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BLOOD & MARROW TRANSPLANT INFORMATION NETWORK

# COVID-19: What Transplant Patients Need to Know

April 17- 23, 2021

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University of Utah

Celebrating a Second Chance at Life Survivorship Symposium

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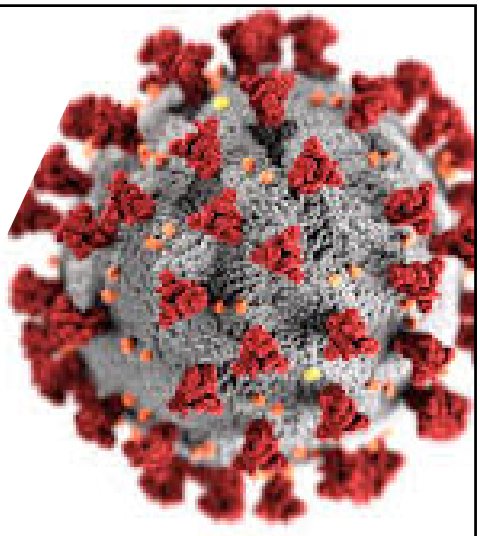
# COVID-19: What Transplant Survivors Need to Know



Celebrating a Second Chance at Life
Virtual Survivorship Symposium
Sunday, April 18, 2021

Erica Stohs, MD, MPH & Hannah Imlay, MD, MS

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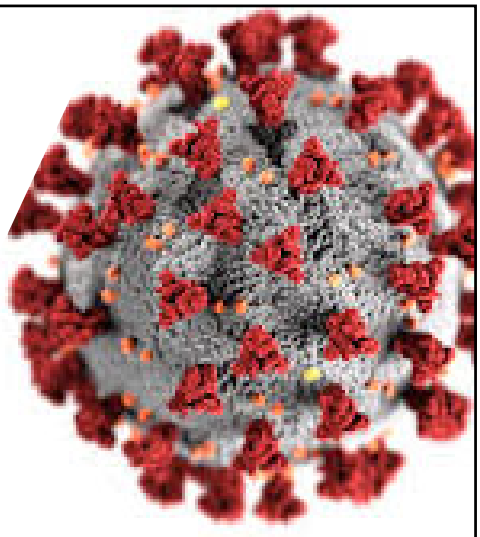
# Disclosures



Erica Stohs:

- Site investigator for Novavax COVID-19 vaccine trial

Hannah Imlay:

- Site investigator on trials for remdesivir (Gilead)

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## Outline

- COVID-19 Overview
- How COVID-19 spreads
- Symptoms and Treatment
- Prevention
  - Masks
  - Variants
  - Vaccines

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## What is COVID-19?

- Respiratory virus SARS-CoV-2
- More contagious than influenza
- Symptoms can be mild to severe
- Onset occurs 2-14 days after exposure
- Affects adults more than children
- Those with underlying medical conditions are at higher risk of serious complications

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## COVID-19 in Cancer

- Having cancer
  - Increased risk for severe illness
  - Increased need for hospitalization, ICU care and death
  - Depends on age & other medical conditions
- Cancer in remission
  - Unclear if it changes risk for severe illness
  - Depends on underlying immune compromise, age and comorbidities

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## Early Studies of COVID-19 and Cancer

- Blood cancers (acute leukemia or non-Hodgkin lymphoma) have higher risk for severe illness compared to solid cancers
- Immunotherapy, hormonal therapy or radiotherapy did not change risk for severe illness
- Chemotherapy within 1 month of COVID-19 showed mixed results
  - Routine COVID-19 testing before chemotherapy is common

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## Symptoms of COVID-19

- Fever or chills
- Cough
- Shortness of breath
- Difficulty breathing
- New loss of smell
- Headache
- Sore throat
- Vomiting for diarrhea
- Muscle aches

**Emergency Warning Signs**:
- Trouble breathing
- Turning blue, grey or pale
- Persistent chest pain or pressure
- New confusion
- Trouble waking/staying awake

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**Seek medical care immediately!**

