

COVID-19
Prevention Network



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COVID-19 Vaccines Update

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What are Vaccines?

Vaccines teach your body to recognize and fight invaders.



Image courtesy of Black Panther | Marvel Studios

How does a vaccine work?

By teaching the body to recognize and fight invaders



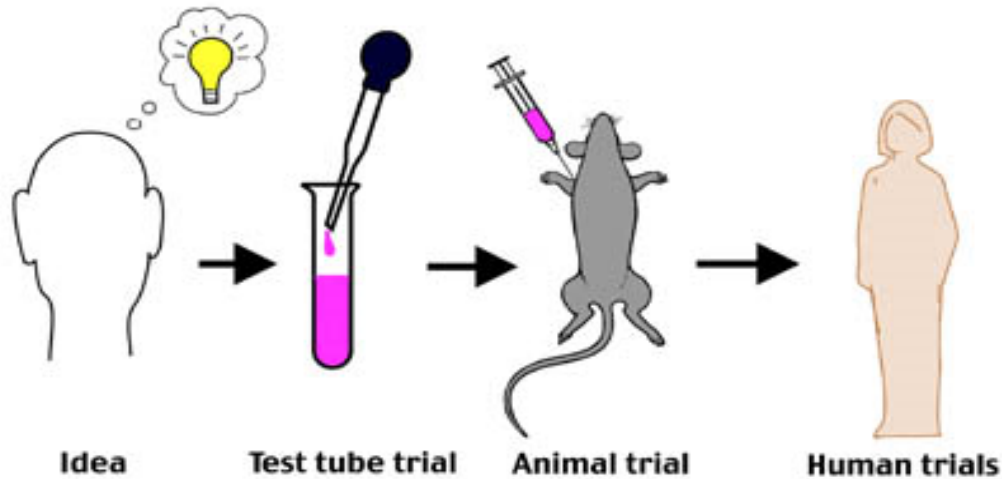
Body recognizes
SARS-CoV-2

Body
sounds alarm

Fighter cells & antibodies
go into action

GOAL: SARS-CoV-2 is
blocked or controlled

Development pathway for vaccines



Phase 3: Randomized, double-blind, placebo-controlled clinical trials

FDA requirement for licensure: **safe & effective**

Phase 1- is it safe?



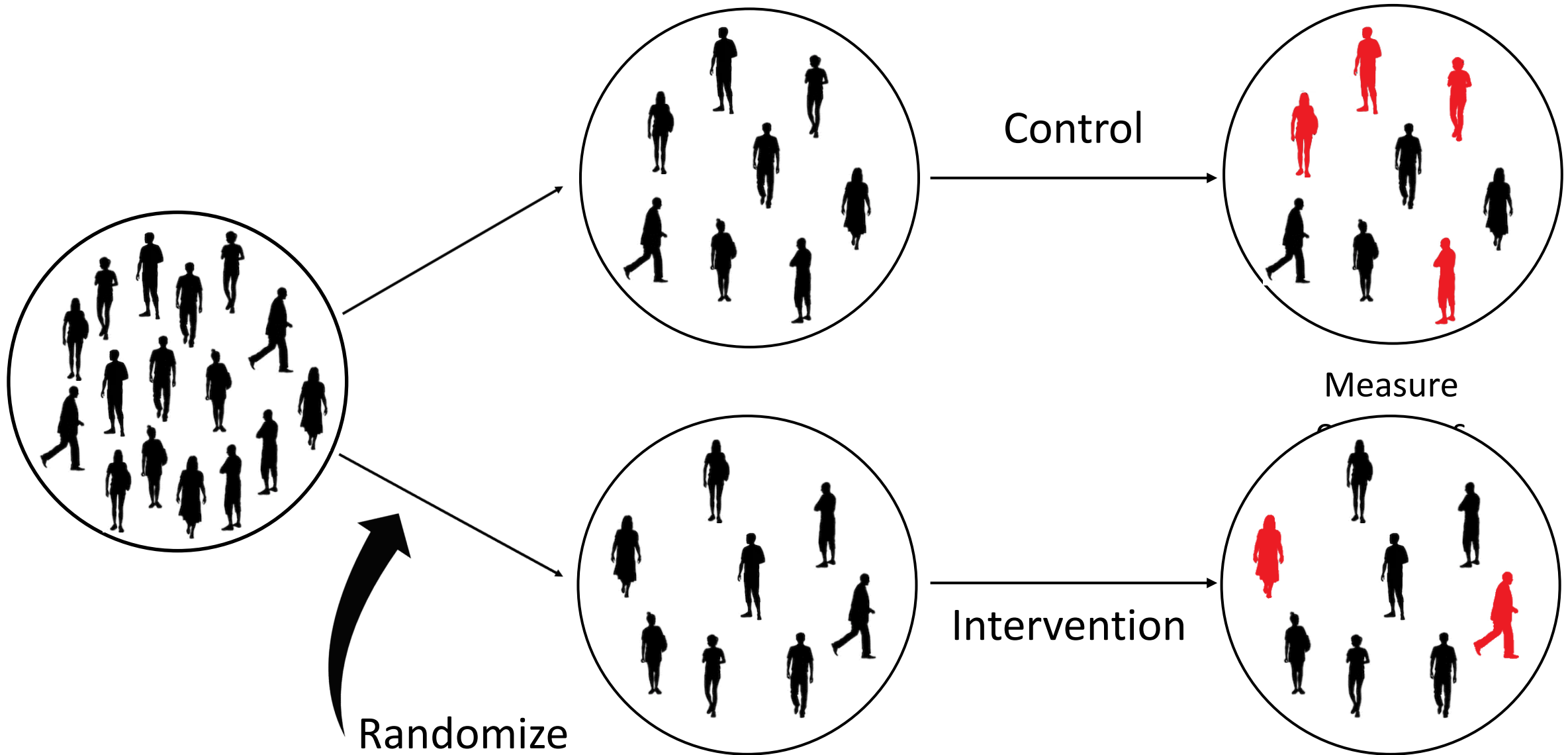
Phase 2- is it immunogenic?



