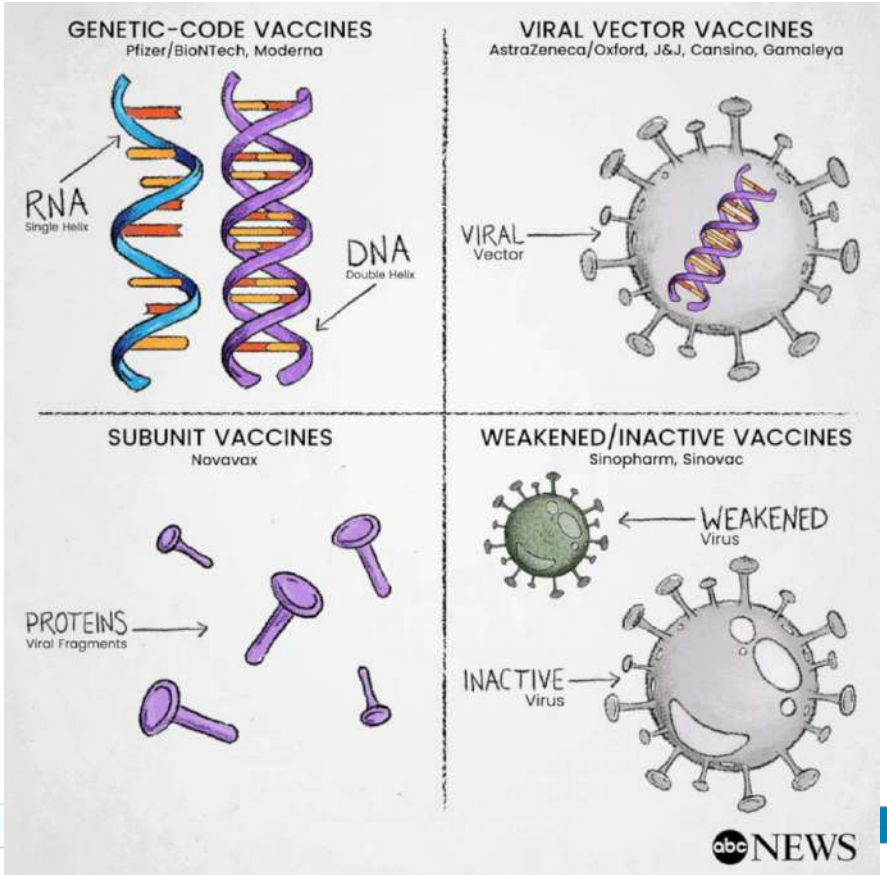
COVID-19 Vaccines: Non-mRNA

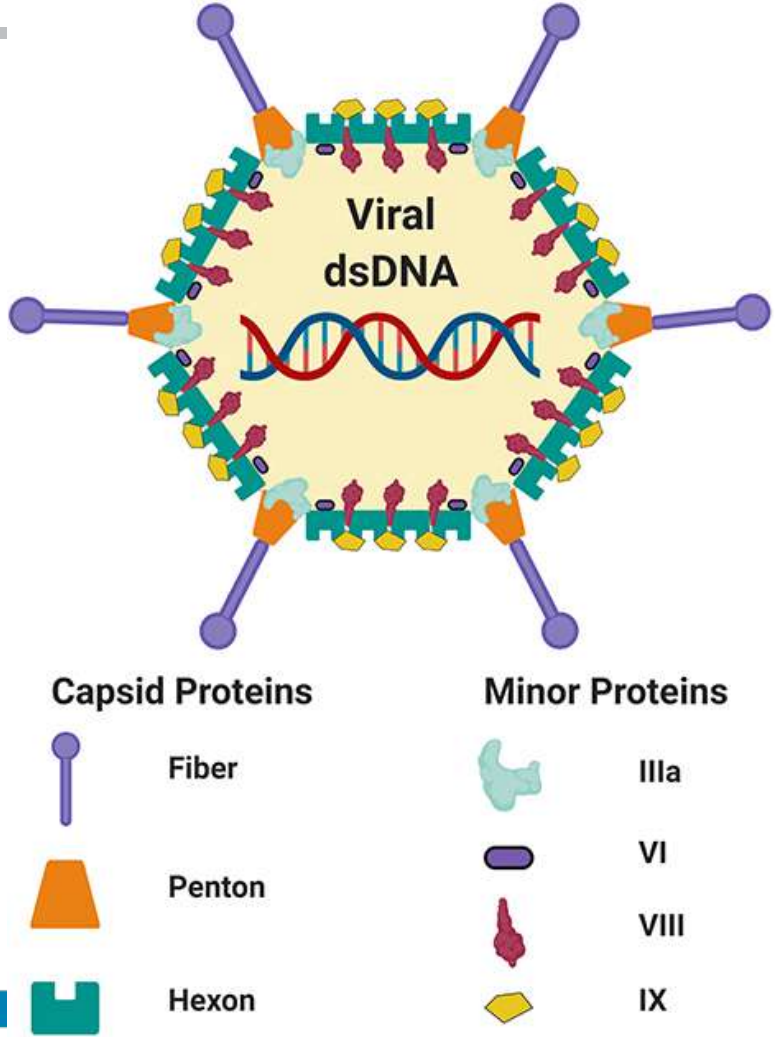
Stephen P. Blatt MD FACP
Medical Director for Infectious Diseases - TriHealth