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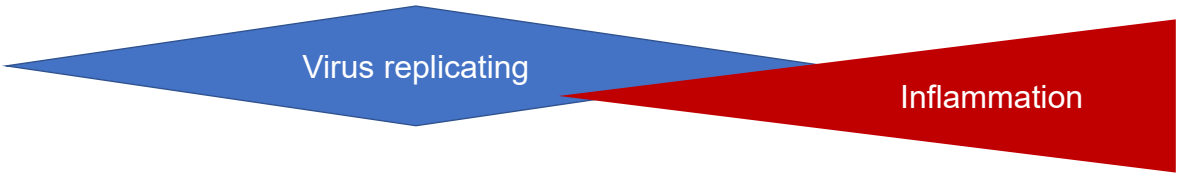
# A bad case of COVID-19

Asymptomatic/ Presymptomatic

Mild/Moderate:
- Fevers
- Chills
- Cough
- Change in taste/smell

Severe:
- Pneumonia
- Shortness of breath
- Need oxygen

Critical Illness:
- Need for life support




RT Gandhi et al. N Engl J Med 2020;383:1757-1766.

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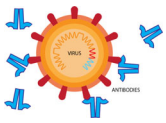
# Can COVID-19 be treated?

| Widely used therapies: | How? | When might it help? |
|---|---|---|
| Monoclonal antibodies<br>- Regeneron: casirivimab + imdevimab<br>- Eli Lilly: bamlanivimab + etesevimab |  | Early, before hospitalization<br>?Prevention after exposure |
| Remdesivir | Blocks RNA | Early in severe disease |
| Dexamethasone | Blocks inflammation | Severe disease |

- Some things used in very select scenarios: convalescent plasma, baricitinib, tocilizumab
- Many things that have not yet shown benefit: hydroxychloroquine, lopinavir, ivermectin, vitamin D, azithromycin, etc.

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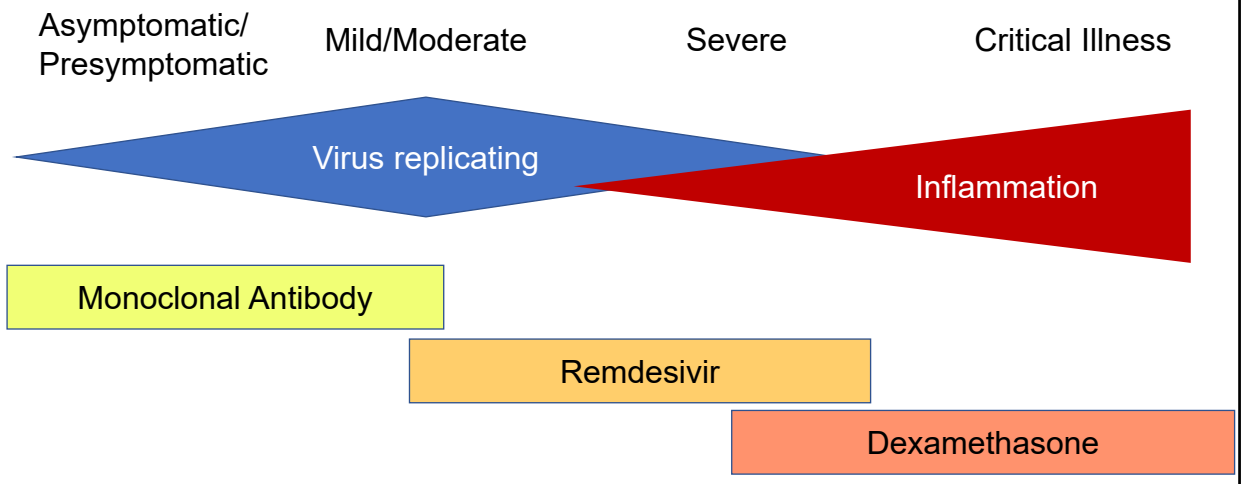
## A bad case of COVID-19




RT Gandhi et al. N Engl J Med 2020;383:1757-1766.