Phase 3- does it protect against disease?

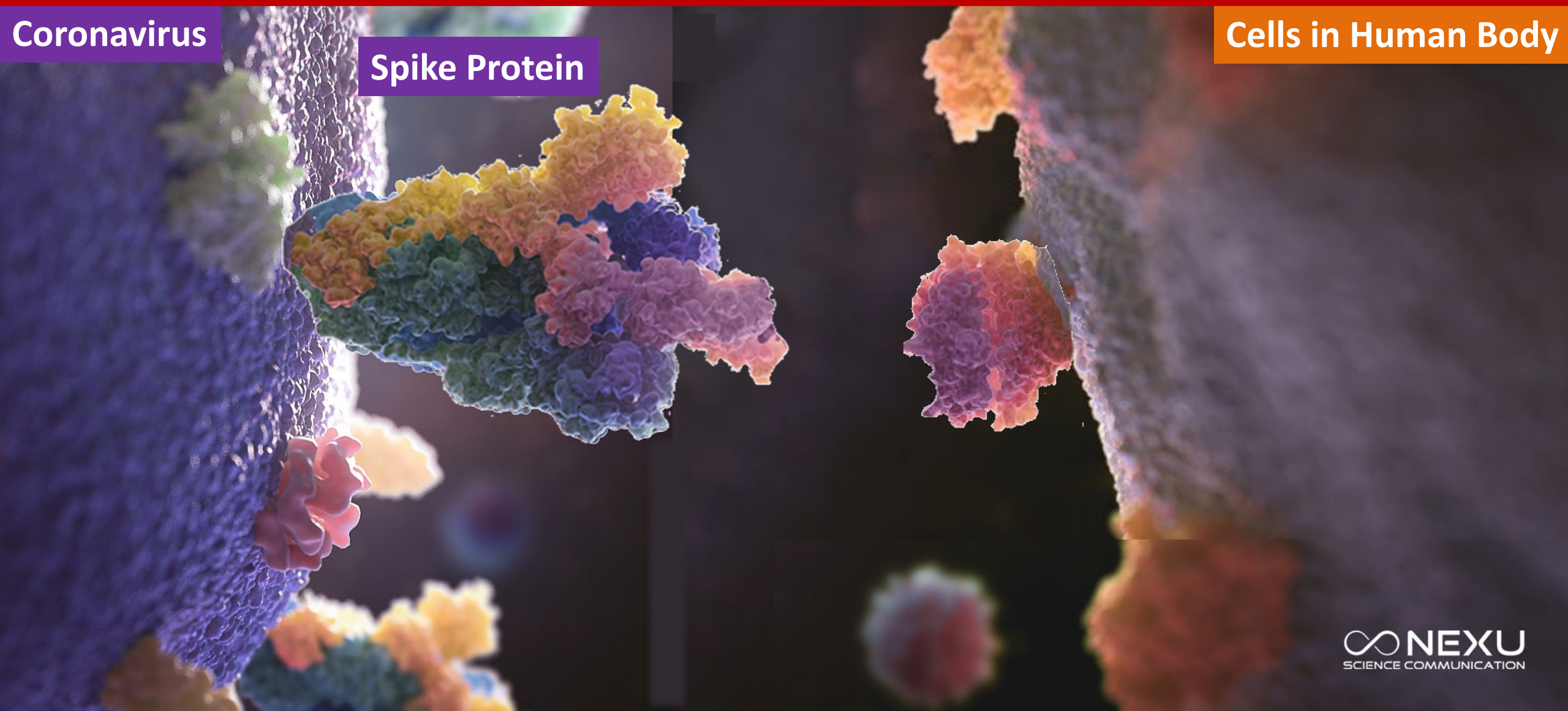


Randomized, double-blind, controlled trials



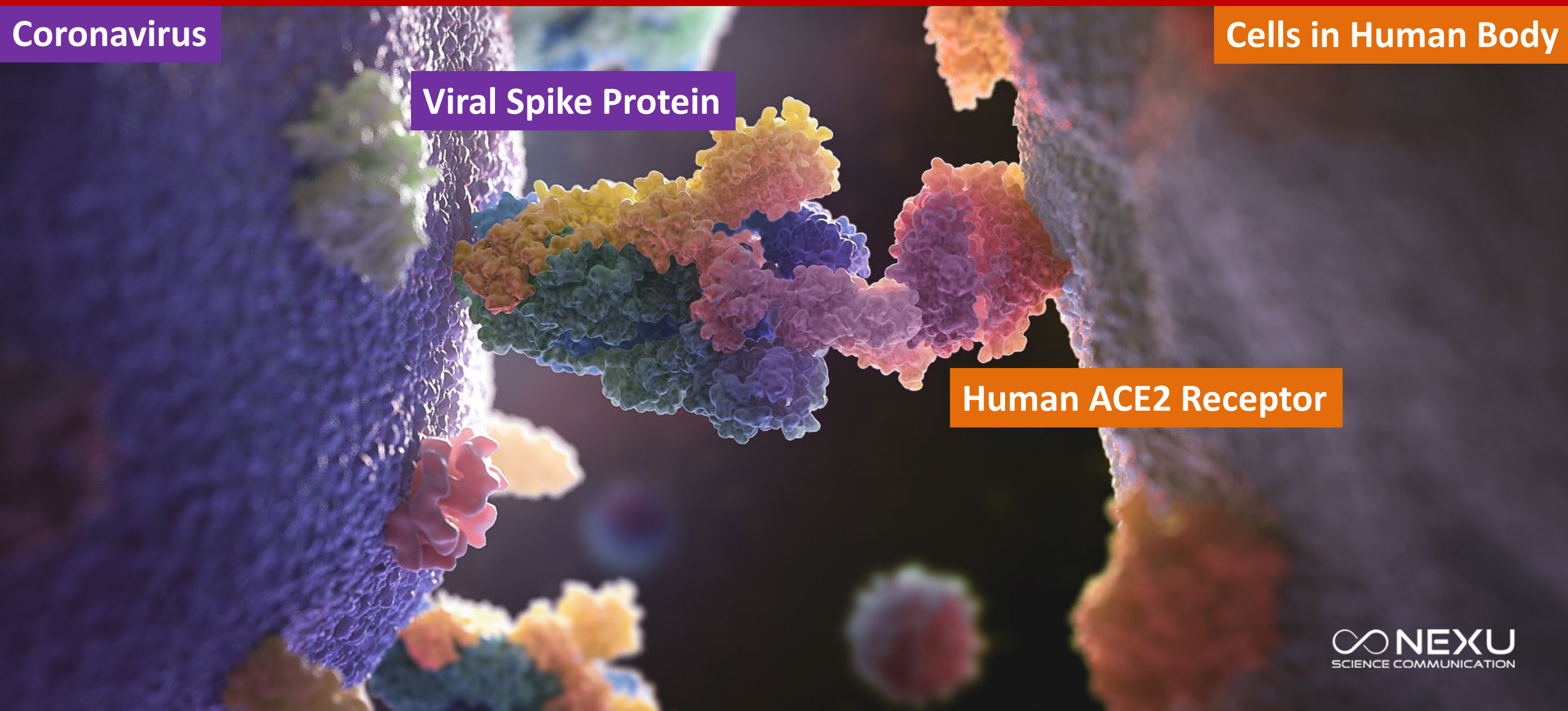
Vaccine Target: Coronavirus Spike Protein

