

COVID-19

Prevention Network



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SARS-CoV-2

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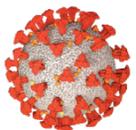
**Severe acute respiratory syndrome
coronavirus 2**

SARS-CoV-2

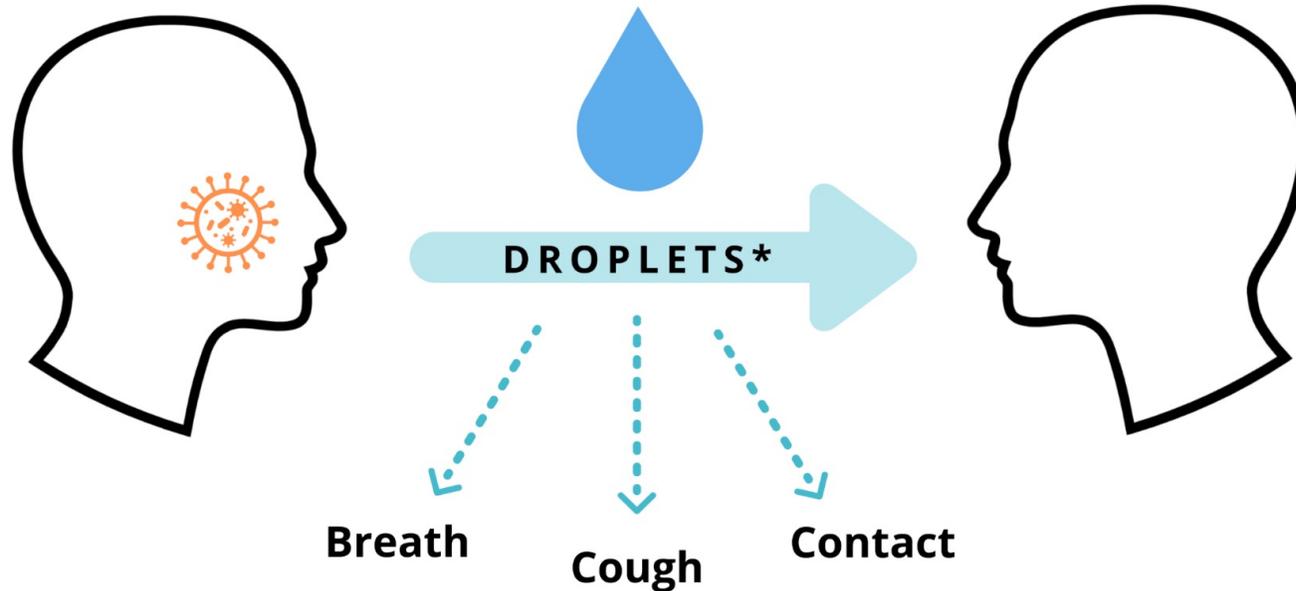
- SARS-CoV-2 is the name of the new coronavirus discovered in late 2019.
- It is the virus that causes the disease called COVID-19, short for “Coronavirus Disease of 2019.”
- In most people, the virus mainly affects the respiratory tract, but we are still learning about all of the ways it impacts the human body.
- People can carry this virus and transmit it to others, even when they do not have any symptoms themselves.
- Some people do not show any symptoms (“asymptomatic”). Some people have a mild to moderate infection and can recover at home. Other people may have a more severe illness and need to be treated in the hospital.



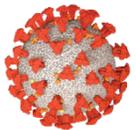
Image credit: Seattle & King County Dept. of Public Health



How does SARS-CoV-2 spread?



- The primary method of transmission is droplets that can land in the mouths or noses of people who are nearby or can possibly be inhaled into the lungs. It is also possible for smaller droplets, known as aerosols, to spread further due to air circulation. It is easiest for this to happen when people are close together.
- Droplets can also fall and remain on surfaces, where they are transmitted to people who touch that surface (examples include countertops, light switches, door knobs, etc.) and then touch their face. Transmission in this manner is very rare.