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## Prevention is key

- Masking, distancing, handwashing, etc
- Vaccination
  - Multiple vaccines now available

**How does the spread of variant SARS-CoV-2 change these strategies?**

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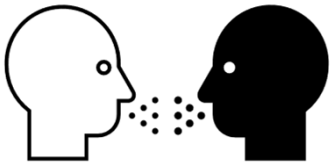
## How COVID-19 spreads

- Close contact with someone who is infected
  - Breathe in respiratory droplets or aerosols
  - Touch droplets, then touch your nose, mouth or eyes
- Poor ventilation
- Crowds



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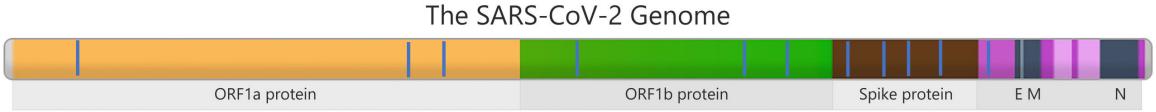
## What are novel variants?




- Mutations of the virus occur gradually
- "Variant of concern"

| Variant | Reported Cases in the US (April 15, 2021) | Number of Jurisdictions Reporting |
|---|---|---|
| B.1.1.7 | 20915 | 52 |
| B.1.351 | 453 | 36 |
| P.1 | 497 | 31 |

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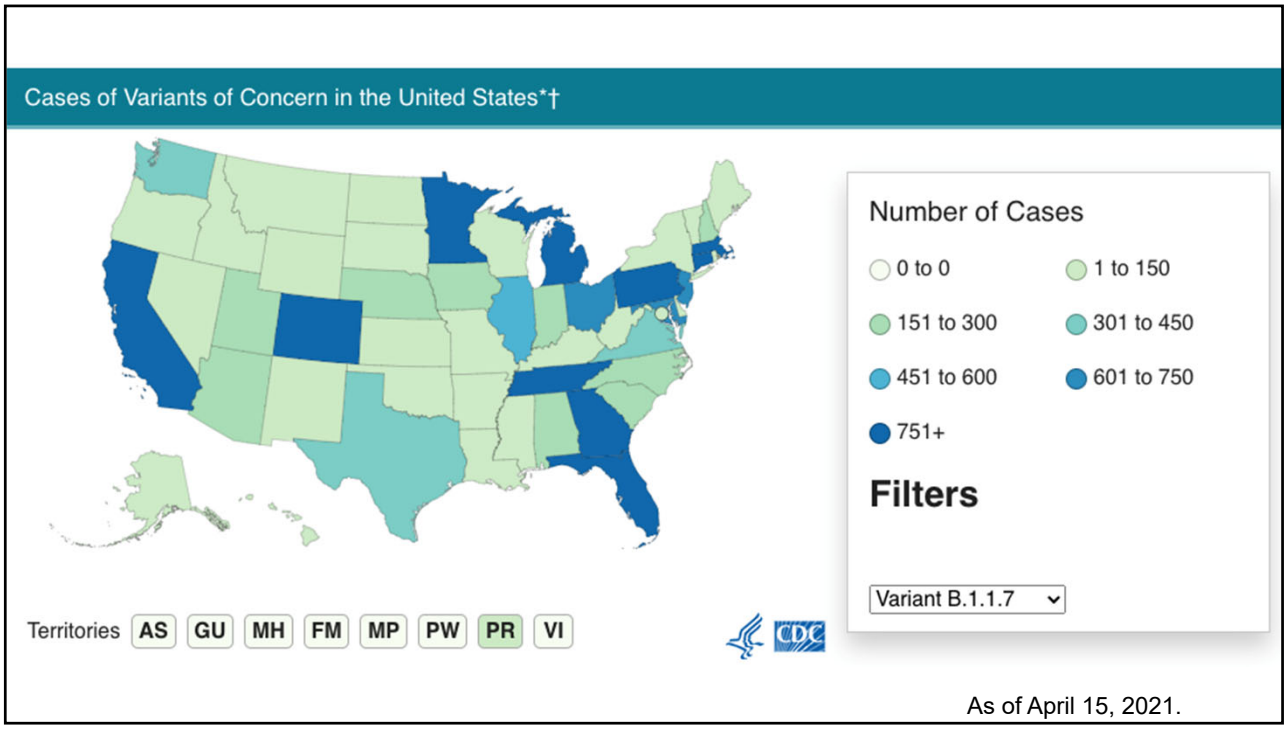