- **Coronavirus spike protein** is on the viral surface; the virus uses the spike to enter human cells, starting infection.
- Ideal vaccines target spike protein to block viral infection.



Vaccine Target: Coronavirus Spike Protein

- Coronavirus spike protein attaches to **ACE2 receptor** on cells to start infection.



Coronavirus

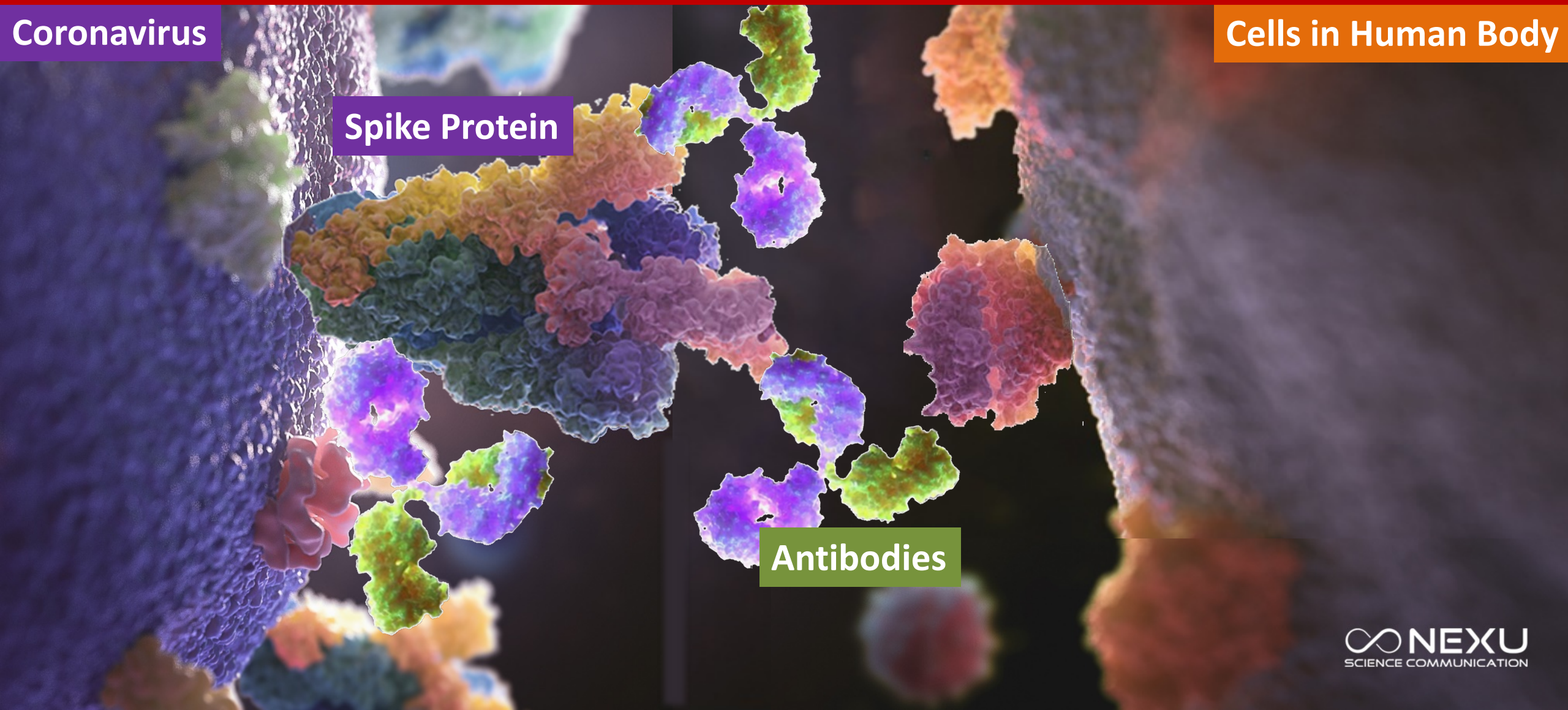
Cells in Human Body

Viral Spike Protein

Human ACE2 Receptor

Vaccines Cause Production of Antibodies

- **Antibodies** are produced after a person gets vaccinated.
- **Antibodies** bind **coronavirus spike protein** to block infection and protect against COVID-19 disease.