Common symptoms of COVID-19 Illness

Fever

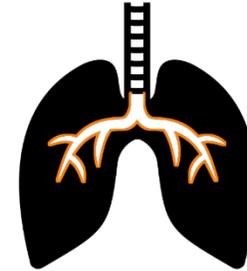


100.4 F or
higher

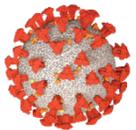
Cough



Difficulty breathing



Symptoms may show up between 2 and 14 days after being around someone who has COVID-19.



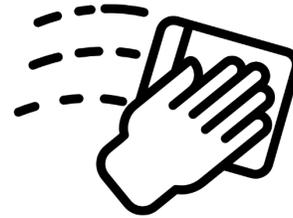
Reducing the spread



Call your doctor and ask for instructions about how to stay home and be in quarantine.



Practice excellent hygiene habits



Clean frequently touched surfaces and objects

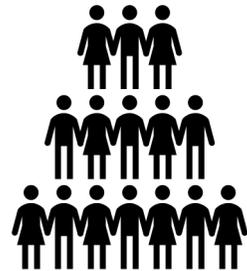


Cloth face masks

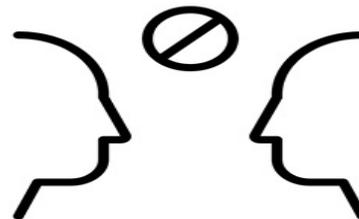
Wear cloth face coverings that cover your mouth and nose



Stay home



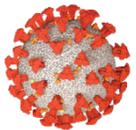
Large gatherings are prohibited



Stay 6 feet apart from other people, and avoid contact with people who are sick



Scarves





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Understanding Vaccines

What could a SARS-CoV-2 vaccine do?

