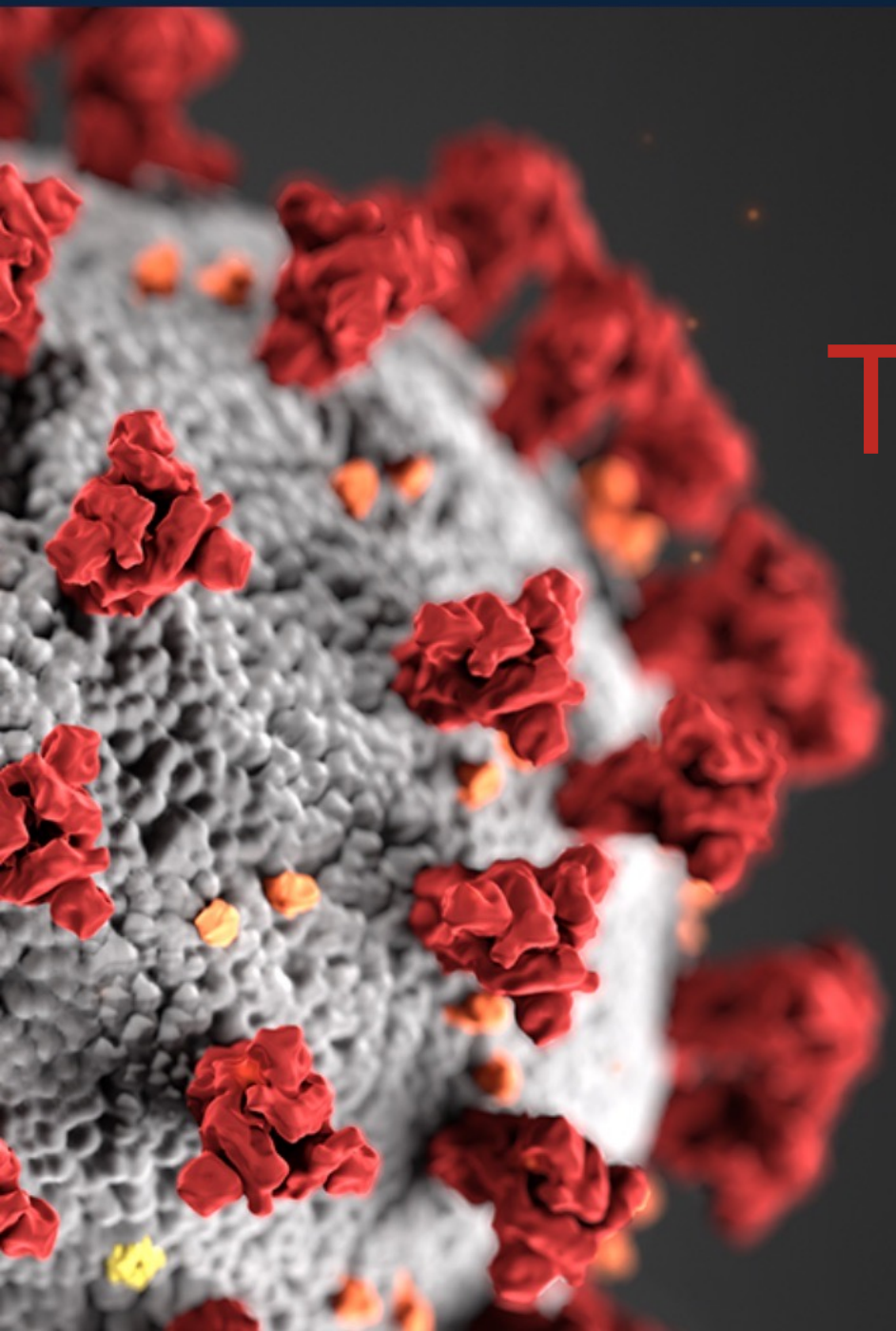
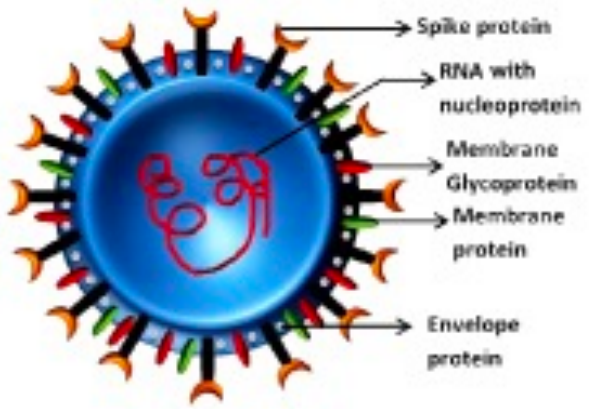