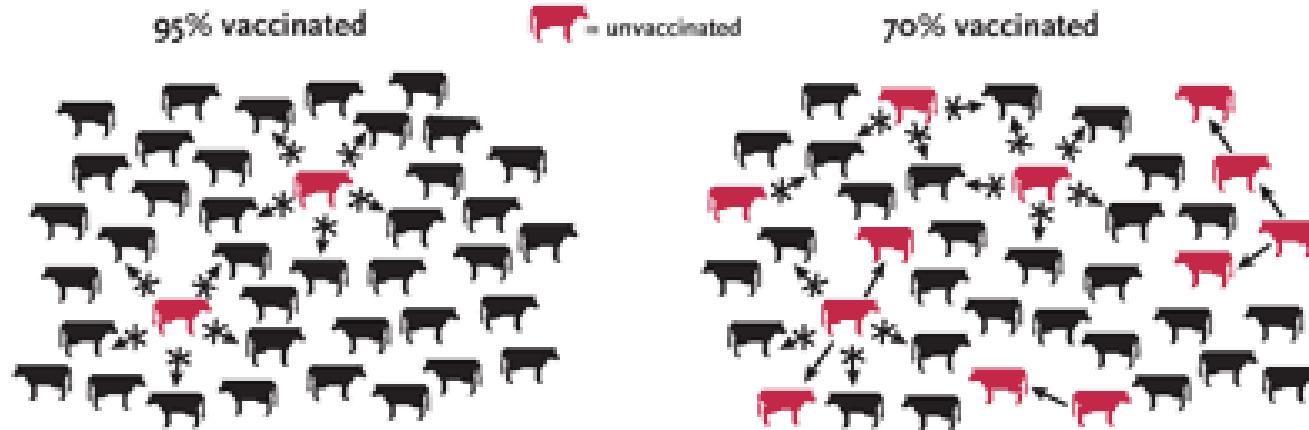


What Might a Preventive Vaccine Do?



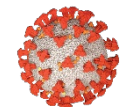
Benefits for the person who gets the vaccine:

- ✓ Prevent infection
- ✓ Prevent disease
- ✓ Delay disease progression



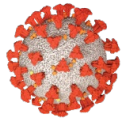
Benefits for the entire community:

- ✓ Prevent further transmission
- ✓ Create “population/community immunity”



We have 3 amazing vaccines under EUA

- **Pfizer, Moderna and J&J vaccines have been examined by the FDA and are approved for use under an Emergency Use Authorization (EUA)**
- **All vaccines went through all 3 phases of clinical trials:**
 - Phase 1: safety – Is it safe in healthy people?
 - Phase 2: is it safe in all types of people? Does it generate immune responses?
 - Phase 3: efficacy – Does it work in a large group of people?
- **All vaccines underwent the most rigorous testing, which is a placebo-controlled randomized blinded trial**
- **Warp Speed: Speed does not mean shortcuts – fast because better funding, less red tape**



Research continues on other vaccines

7 billion people on earth need access to vaccines to end the COVID-19 pandemic... so research continues!

2 other major vaccine trials are underway:

- **AstraZeneca vaccine:** chimpanzee adenovirus vector, some preliminary evidence shows efficacy, trial is fully enrolled (32,000+) and ongoing
- **Novavax vaccine:** protein-adjuvant vaccine, trial underway and will soon be fully enrolled with 30,000 people
- Multiple other vaccines in development using a variety of technologies
- Research in progress/upcoming for children and adolescents, research needed for pregnant persons

What about Variants?

Viral Variants Are Normal

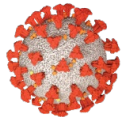
- Viral Variants are expected – all viruses evolve and mutate over time.
- Mutations are more likely to occur as the virus spreads through populations, infecting more people.
- The flu virus is a great example of this.
 - One reason that we need to get a flu shot every year is because the flu virus mutates and there are new strains each year.

The variants in the news are named after the countries where they were first identified. These variants are circulating around the world.

1. Variant first ID'd in UK = increased rates of transmission, hospitalization, and death
2. Variant first ID'd in South Africa = increased rates of transmission. When people have been infected with prior strains and developed immunity to those strains, they appear to still be at risk for the South Africa variant.
3. Variant first ID'd in Brazil = increased rates of transmission

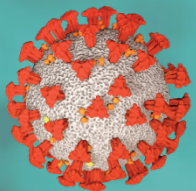
Preventing Infection Is Key

The more people interact and increase the possibility of infection, the more the virus learns how to change (mutate) to escape our immune system's attack.



How will viral mutations affect COVID-19 vaccines?

- **As of March 2021, This Is What We Know**
- Current vaccines work well against the variant first ID'd in UK.
- There seems to be some reduced efficacy for the variant first ID'd in South Africa for Moderna and Pfizer but not J&J
 - The vaccines are still incredibly effective in preventing severe disease (getting hospitalized, put on oxygen, needing a ventilator) and death.
 - This means the vaccines may not prevent you from getting mild symptoms but will prevent severe disease.



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COVID-19 Vaccine Overview: What does the research show?

Slides from: Dr. Alison Roxby
Associate Professor,
University of Washington
COVID-19 Prevention Network



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Were vaccines tested on people like me?

YES!

- Vaccine trials included all adults >18 years of age
- 25% of participants mandated to be >65 years of age
- Study participants included at least 25% of people with high blood pressure, diabetes, HIV, and cancer
- No exclusions for disease or medications, except immune suppression

Exception: the vaccine studies did not include pregnant people

Do these vaccines work for all races/ethnic groups?

YES!

- While there are small biological and genetic differences in the immune systems of people of different backgrounds, there is strong evidence that the vaccines work well for all people, regardless of their genetic background.

What types of reactions have been reported after vaccination?