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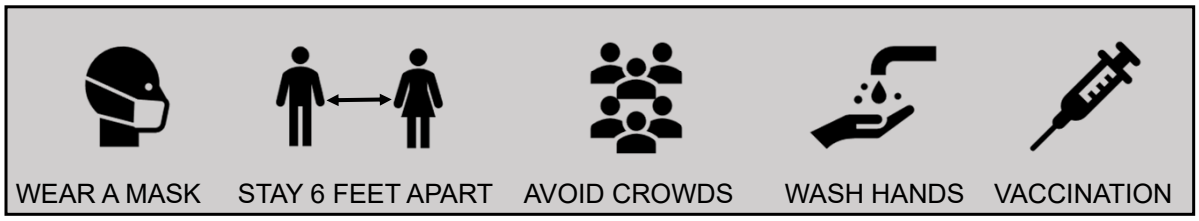
## How to prevent transmission




## When to use masks

- In public
- When traveling
- Visitors
- Someone at home has or could be sick with COVID-19

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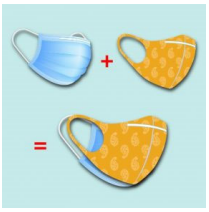
## Which mask is best?

Fit and Filtration

- Should cover nose & mouth
- Fit snugly against the sides of the face without gaps
- Nose wire can improve fit
- Double masking can improve fit & filtration
- No valves



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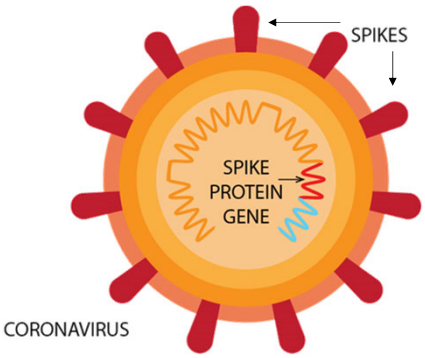
## Goals of a vaccine

- Train immune system to recognize parts of a virus
  - Bonus points if it's a part of a virus crucial for the virus replicating

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## Current COVID-19 vaccines

| Vaccine | Type | Authorized in the US? |
|---|---|---|
| Pfizer BioNTech | mRNA | Yes |
| Moderna | mRNA | Yes |
| Johnson+Johnson | Adenovirus vector | Yes |
| Astra Zeneca | Adenovirus vector | Not yet |
| Novavax | Protein subunit | Not yet |

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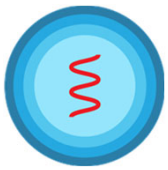
## mRNA vaccines

**Pfizer/BioNTech**
**Moderna**

- mRNA = messenger RNA
  - This is usually what our DNA makes as the first step in making protein
- Like an email telling your cells how to make spike protein



