HIV, MERS
Replicating Viral Vector	VSV-S	Aurobindo	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	VSV vector	FBRI SRC VB VECTOR, Rospotrebnadzor, Koltsovo	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	M2-deficient single replication (M2SR) influenza vector	UW-Madison/FluGen/Bharat Biotech	SARS-CoV2	Pre-Clinical	influenza
Replicating Viral Vector	Newcastle disease virus vector (NDV-SARS-CoV-2/Spike)	Intravacc/ Wageningen Bioveterinary Research/Utrecht Univ.	SARS-CoV2	Pre-Clinical	
Replicating Viral Vector	Avian paramyxovirus vector (APMV)	The Lancaster University, UK	SARS-CoV2	Pre-Clinical	
RNA	D614G variant LNP-encapsulated mRNA	Globe Biotech Ltd	SARS-CoV2	Pre-Clinical	
RNA	saRNA formulated in a NLC	Infectious Disease Research Institute/ Amyris, Inc.	SARS-CoV2	Pre-Clinical	
RNA	LNP-encapsulated mRNA encoding S	Max-Planck-Institute of Colloids and Interfaces	SARS-CoV2	Pre-Clinical	
RNA	Self-amplifying RNA	Genova	SARS-CoV2	Pre-Clinical	
RNA	mRNA	Selcuk University	SARS-CoV2	Pre-Clinical	
RNA	LNP-mRNA	Translate Bio/Sanofi Pasteur	SARS-CoV2	Pre-Clinical	
RNA	LNP-mRNA	CanSino Biologics/Precision NanoSystems	SARS-CoV2	Pre-Clinical	
RNA	LNP-encapsulated mRNA cocktail encoding VLP	Fudan University/ Shanghai JiaoTong University/RNACure Biopharma	SARS-CoV2	Pre-Clinical	
RNA	LNP-encapsulated mRNA encoding RBD	Fudan University/ Shanghai JiaoTong University/RNACure Biopharma	SARS-CoV2	Pre-Clinical	
RNA	Replicating Defective SARS-CoV-2 derived RNAs	Centro Nacional Biotecnología (CNB-CSIC), Spain	SARS-CoV2	Pre-Clinical	
RNA	LNP-encapsulated mRNA	University of Tokyo/ Daiichi-Sankyo	SARS-CoV2	Pre-Clinical	MERS
RNA	Liposome-encapsulated mRNA	BIOCAD	SARS-CoV2	Pre-Clinical	
RNA	Several mRNA candidates	RNAimmune, Inc.	SARS-CoV2	Pre-Clinical	
RNA	mRNA	FBRI SRC VB VECTOR, Rospotrebnadzor, Koltsovo	SARS-CoV2	Pre-Clinical	
RNA	mRNA	China CDC/Tongji University/Stermina	SARS-CoV2	Pre-Clinical	
RNA	LNP-mRNA	Chula Vaccine Research Center/University of Pennsylvania	SARS-CoV2	Pre-Clinical	
RNA	mRNA in an intranasal delivery system	eTheRNA	SARS-CoV2	Pre-Clinical	
RNA	mRNA	Greenlight Biosciences	SARS-CoV2	Pre-Clinical	

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.

RNA	mRNA	IDIBAPS-Hospital Clinic, Spain	SARS-CoV2	Pre-Clinical	
T-cell based	CD8 T cell peptide targeting (S, M, N) and (NSPs) SARS-CoV-2 proteins	OSE immunotherapeutics	SARS-CoV2	Pre-Clinical	
VLP	VLPs produced in BEVS	Tampere University	SARS-CoV2	Pre-Clinical	
VLP	VLP	Max Planck Institute for Dynamics of Complex Technical Systems	SARS-CoV2	Pre-Clinical	
VLP	Virus-like particle-based Dendritic Cell(DC)-targeting vaccine	University of Manitoba	SARS-CoV2	Pre-Clinical	
VLP	VLP	Bezmialem Vakif University	SARS-CoV2	Pre-Clinical	
VLP	VLP	Middle East Technical University	SARS-CoV2	Pre-Clinical	
VLP	Enveloped Virus-Like Particle (eVLP)	VBI Vaccines Inc.	SARS-CoV-2, SARS-CoV, & MERS-CoV	Pre-Clinical	CMV, GBM, Zika
VLP	S protein integrated in HIV VLPs	IrsiCaixa AIDS Research/IRTA-CReSA/Barcelona Supercomputing Centre/Grifols	SARS-CoV2	Pre-Clinical	
VLP	VLP + Adjuvant	Mahidol University/ The Government Pharmaceutical Organization (GPO)/Siriraj Hospital	SARS-CoV2	Pre-Clinical	
VLP	Virus-like particles, lentivirus and baculovirus vehicles	Navarrabiomed, Oncoimmunology group	SARS-CoV2	Pre-Clinical	
VLP	Virus-like particle, based on RBD displayed on virus-like particles	Saiba GmbH	SARS-CoV2	Pre-Clinical	
VLP	ADDomer™ multiepitope display	Imophoron Ltd and Bristol University's Max Planck Centre	SARS-CoV2	Pre-Clinical	
VLP	Unknown	Doherty Institute	SARS-CoV2	Pre-Clinical	
VLP	VLP	OSIVAX	SARS-CoV1 SARS-CoV2	Pre-Clinical	
VLP	eVLP	ARTES Biotechnology	SARS-CoV2	Pre-Clinical	malaria
VLP	VLPs peptides/whole virus	Univ. of Sao Paulo	SARS-CoV2	Pre-Clinical	

DISCLAIMER:

These landscape documents have been prepared by the World Health Organization (WHO) for information purposes only concerning the 2019-2020 pandemic of the novel coronavirus. Inclusion of any particular product or entity in any of these landscape documents does not constitute, and shall not be deemed or construed as, any approval or endorsement by WHO of such product or entity (or any of its businesses or activities). While WHO takes reasonable steps to verify the accuracy of the information presented in these landscape documents, WHO does not make any (and hereby disclaims all) representations and warranties regarding the accuracy, completeness, fitness for a particular purpose (including any of the aforementioned purposes), quality, safety, efficacy, merchantability and/or non-infringement of any information provided in these landscape documents and/or of any of the products referenced therein. WHO also disclaims any and all liability or responsibility whatsoever for any death, disability, injury, suffering, loss, damage or other prejudice of any kind that may arise from or in connection with the procurement, distribution or use of any product included in any of these landscape documents.