Benefit the individual

- ➔ Reduce the severity of illness
- ➔ Prevent infection

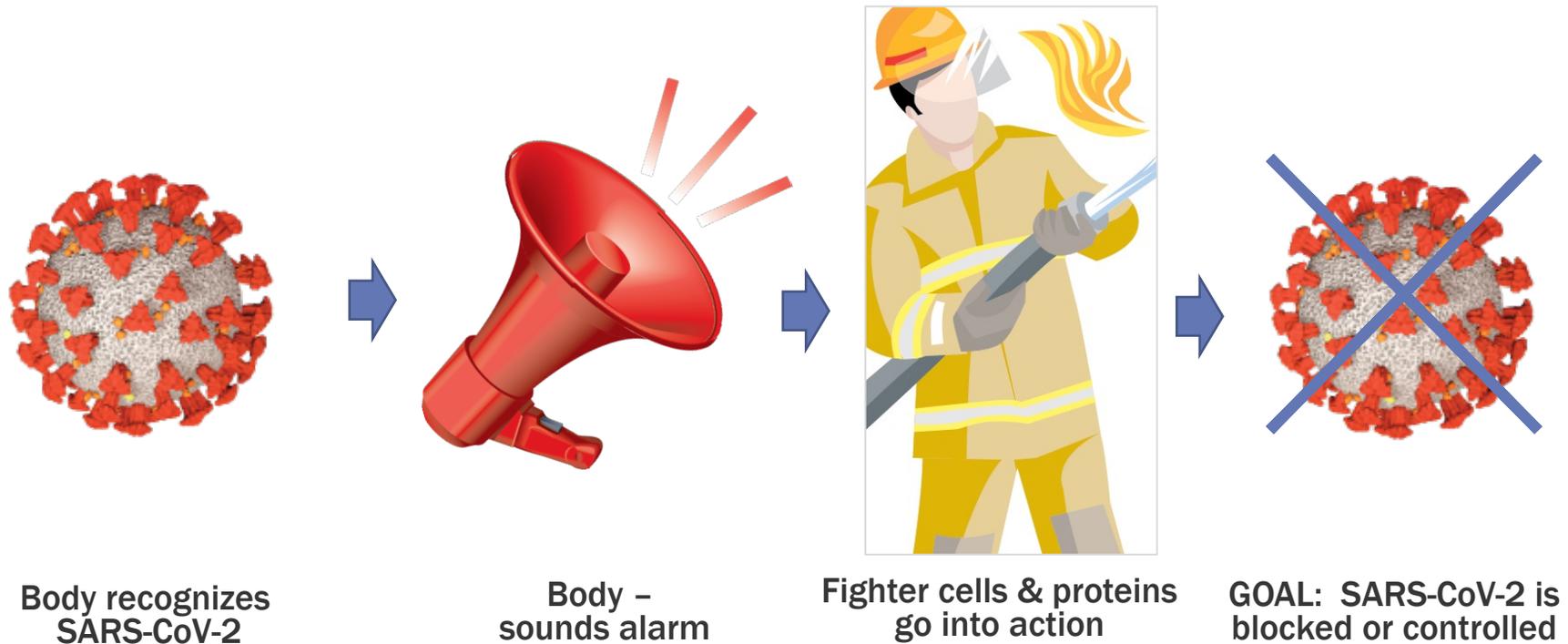
Benefit the community

- ➔ Reduce transmission
- ➔ Healthier communities



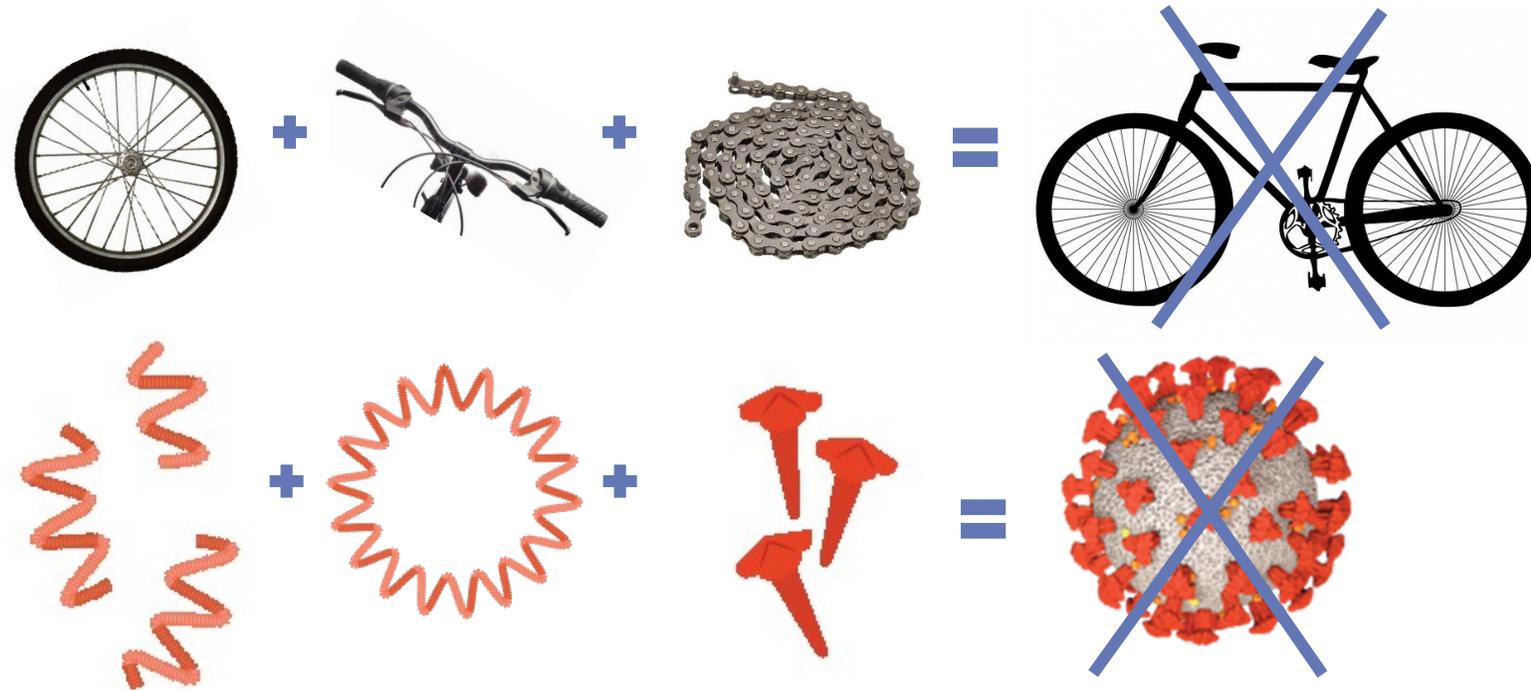
How does a vaccine work?