Common reactions: sore arm, headache, aches, fever, <48 hours

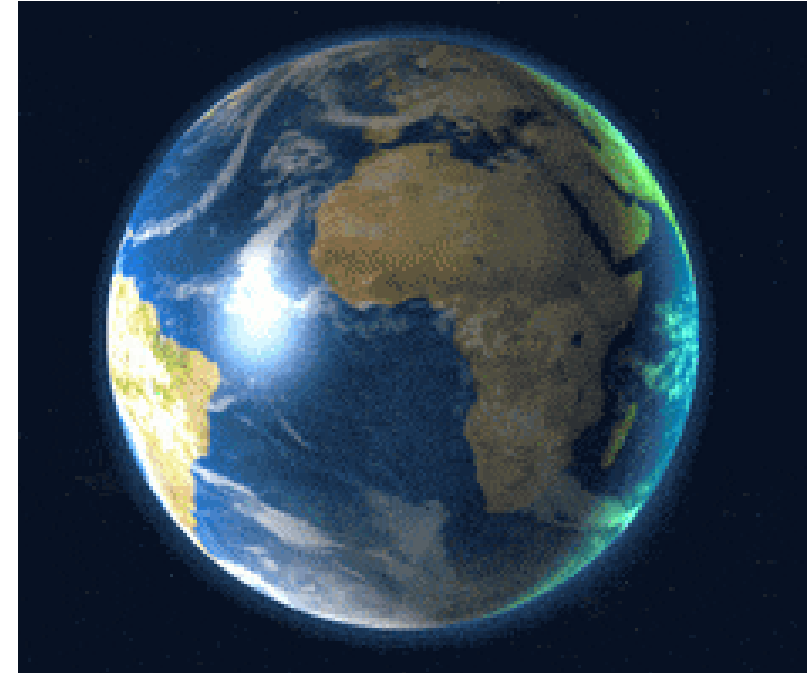
- Similar to reactions after Shingrix and influenza vaccines

Rare reactions:

- anaphylaxis: Pfizer: *21 cases with 2 million doses delivered*
Moderna: *10 cases with 4 million doses delivered*
- Current recommendation: 15 minutes of observation post-injection
- If you have a history of severe allergies or anaphylaxis to a vaccine, recommend discussion with your provider and 30 minutes of observation after receiving the vaccine
- Most people with history of allergies or anaphylaxis have received a vaccine with no issues

Should I get vaccine now, or “wait and see”?

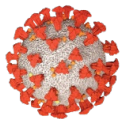
- You are not the first: Greater than 21 million Americans have received these 2 vaccines (63 million globally as of 1/23/2021)
- CDC v-safe and VAERS are monitoring safety
- Last week in the US: 18,400 people died of Covid-19, and cases are rising
- Vaccines take 4-5 weeks to protect you fully (2 doses)
- New COVID-19 strains are more contagious



Does mRNA change your DNA?

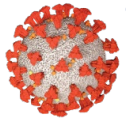
NO!

- mRNA is a signal to your cell. It stays in the outer part of cell and does not enter the nucleus where DNA is located.
- The mRNA in the vaccine is only present in the body for 1-3 days then it degrades, and the immune system is primed.
- Other vaccines do the same thing: material enters your body, but only stays a few days.



We have 3 amazing vaccines under EUA

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- **These vaccines went through all 3 phases of clinical trials:**
 - Phase 1: safety – Is it safe in healthy people?
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? How do mRNA vaccines work?

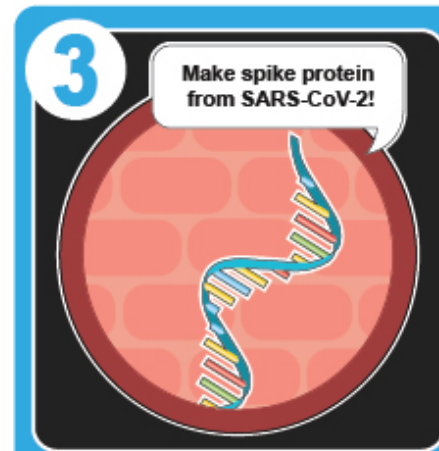
mRNA vaccines give your body the information needed to defend against a virus.



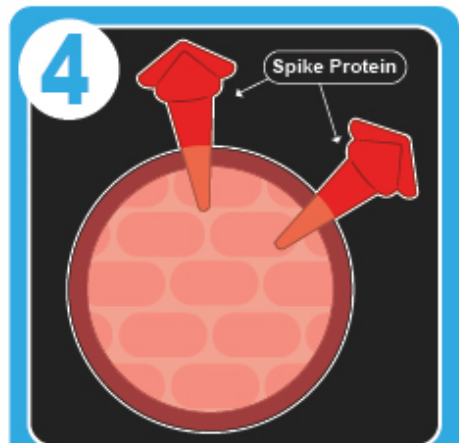
mRNA has instructions for making the spike protein from SARS-CoV-2



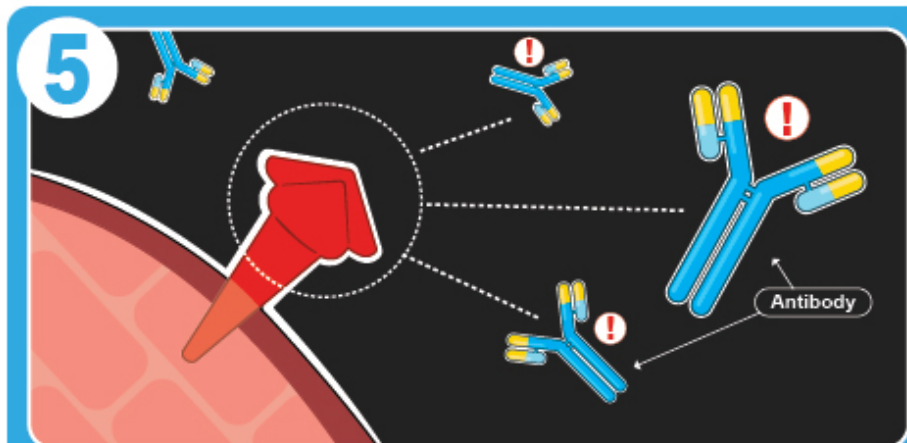
mRNA enters a human muscle cell through an injection



mRNA in the cell delivers the instructions to make the spike protein. It lasts about 24 hours



