

Candidate SARS-CoV-2 Vaccines in Advanced Clinical Trials: Key Aspects

Compiled by John D. Grabenstein, RPh, PhD | All dates are estimates. All Days are based on first vaccination at Day 0.

Vaccine Sponsor [with Major Partners]	Univ. of Oxford (Jenner Institute) with AstraZeneca	ModernaTX USA	BioNTech with Pfizer	Johnson & Johnson (Janssen Vaccines & Prevention)	Novavax	Sanofi Pasteur with GlaxoSmithKline	CureVac with Bayer	CanSino Biologics with Academy of Military Medical Sciences	Sinopharm (China National Biotec Group) (Beijing IBP, Wuhan IBP)	Sinovac Biotech Co.
Headquarters	Oxford, England; Cambridge, England, Gothenburg, Sweden	Cambridge, Massachusetts	Mainz, Germany; New York, New York	New Brunswick, New Jersey (Leiden, Netherlands)	Gaithersburg, Maryland	Lyon, France; Brentford, England	Tübingen, Germany	Tianjin, China; Beijing, China	Beijing, China; Wuhan, China	Beijing, China
Product Designator	ChAdOx1 or AZD1222	mRNA-1273	BNT162b2, tozinameran, Comirnaty	Ad26.COV2.S, JNJ-78436735	NVX-CoV2373	TBA	CVnCoV	Ad5-nCoV, Convidecia	BBIBP-CorV	CoronaVac
Vaccine Type	Adenovirus 63 vector	mRNA	mRNA	Adenovirus 26 vector	Subunit (spike) protein	Subunit (spike) protein	mRNA	Adenovirus 5 vector	Inactivated whole virus	Inactivated whole virus
Product Features	Chimpanzee adenovirus type 63 vector	Within lipid nanoparticle dispersion	Within lipid nanoparticle dispersion	Human adenovirus type 26 vector	Adjuvanted with Matrix-M	Adjuvanted with AS03 or AF03	Adjuvanted with AS03	Human adenovirus type 5 vector	Adjuvanted with aluminum hydroxide	Adjuvanted with aluminum hydroxide
Production Medium (origin)	HEK-293A (human embryo)	Cell free (synthetic)	Cell free (synthetic)	PER.C6 (human embryo)	Baculovirus/Sf9 (insect)	Baculovirus/Sf9 (insect)	Cell free (synthetic)	HEK-293 (human embryo)	Vero cells (monkey)	Vero cells (monkey)
Route	IM	IM	IM	IM	IM	IM	IM	IM	IM	IM
CPT Code	91302	91301	91300	91303						
CVX Code	210	207	208	212						
NDC Code	00310-1222-10	80777-0273-xx	59267-1000-xx	59676-0580-05						
Dosing Regimen	Single dose or Weeks 0 + 4-12	Days 0 + 28	Days 0 + 21	Single dose or Days 0 + 56	Days 0 + 21	Days 0 + 21	Days 0 + 28	Single dose or Days 0 + 56	Days 0 + 14 or Days 0 + 21	Days 0 + 14 or Days 0 + 28
Expected Dose	5x10 ¹⁰ viral particles in 0.5 mL [EU: NLT 2.5 x 10 ⁸ infectious units]	100 mcg in 0.5 mL	30 mcg/0.3 mL (after dilution)	5x10 ¹⁰ viral particles in 0.5 mL	5 mcg protein plus 50 mcg Matrix-M in 0.5 mL	5 or 15 mcg, TBD	6 or 8 mcg, TBD	5x10 ¹⁰ or 1x10 ¹¹ viral particles	4 mcg	600 antigen units (SU) in 0.5 mL
Expected Packaging	Suspension, 8- or 10-dose vial, preservative free	Frozen liquid, 10-dose vial, preservative-free	Frozen liquid, 6-dose vial, preservative-free. Dilute 0.45 mL of concentrate with 1.8 mL NaCl 0.9% to yield 30 mcg/0.3 mL	Liquid, 5-dose vial, preservative-free	Liquid, 10-dose vial, preservative-free	TBA	TBA	TBA	TBA	Suspension, 40-dose vial, preservative-free