- By teaching the body to recognize and fight invaders



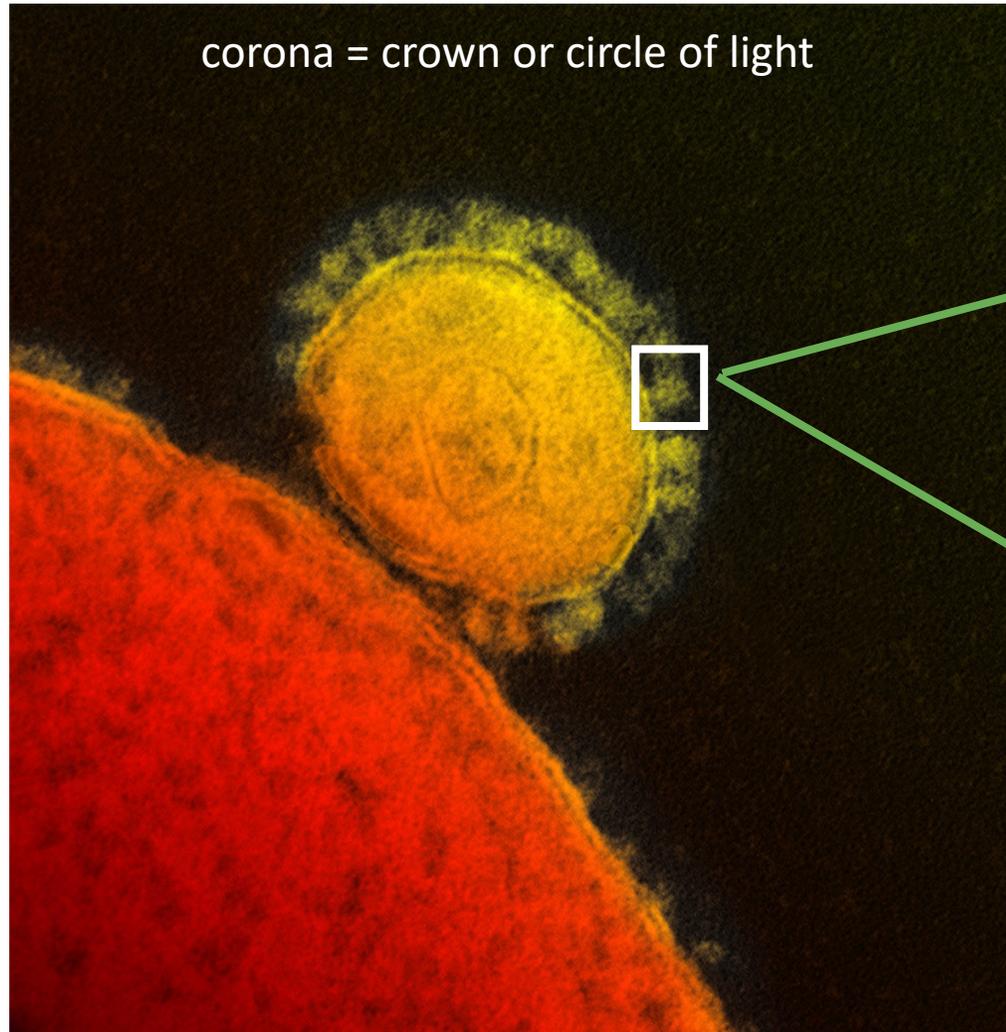
Can vaccines cause SARS-CoV-2 infection or cause COVID-19 illness?

NO! The vaccines being tested are made from synthetic (laboratory made) pieces copied from SARS-CoV-2, not the whole virus. Therefore, the vaccines CANNOT cause infection or cause you to get COVID-19 illness.