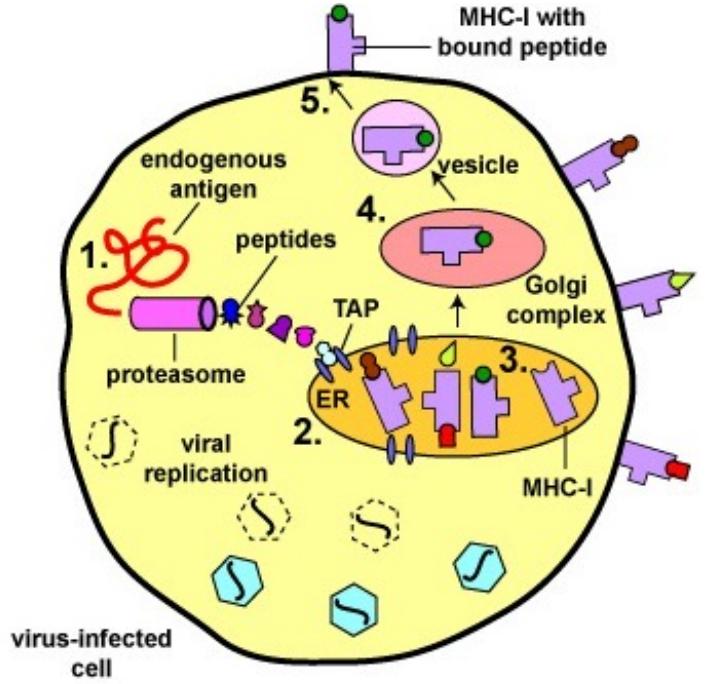
The Science of Covid Vaccines

Methods, Cell Lines, and Safety

Getting a Vaccine to Work

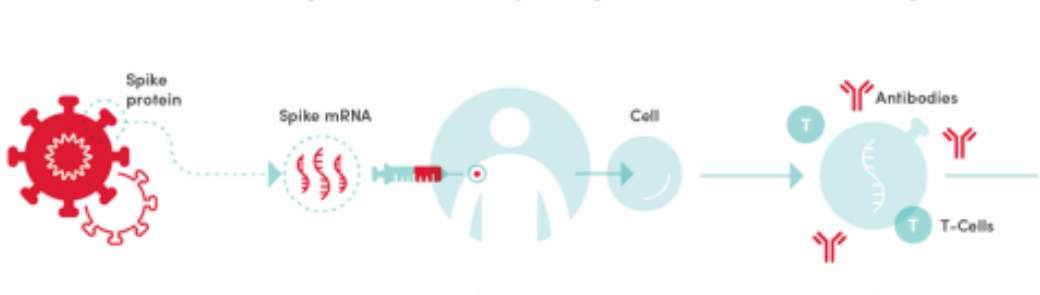
- What do you want vaccine to do?
- Generate antibodies and T cells specific to the pathogen
- Expose individuals to the surface proteins on the virus
  - Activate the body's immune response without actually exposing person to the viral pathogen