Expected Storage & Handling Conditions	Refrigerate unopened vial @ 2°C to 8°C for up to 6 mo, protecting from light. After first use, use within 6 h, storing @ 2°C to 25°C	Ship @ -20°C. Refrigerate @ 2°C to 8°C NMT 30 d. Room temp NMT 12 h after thaw.	Ship and store @ -70°C. Refrigerate @ 2°C to 8°C NMT 5 days. After diluting, use within 6 hours	Long-term storage @ -20°C up to 2 y. Refrigerate @ 2°C to 8°C up to 3 months. Use within 6 h	Refrigerate @ 2°C to 8°C	Refrigerate @ 2°C to 8°C. Before injection, mix antigen with adjuvant	>3 mo @ 2°C to 8°C. Room temp 24 h	Refrigerate @ 2°C to 8°C	Refrigerate @ 2°C to 8°C	Refrigerate @ 2°C to 8°C. Agitate before withdrawing dose. Discard unused product after work day
Clinical Trial Status	Phase 3	Phase 3	Phase 3	Phase 3	Phase 3	Phase 1	Phase 2	Phase 3	Phase 3	Phase 3
Date Data Sufficient for EUA	UK: 2020 Dec 29, US: 2021 Apr?	issued 18 Dec 20	issued 11 Dec 20	2021 Feb	2021 Apr?	2021 May?	2021 Mar?	2020 Jun - China: military uses	2020 Jul - China: workers and families	2020 Jul - China: workers and families
Goal Date to File for License	2021 Apr?	2020 Dec	2020 Dec	2021 Mar?	2021 Feb?	2021 Mar?	2021 Mar?	PRC 2021 Jan?	PRC 2021 Jan?	PRC 2021 Jan?
US Gov't Contracts, 2020-21 (doses)	300 million	200 million plus options	200 million	100 million	100 million	100 million	none	none	none	none
Clinicaltrials.gov Numbers	NCT04324606, NCT04400838, NCT04444674, NCT04516746, NCT04536051, NCT04536051, NCT04540393	NCT04283461, NCT04405076, NCT04470427, NCT04649151	NCT04368728, NCT04380701, NCT04523571, NCT04537949	NCT04436276, NCT04505722, NCT04509947	NCT04368988, NCT04533399	NCT04537208	NCT04449276, NCT04515147	NCT04313127, NCT04341389, NCT04398147, NCT04526990, NCT04540419, NCT04552366	NCT04510207	NCT04352608, NCT04383574, NCT04456595, NCT04508075, NCT04551547
Ages Studied to Date (y)	18 to 55, 5 to 12	≥18	12 to 55, 56 to 85	18 to 59, ≥60	18 to 59, 60 to 84	≥18	≥18	≥18	18 to 59, 60 to 80	≥18
Evidence in Non-Human Primates	Graham 2020; van Doremalen 2020	Corbett 2020	Sahin 2020; Vogel 2020	Mercado 2020; Yu 2020	Guebre-Xabier 2020; Tian 2020				Wang 2020	Gao 2020
Evidence in Humans	Folegatti 2020; Ramasamy 2020; Voysey 2020; Voysey 2021	Jackson 2020; Anderson 2020; Widge 2020; Baden 2021	Mulligan 2020; Walsh 2020; Polack 2020	Sadoff 2021	Keech 2020		Kremsner 2020	Zhu 2020a, Zhu 2020b	Xia 2020 a, Xia 2020 b	Zhang 2020
Analogous Licensed Vaccines	No other adenovirus type-63 based vaccine	No other licensed mRNA vaccine	No other licensed mRNA vaccine	Adenovirus type-26 EU-registered Ebola vaccine component Zabdano (Janssen, JNJ)	Influenza hemagglutinin vaccine (FluBlok, Sanofi), with NVX-CoV2373 adding a new adjuvant	Influenza hemagglutinin vaccine (FluBlok, Sanofi), with this candidate adding an adjuvant	No other licensed mRNA vaccine	No other adenovirus type-5 based vaccine	Inactivated hepatitis A, poliovirus, rabies vaccines	Inactivated hepatitis A, poliovirus, rabies vaccines

Abbreviations & Acronyms: EUA (Emergency Use Authorization); IBP (Institute of Biological Products); mRNA (messenger ribonucleic acid); NMT (not more than); Sf9 (*Spodoptera frugiperda*); TBA (to be announced); TBD (to be determined)

Last updated: 2/4/2021

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