Cell makes spike protein and displays it on the surface for about 3 days



Immune system sees the spike protein, recognizes it as foreign, and creates an immune response to prevent disease

mRNA doesn't last in your body – it breaks down quickly (within 1-3 days; that's why vaccines need to be stored at very cold temperatures)

mRNA vaccines are not new

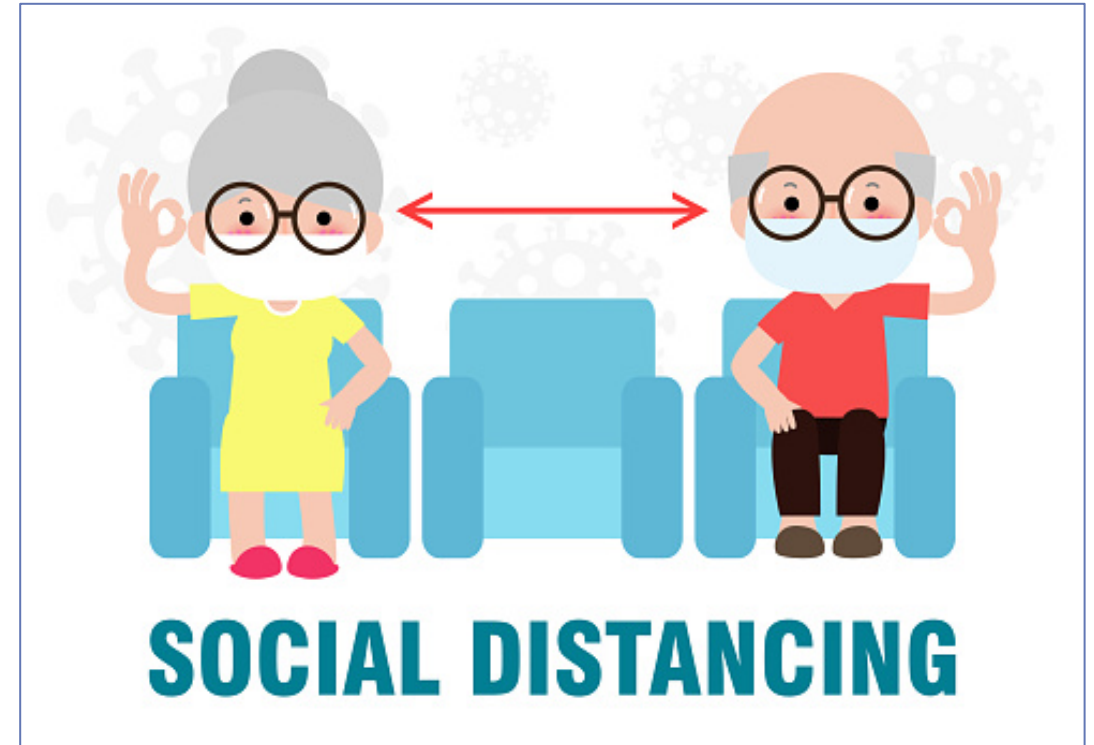
- The National Institutes of Health have been working on mRNA vaccines for 17 years
- This technology has previously been used to make vaccines for other diseases, although the COVID-19 vaccines are the first with FDA EUA.
- It's a technology that allows for rapid development of vaccines – perfect for new diseases like COVID-19.



Dr. Barney Graham and Dr. Kizzmekia Corbett at NIH, researchers who developed the mRNA vaccine
(photo credit NIH Record.nih.gov)

Why do I have to wear a mask after getting immunized against COVID-19?

- The vaccines prevent COVID-19 disease, severe disease, and death
- We do not know if vaccines prevent asymptomatic infection – this was not studied
- Until we know that, we must assume that vaccinated people might get COVID-19 and not know it
- Masks, social distancing, hand washing are still required until we have more information

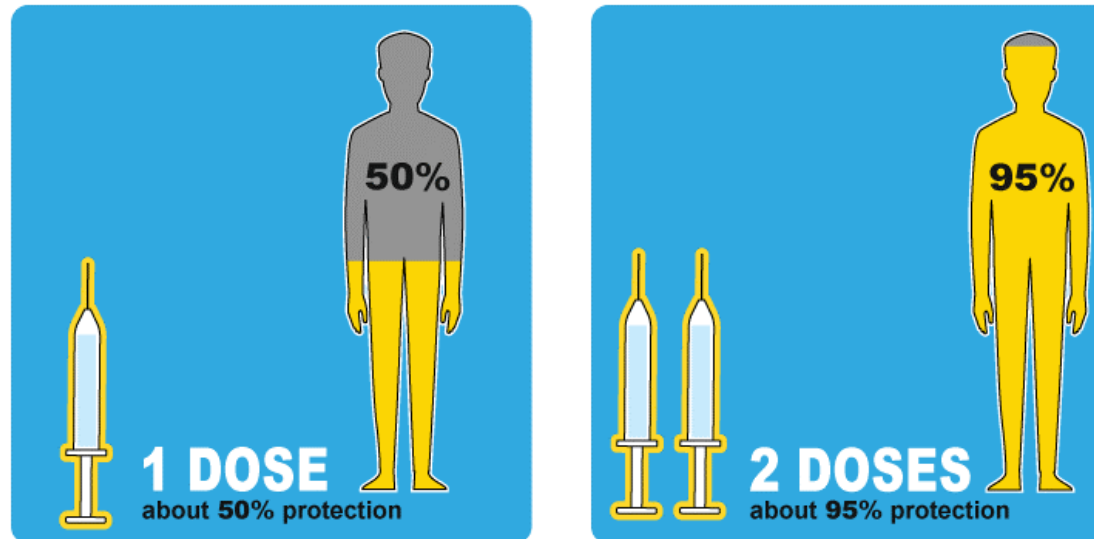


Is one dose of vaccine as effective as two doses?