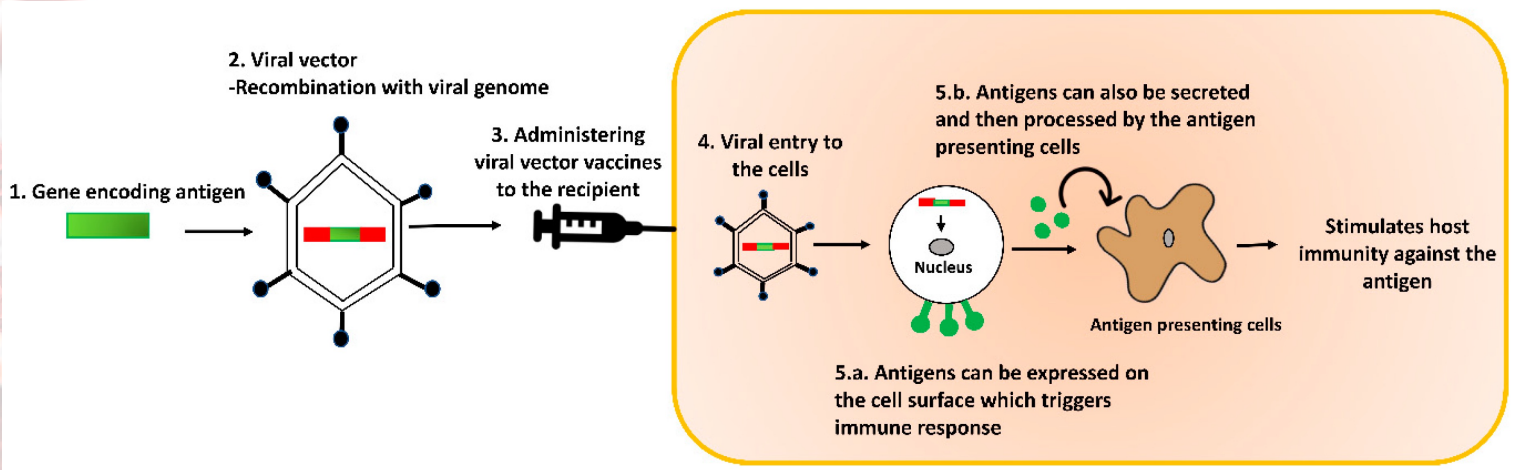


Current Covid-19 Vaccines: The Spike Protein

- Pfizer-BioNTech and Moderna
  - Synthetic mRNA of the SARS-CoV2 spike protein

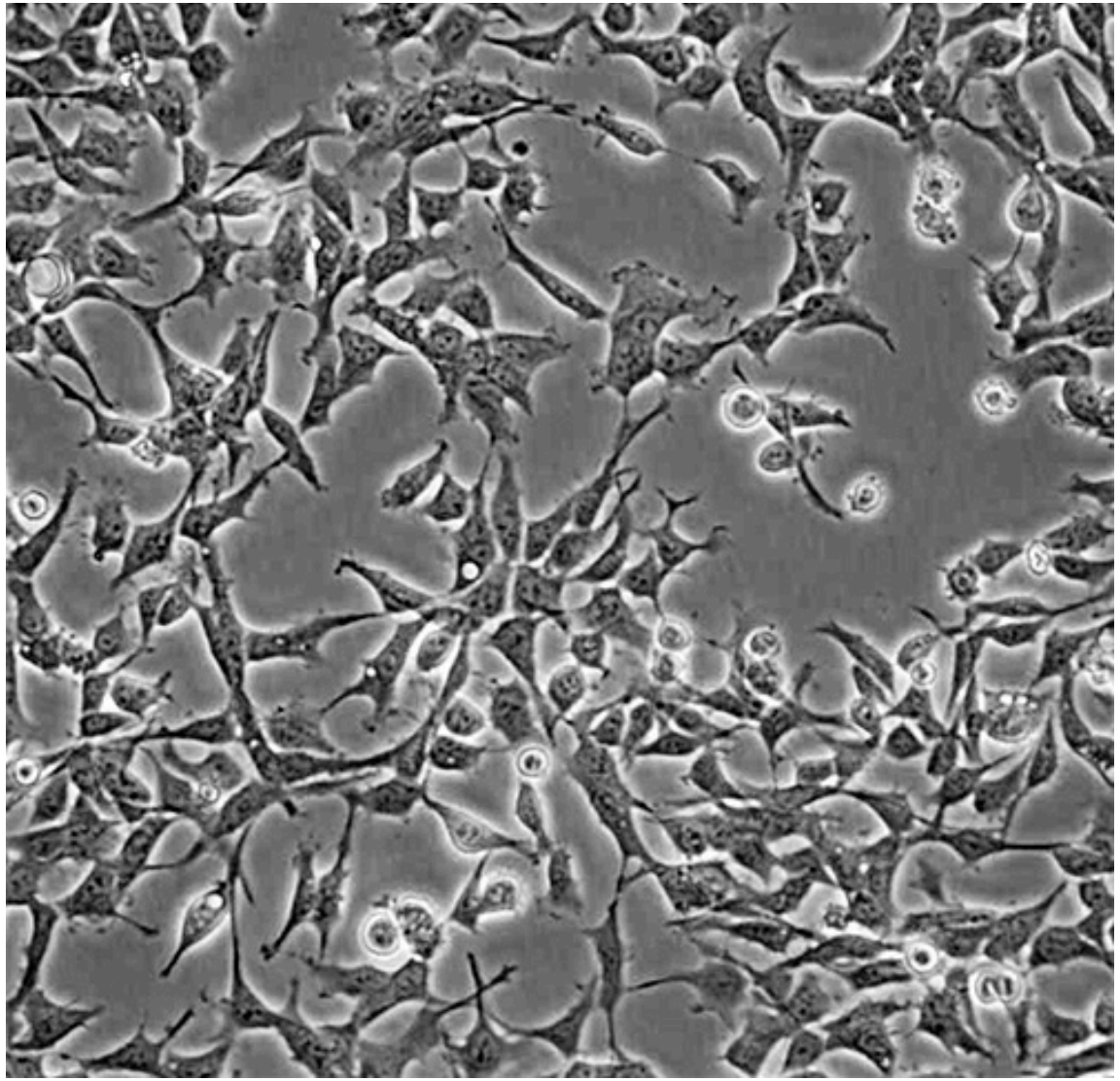


- Johnson and Johnson
  - Attenuated adenovirus with SARS-CoV2 spike protein gene added