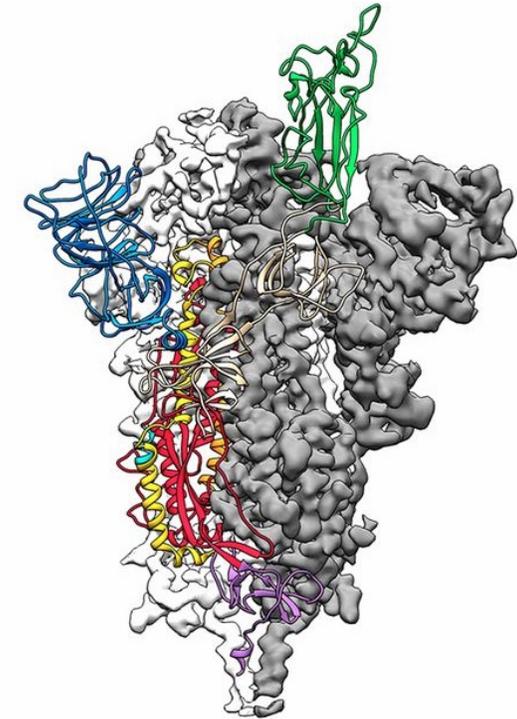


SARS-CoV-2 and its spike protein (the vaccine target)

Slide credit: Vaccine Research Center, NIAID



Spike Protein



Viral membrane

[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

Image credit: Wrapp D, Wang N, Corbett KS, Goldsmith JA, Hsieh CL, Abiona O, Graham BS, McLellan JS. Cryo-EM structure of the 2019-nCoV spike in the prefusion conformation. Science. 2020 Feb 19:eabb2507. doi: 10.1126/science.abb2507.

The pieces involved - 1

- The coronavirus spike protein is on the surface of the virus. It directs how the virus attaches to cells to start the infection process.
- An ideal vaccine targets the coronavirus spikes in order to block infection.

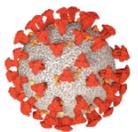
Slide credit: Vaccine Research Center, NIAID

Coronavirus

Spike Protein

Human ACE2 Receptor

Cells in Human Body



The pieces involved - 2

- The coronavirus spike protein attaches to the ACE2 receptor to start an infection.