The data are very clear that for the Pfizer and Moderna vaccines, the best protection from COVID-19 disease happens after the 2nd (booster) dose.

The first dose starts the immune response and the second dose boosts it to make high antibody levels.

? How many doses are needed?
These vaccines require **2 doses** to get the **most benefit**.



How long does vaccine immunity to COVID-19 last?

- *We don't know.* COVID-19 is a brand-new human disease, and we will need more time to determine how long vaccine responses last.

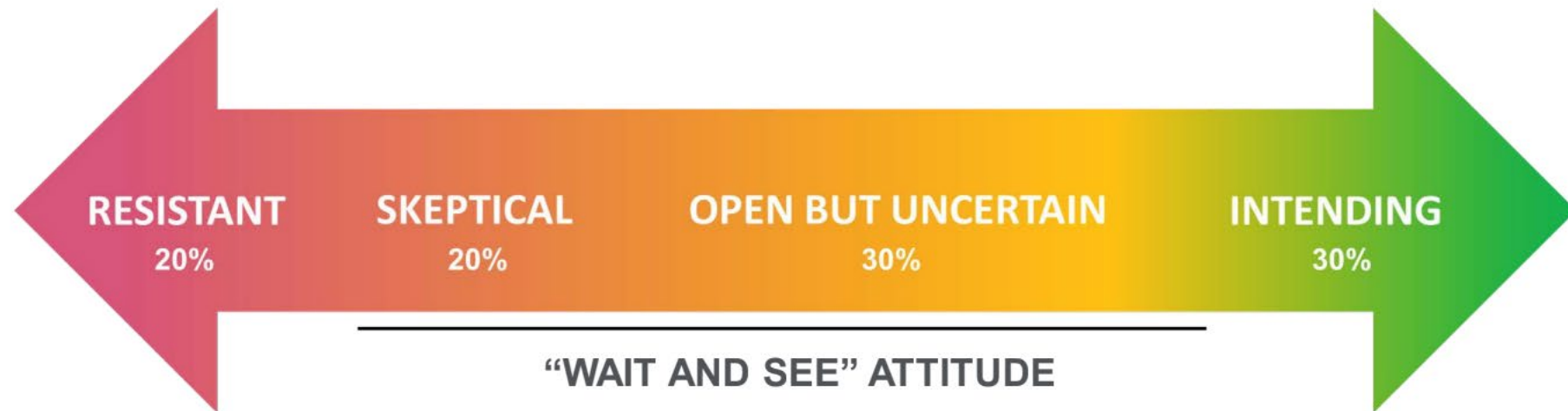
Addressing Vaccine Hesitancy



Understanding Current Attitudes about Vaccination

Ad Council/Ipsos National Survey Adults 18+ Dec 15-21, 2020

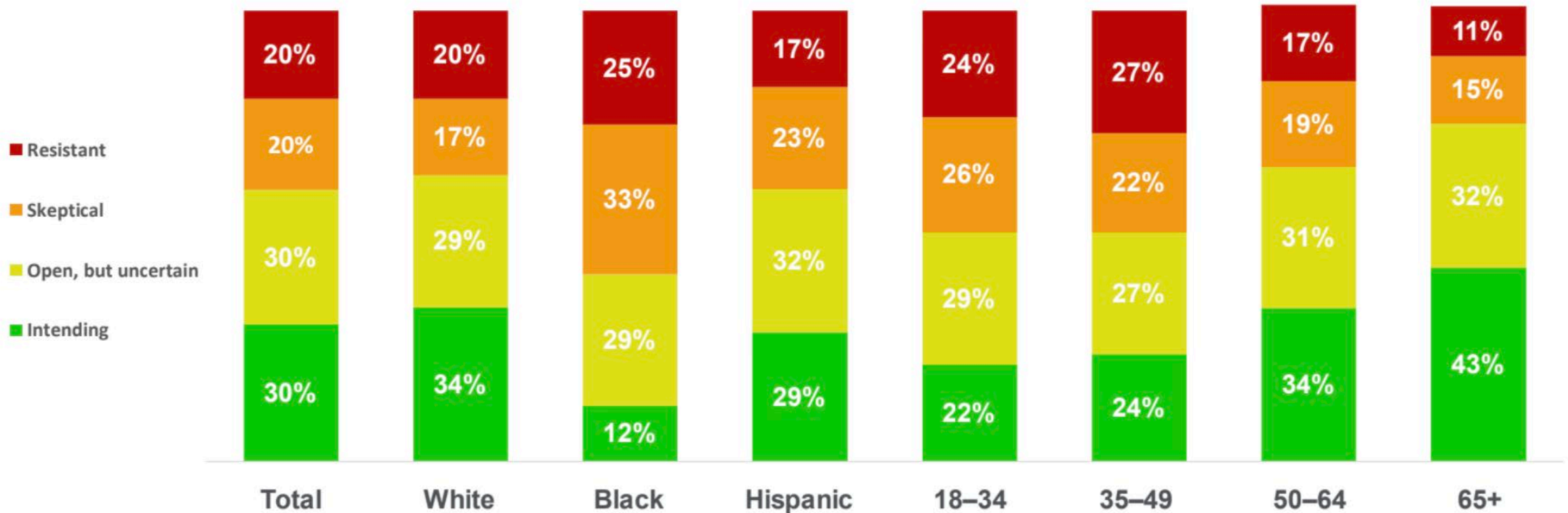
COVID-19 VACCINE DEMAND CONTINUUM



Vaccine Intent is Lowest Among Black and Young Adults

Ad Council/Ipsos National Survey Adults 18+ Dec 15-21, 2020

COVID-19 Vaccination Intent



Reasons for Vaccine Hesitancy

- 1. Questions and concerns about benefits, safety and side effects**
- 2. Concerns about speed of development process and representation of people “like me”**
- 3. Distrust in political and economic motivations of the government and companies involved**
- 4. Established and new conspiracy theories about vaccines and COVID-19**

Medical Racism

- Systematic and wide-spread racism against communities of color within the medical system. This includes cultural and societal instances of racism that makes communities of color less healthy, the resulting health disparities, and the biases held by healthcare professionals against communities of color.
- Legacy of distrust; historical abuses (Lacks, USPHS, NC eugenics)
- Historic abuses are critical factors that contribute to vaccine hesitancy culturally; current and everyday experiences of medical racism contribute directly and more
- To respond effectively, message and messenger matters...