- Vaccine made up of:
  - mRNA
  - Surrounded by an oily coating

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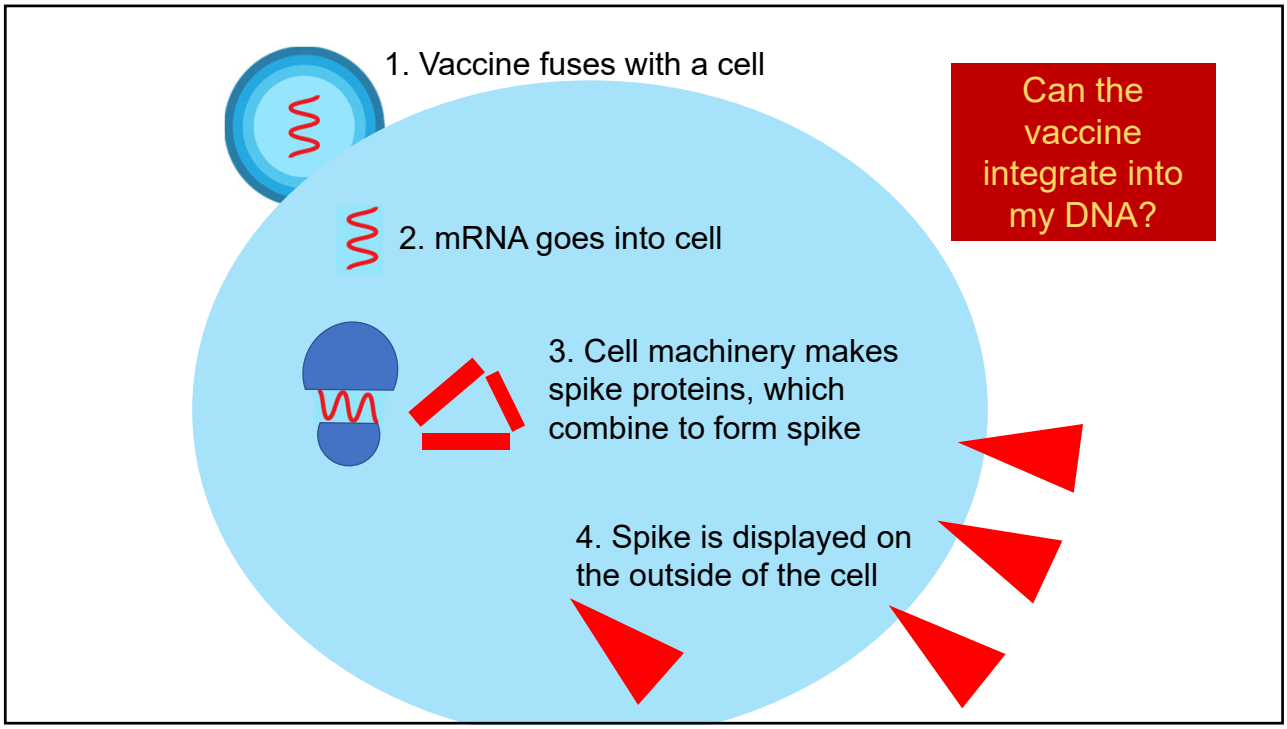
1. Vaccine fuses with a cell
Can the vaccine integrate into my DNA?
2. mRNA goes into cell
3. Cell machinery makes spike proteins, which combine to form spike
4. Spike is displayed on the outside of the cell

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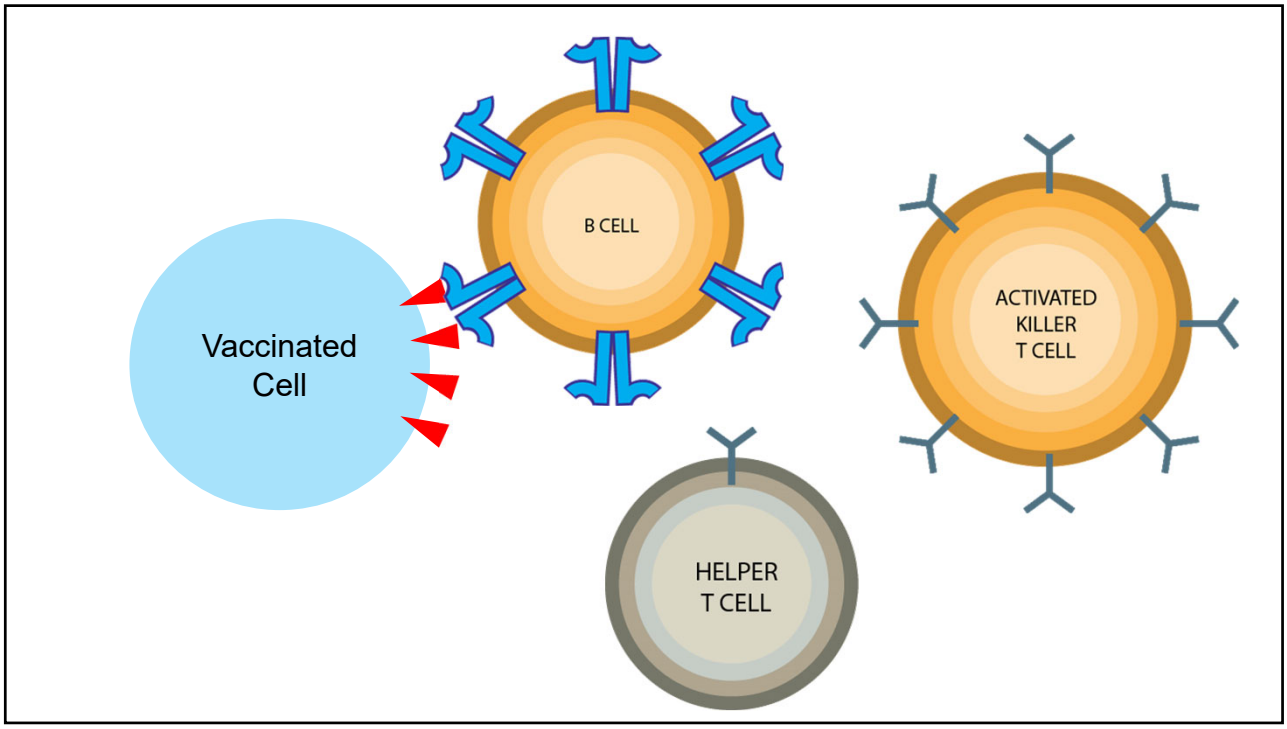
B CELL
Vaccinated Cell
ACTIVATED KILLER T CELL
HELPER T CELL