Vaccine Types



AstraZeneca AZD-1222

-Viral vector vaccine ChAdOx1
-Replication deficient chimpanzee adenoviral vector
-Will infect human cells but cannot replicate
-No pre-existing human immunity to primate viruses
-Contains spike protein gene
-Primes immune system to develop anti-spike antibodies
-Storage: refrigeration


Viral
dsDNA
Capsid Proteins
Fiber
Penton
Hexon
Minor Proteins
IIIa
VI
VIII
IX

AZD-1222 Efficacy

11,636 participants: UK, Brazil, S Africa

-2 doses 28 days apart

-overall efficacy 70.4%

-90% in low dose followed by high dose

-62% in group with 2 standard doses

-The low dose/high dose regimen was an error

and not in the protocol and will require further investigation by regulatory agencies

-Currently in use in UK

Lancet S0140-6736(20)32661-1

AZD-1222 Side Effects

-Trial halted due to a case of Transverse Myelitis – DSMB determined not related to vaccine

-2 additional cases of TM, one turned out to be MS, one in placebo group

-Other side effects not reported in detail in the published study

J&J Ad26.COV2.S

-Human Adenovirus 26 recombinant vector which contains genes for Spike protein

-Single dose

-Storage: Standard refrigerator temps for 3 months – easier to distribute to regular offices

-Uses Janssen's AdVac vaccine platform also used for their Zika, RSV, HIV and Ebola vaccines

-2 dose regimen also in Phase 3 trials

J&J Ad26.COV2.S

Ensemble trial data

-presented only in press release so far

-US, S America, S Africa

-45,000 participants

-Neutralizing antibodies in 90% by day 29 and 100% by day 57

-Efficacy in US 72% in preventing moderate to severe COVID

-Efficacy 66% in S America and 57% in S. Africa (most cases due to S African variant strain)

-85% effective in preventing severe COVID (ICU, resp failure, death)

J&J Ad26.COV2.S

Side effect profile:

-no significant safety concerns from the DSMB of the trial

-Fever 9%

-No anaphylaxis reported

J&J plans to file for EUA in US early Feb 2021

Novavax NVX-CoV2373

-Genetically engineered coronavirus spike protein antigen with an adjuvent (subunit vaccine)

-Produced in insect cells

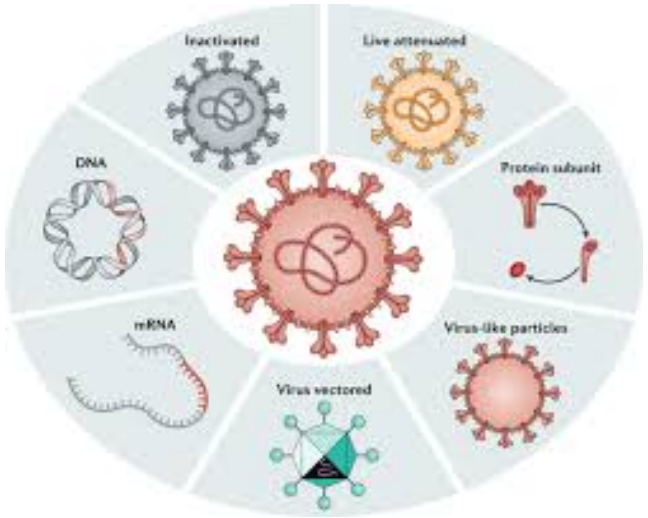
-Phase 3 trial in UK and S. Africa just announced in press release

-Currently still enrolling in US and Mexico trial

-2 doses 21 days apart

-Stable at refrigerator temps

Protein Subunit Vaccine - Novavax



Novavax Subunit Protein Vaccine

-UK data: 15,000 patients

-Endpoint: PCR confirmed symptomatic COVID case

-Efficacy 89.3%

-95.6% against original COVID strain

-85.6% against the UK variant strain

Novavax Subunit Protein Vaccine

-S Africa data:

-Phase 2b study 4400 patients

-60% efficacy in Non-HIV population

-49.4% in total population

-92% of cases were the new triple mutant S Africa variant

-1/3 of enrollees were COVID seropositive but still acquired infection with the new variant strain

-Novavax reformulating their vaccine with the new S African variant spike protein

-Plans for bivalent vaccine in progress (original strain + variant strain)

Novavax Subunit Protein Vaccine

-US and Mexico vaccine trial 30,000 patients to complete enrollment in Feb

-Side effects: “Low level” per press release

CoronaVac (Sinovac)

-Inactivated COVID virus vaccine

-Phase 1-2 trial – neutralizing antibody levels developed in the majority of participants but lower level than with natural infection

-Efficacy:

-Brazil ~50%

-Turkey 91.2%

-No peer reviewed published phase 3 studies

Others

-At least 22 other candidate vaccines in various stages of development

-Some orally or nasally inhaled

Questions:

What to do about the new variant strains?

What level of efficacy is worth continuing with a vaccine when the variant strains predominate?

How quickly can we make bivalent or trivalent vaccines which include the variant epitope genetic material or proteins?

Can we get ahead of this virus???

“Let’s Be Careful Out There”