



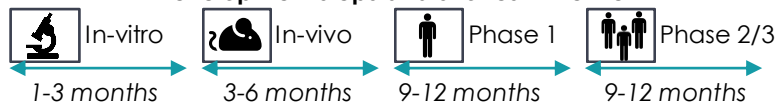
COVID-19 Update
Vaccines & Treatments Development Snapshot

March 23rd, 2020

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Development steps and shortest timeline

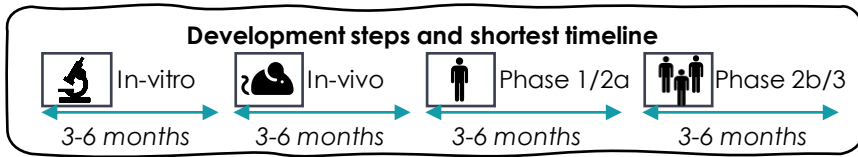


mRNA-1273 (Moderna, Inc.) Phase 1:

- 45 Healthy Volunteers
- 18-55 aged
- Completion: June 1st, 2021

| Company | Product | Type of vaccine | Development Stage | Phase 1 Starting Date |
|---|-------------------|-----------------------|-------------------|-----------------------|
| Moderna, Inc. | mRNA-1273 | RNA Based | | March 2020 |
| Inovio Pharma. & Beijing Advaccine Biotech. | INO-4800 | DNA based | | April 2020 (expected) |
| Novavax, Inc. | - | Protein based | | May 2020 (expected) |
| CureVac AG | - | RNA based | | June 2020 (expected) |
| Johnson & Johnson | AdVAC | Viral vector | | - |
| Applied DNA Sciences & Takis Biotech | - | DNA Based | | - |
| Altimmune, Inc. | NasoVAX | Viral vector | | - |
| Arcturus Therapeutics & Duke-NUS | - | RNA based | | - |
| Codagenix & Serum Institute of India | - | Live-Attenuated Virus | | - |
| CanSino Biologics | - | Viral vector | | - |
| Clover Biopharma. & GSK | COVID-19 S-Trimer | Protein based | | - |
| ExpreS2ion Biotechnologies | - | Protein based | | - |
| Genexx & EpiVax | li-Key Peptide | Protein based | | - |
| GeoVax Labs; BravoVax | MVA-VLP | Viral Vector | | - |
| Greffex, Inc. | Ad5 S | Viral vector | | - |
| iBio & CC-Pharming | - | Protein Based | | - |
| Sanofi | - | DNA based | | - |
| Stermira Therap. & Tongji University | - | RNA Based | | - |
| Tonix Pharma. Holding | TNX-1800 | Horsepox virus | | - |
| Vaxart | - | Viral Vector | | - |
| Vaxil Bio | - | Protein Based | | - |
| Zydus Cadila | - | DNA based | | - |
| | rMV | Live-Attenuated Virus | | - |

Other Research Institutions currently developing a vaccine for nCov-19: Institute Pasteur; Imperial College London; Migal Institute; Oxford University; Wrair and Usamriid; Baylor, New York Blood Center and Fudan University.



Remdesivir (Gilead Science) Phase 3:

- 1,000 Patients (18+ aged)
- Mild & severe COVID 19
- Completion: May, 2020

Bold = top candidates

| Company | Product | Type of Treatment | Development Stage | Clinical Trial Starting Date |
|---------------------------------------|-------------------------------|--------------------------------------|-------------------|-----------------------------------|
| Gilead Science | Remdesivir | ATP Analog | | March 2020 (recruiting) |
| Roche | Tocilizumab (Actemra) | mAb targeting interleukin-6 | | March 2020 (not recr. yet) |
| Sanofi/Regeneron | Sarilumab (Kevzara) | mAb targeting interleukin-6 | | March 2020 (not recr. yet) |
| Ascletis, AbbVie | ASC09/ ritonavir | Protease inhibitors | | March 2020 (recruiting) |
| Biogen, Merck | Interferon alfa-2b | recombinant anti-viral cytokine | | February 2020 (recruiting) |
| Incyte | Camrelizumab and thymosin | mAb targeting PD-1 | | February 2020 (not recr. yet) |
| Janssen, Gilead | darunavir/ cobicistat | Protease inhibitor | | February 2020 (recruiting) |
| Shanghai Zhongxi Pharmaceutical, | Chloroquine | fusion inhibitor | | February 2020 (recruiting) |
| Shionogi, Toyama Chemical | baloxavir marboxil and others | Cap-dependent endonuclease inhibitor | | February 2020 (recruiting) |
| Zhengzhou Granlen PharmaTech | Azvudine | transcriptase inhibitor | | February 2020 (recruiting) |
| Apeiron Bio. & UBC | APN01 | rhACE2 enzyme | | February 2020 (recruiting) |
| Takeda Pharmaceutical Company Ltd | TAK-888 | Hyperimmune globulins | | - |
| Vir Biotechnology Inc. WuXi Biologics | - | Monoclonal Antibody | | - |

Other companies and institutions with active pre-clinical programs (new drugs): AbCellera, Eli Lilly, Takeda, Celtrion, Emergent BioSolutions, Euflex, GC Pharma Harbour BiomeD, Mount Sinai, ImmunoPrecise Antibodies; Sorrento Therapeutics, NanoViricides; CEL-SCI Corporation; Enanta Pharmaceuticals; Insilico Medicine; Sirnaomics; Alynlam; Flanders Institute for Biotechnology; National Institutes of Health;