Slide credit: Vaccine Research Center, NIAID

Coronavirus

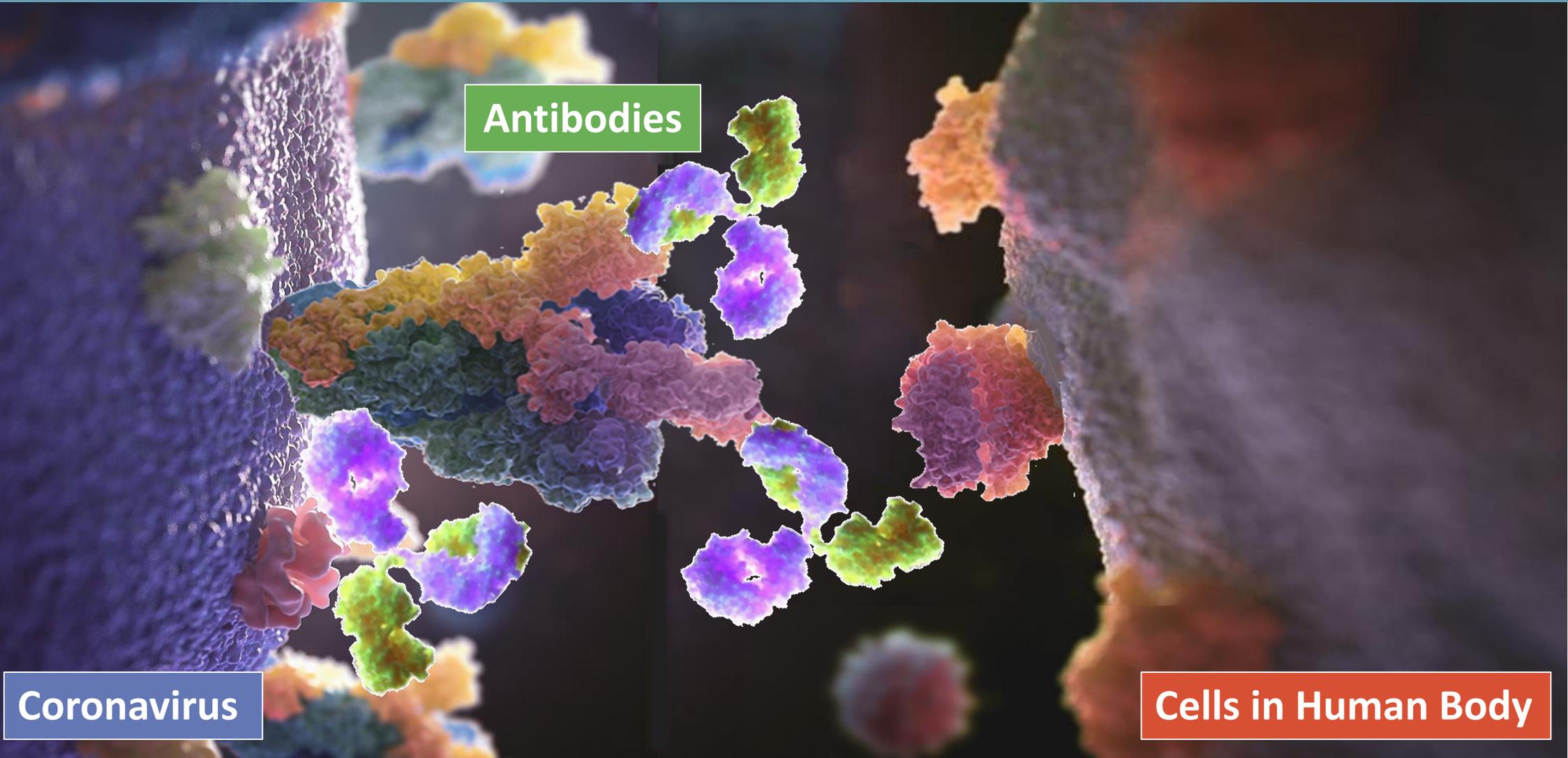
Cells in Human Body



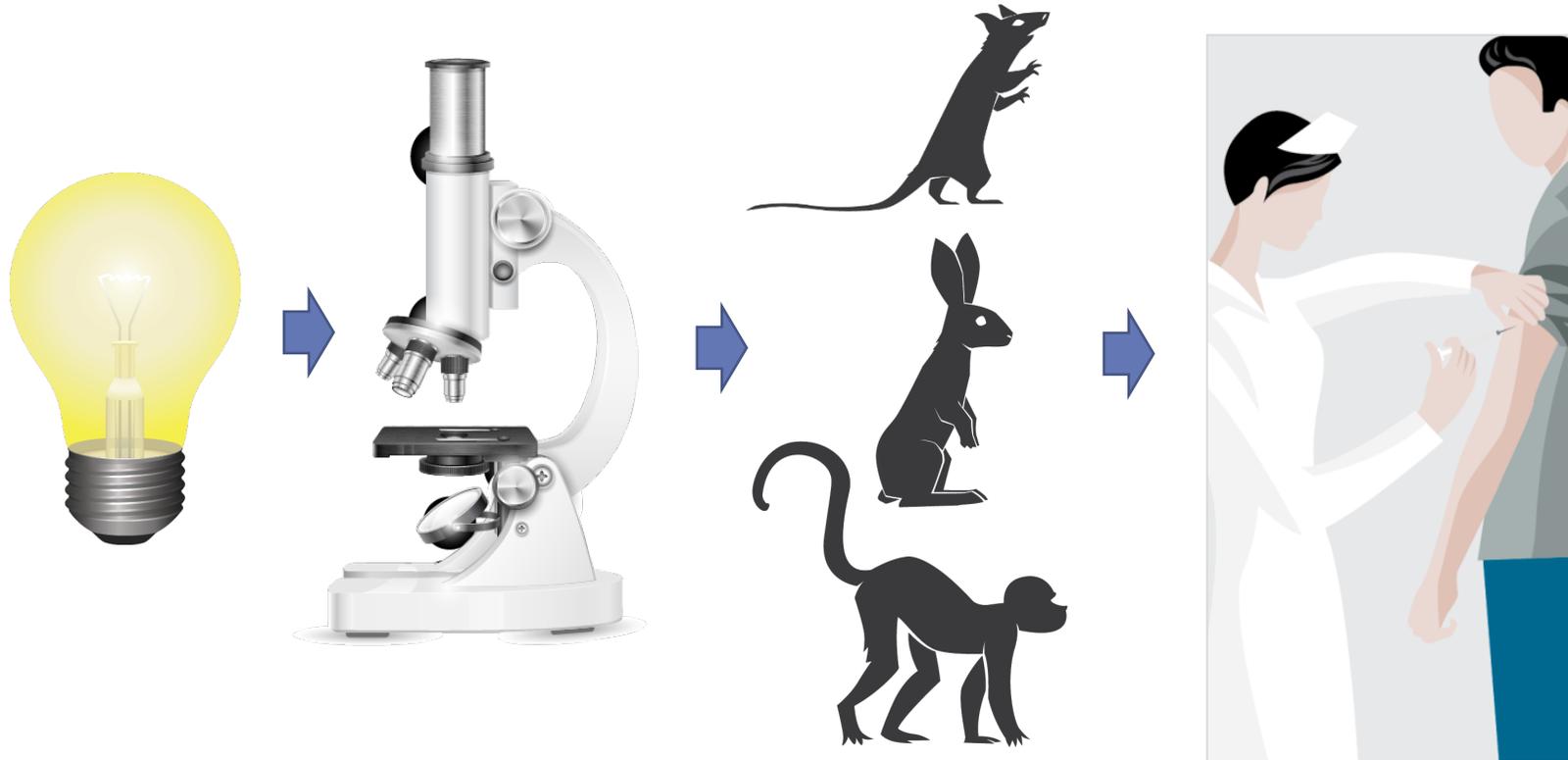
The goal: antibodies!