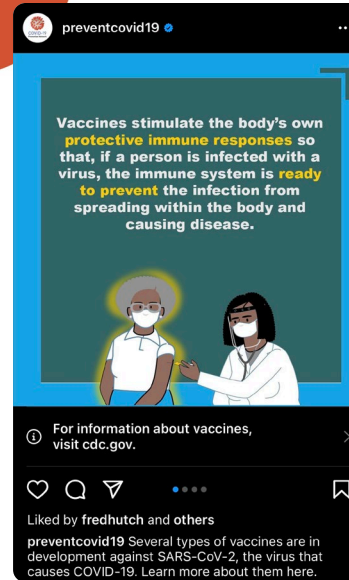
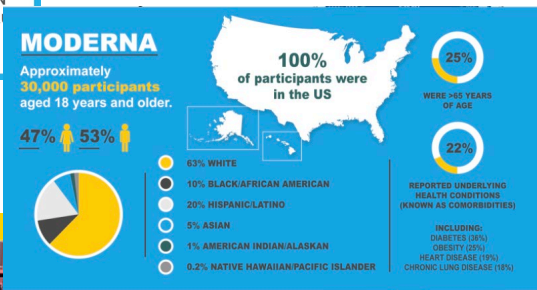
Materials in English & Spanish on Dropbox at this link:

tinyurl.com/y2ueyqrx

Animations, Infographics,
Ask An Expert

Slide Sets
Social Media posts

Educational Videos



Follow Us Online, PreventCOVID.org

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tinyurl.com/y2ueyqrx

Infographics

COVID-19 VACCINES: WHAT DO THEY DO?

Many people believe that the vaccines that receive Emergency Use Authorization (EUA) will prevent people from getting infected with coronavirus. We don't know yet if that is true. The results show that these vaccines are really good at preventing an infection from turning into severe COVID-19 disease.

Even if you get a COVID-19 vaccine, you might still get a coronavirus infection.

WHAT DO WE KNOW?

WHAT A COVID-19 VACCINE CAN DO FOR YOU:



- Protect you against getting severe COVID-19
- Protect you against hospitalization and death

WHAT YOU MUST DO TO CONTINUE TO PROTECT YOURSELF & OTHERS



- Masks, hand washing, and physical distancing help to protect you against getting infected.
- They also help to prevent spreading COVID-19 to other people.
- Until we know whether the vaccines protect against infection, these guidelines are still important.

Messenger RNA (mRNA) Vaccines

HOW DO THEY WORK?

How do mRNA vaccines work?

mRNA vaccines give your body the information needed to defend against a virus.

- mRNA has instructions for making the spike protein from SARS-CoV-2.
- mRNA enters a human muscle cell through an injection.
- mRNA in the cell delivers the instructions to make the spike protein. It lasts about 24 hours.
- Cell makes spike protein and displays it on the surface for about 3 days.
- Immune system sees the spike protein, recognizes it as foreign, and creates an immune response to prevent disease.

Population Immunity & COVID-19 Vaccines

Can a COVID-19 vaccine create population immunity (herd immunity)?

We don't know yet. Studies show that the vaccines prevent severe COVID-19 disease, but we need more time to find out if they also prevent infection with or transmission of coronavirus.

How population immunity works with other vaccines that prevent infection:

not immunized, but still healthy

immunized, and healthy

not immunized, sick, and contagious

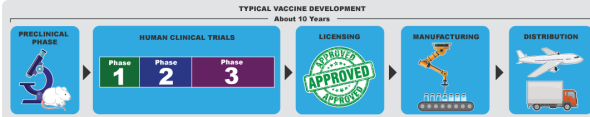
If no one is immunized, contagious disease spreads through the population.

COVID-19 Vaccines: HOW DID WE GET THEM SO FAST?

Normally, vaccine development takes so long because of **limited resources** and the **time** it takes to prepare for and obtain funding to do the next phase.

TYPICAL VACCINE DEVELOPMENT

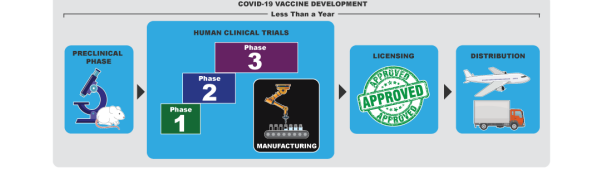
About 10 Years



In the search for a COVID-19 vaccine or antibody we're **not cutting any corners** or **skipping any steps**. We are **overlapping** some of the steps instead of doing them one after the other.

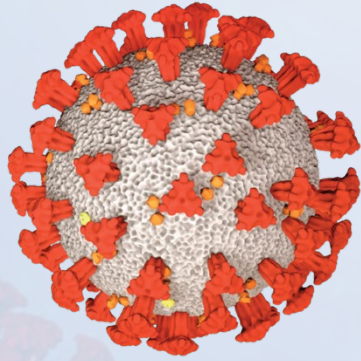
COVID-19 VACCINE DEVELOPMENT

Less Than a Year



With funding from the U.S. government, these COVID-19 vaccines began getting manufactured in large quantities **while** the phase 3 trials were being conducted. This manufacturing was a **risk**, because we didn't yet know if the vaccines were effective. This risk was taken because of the public health crisis. **If the studies show the vaccines are not effective, they will be destroyed.** At every stage of the vaccine development process **our primary concern is the safety of the public.**

Including: COVID-19 Vaccines: What Do They Do?, Messenger RNA Vaccines, Population Immunity & COVID-19 Vaccines, and COVID-19 Vaccines: How Did We Get Them So Fast?



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