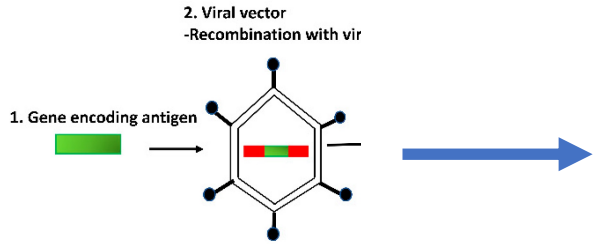
Cell Lines Used for Covid-19 Vaccines

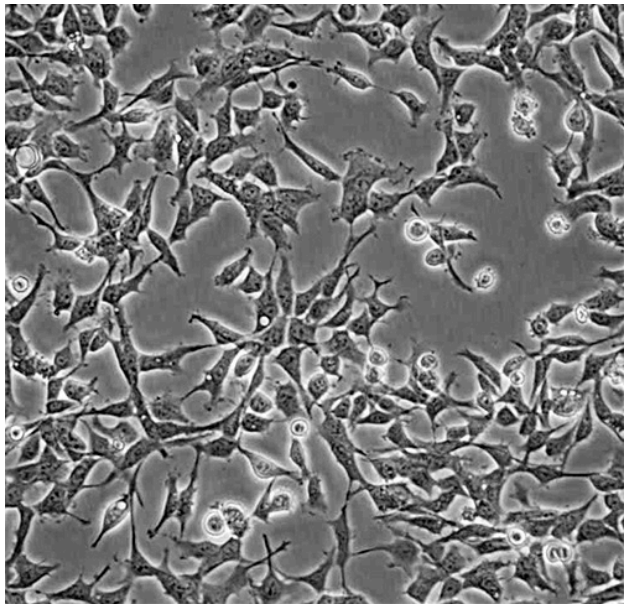
- HEK293
  - Able to support the growth of attenuated adenovirus vectors
  - Well-established/characterized
  - Easy to culture
  - Easy to modify
  - Human protein expression
- PER.C6