- Vaccine-induced antibodies can block the spike protein from attaching to human cells.

Slide credit: Vaccine Research Center, NIAID



How do you test a vaccine?

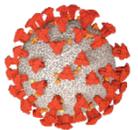


IDEAS

LAB RESEARCH

ANIMAL TESTING

HUMAN STUDIES



Stages of clinical trials

PHASE 1

12 to 18 months

Trials to test safety and whether the body can tolerate the product. Often involves comparing against a placebo with no active ingredients. Usually less than 100 people.

PHASE 2

Up to 2 years

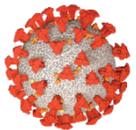
Identifying the maximum tolerated dose, the best dosing schedule, and if the immune system is having the desired responses. Usually a few hundred to a few thousand people.

PHASE 3

2+ years

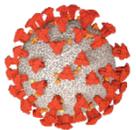
“Does this product prevent infections, or help to reduce the severity of disease?” Involves thousands of people, including some at risk of infection.

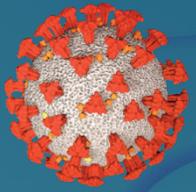
With SARS-CoV-2, we are working as quickly as possible. No phases are skipped. Instead, we overlap the phases, starting the next phase as quickly as we have the necessary safety data collected and analyzed from the earlier phase. The new phase can start while the long-term follow-up of people in the earlier phase continues. Other steps can be done in parallel, instead of one after the other.



Study vaccines

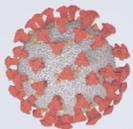
- The **study vaccine** is experimental. That means we do not know if it will be effective to use in people (if it will prevent SARS-CoV-2 infection or reduce the severity of COVID-19 illness).
- The **study** vaccine can only be used in research.





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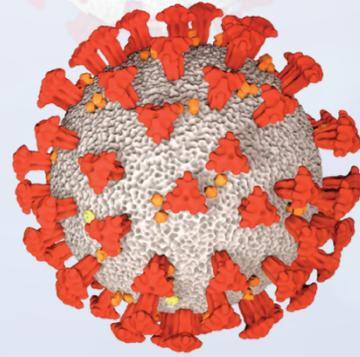
Questions?



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Acknowledgements

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THANK YOU!