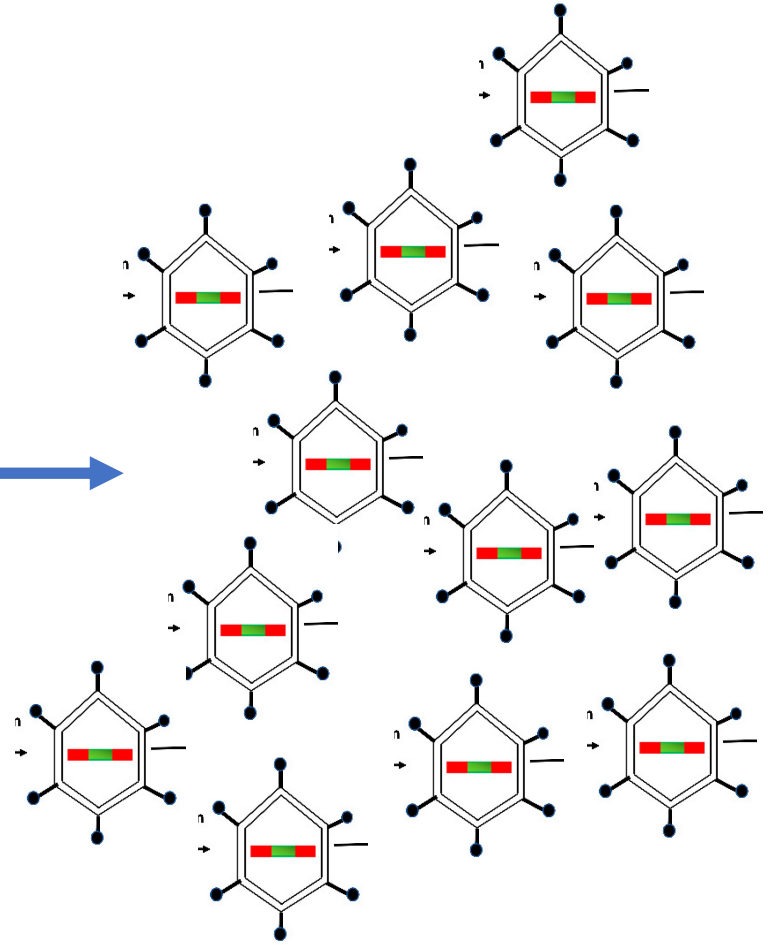


Making the Johnson and Johnson Vaccine

- PER.C6 cells are not in the final product

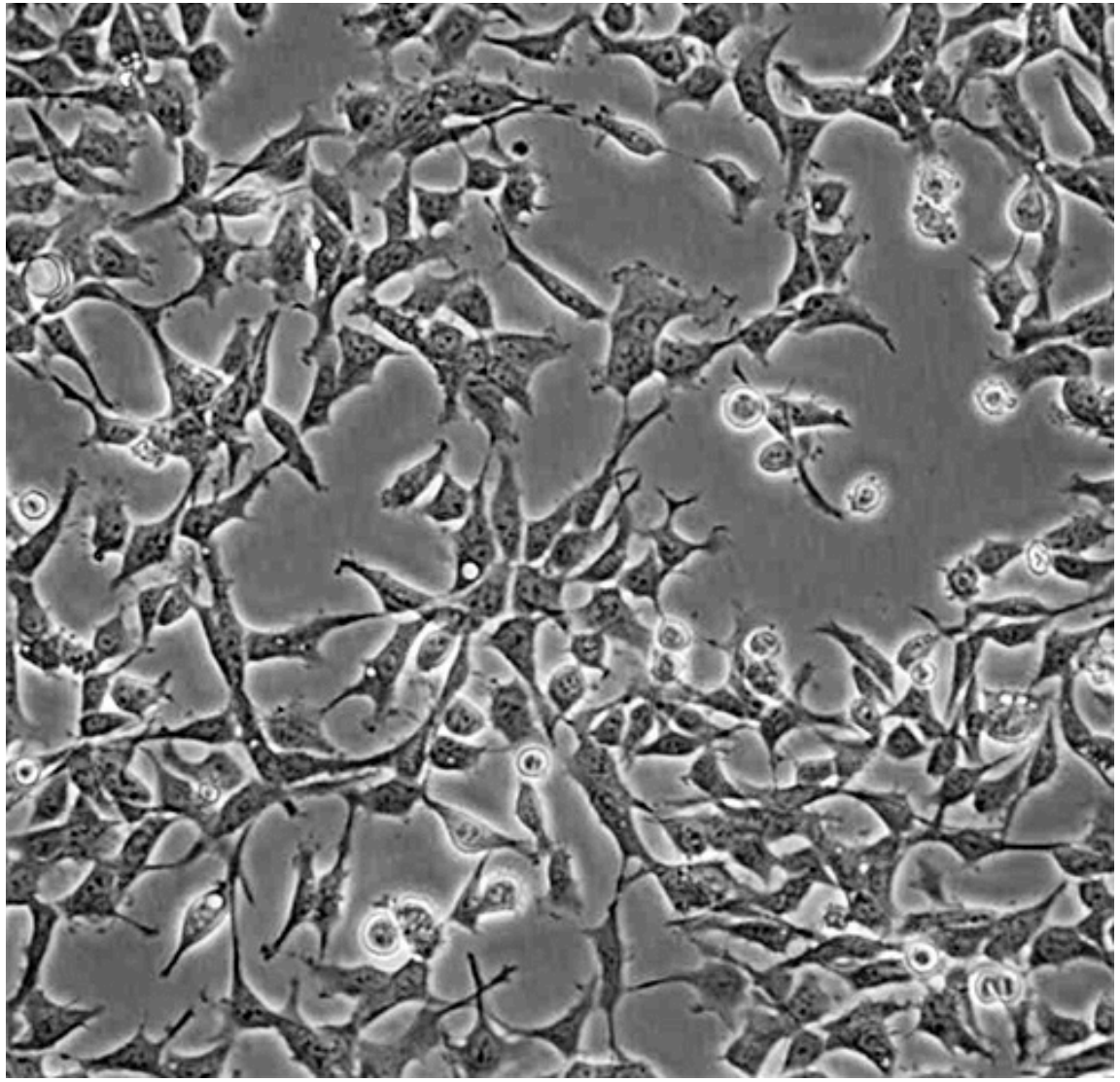






Uses of HEK293 and PER.C6 Cells

- Basic research
- Testing of existing medications
- Development and manufacturing of vaccines
- Development of food additives
- Development of new medications



Clinical Trials and Risks of Covid-19 Vaccines

- Pfizer BioNTech Trial
  - 95% effective in preventing symptomatic infection
  - Safety data on ~43,000 participants, more deaths and serious adverse events in control group
- Moderna Trial
  - 94% effective in preventing symptomatic infection
  - Safety data on ~30,000 participants, no difference in serious adverse events with control group
- Johnson and Johnson Trial
  - 65% effective overall, 85% effective in preventing severe infection
  - Safety data on ~40,000 participants, no difference in serious adverse events with control group
- Long-term effects, pregnant women, children, immunosensitive
  - those with active infection