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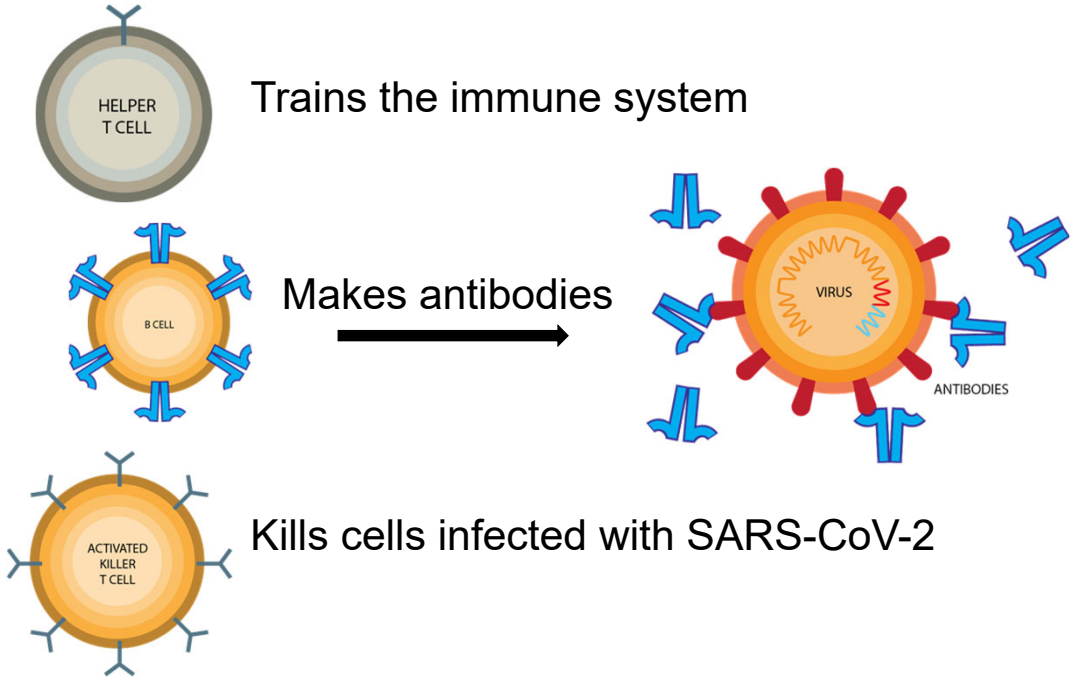


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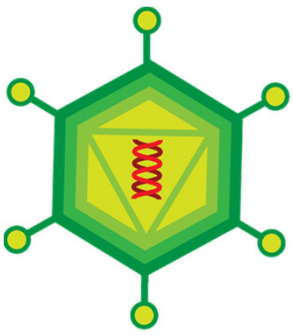
## Adenovirus vector vaccines

Johnson+Johnson
Astra Zeneca

- DNA encoding for SARS-CoV-2 spike protein, packaged inside an Adenovirus
- The Adenovirus is not infectious—it can only inject spike protein DNA, not infect a cell or make more Adenovirus



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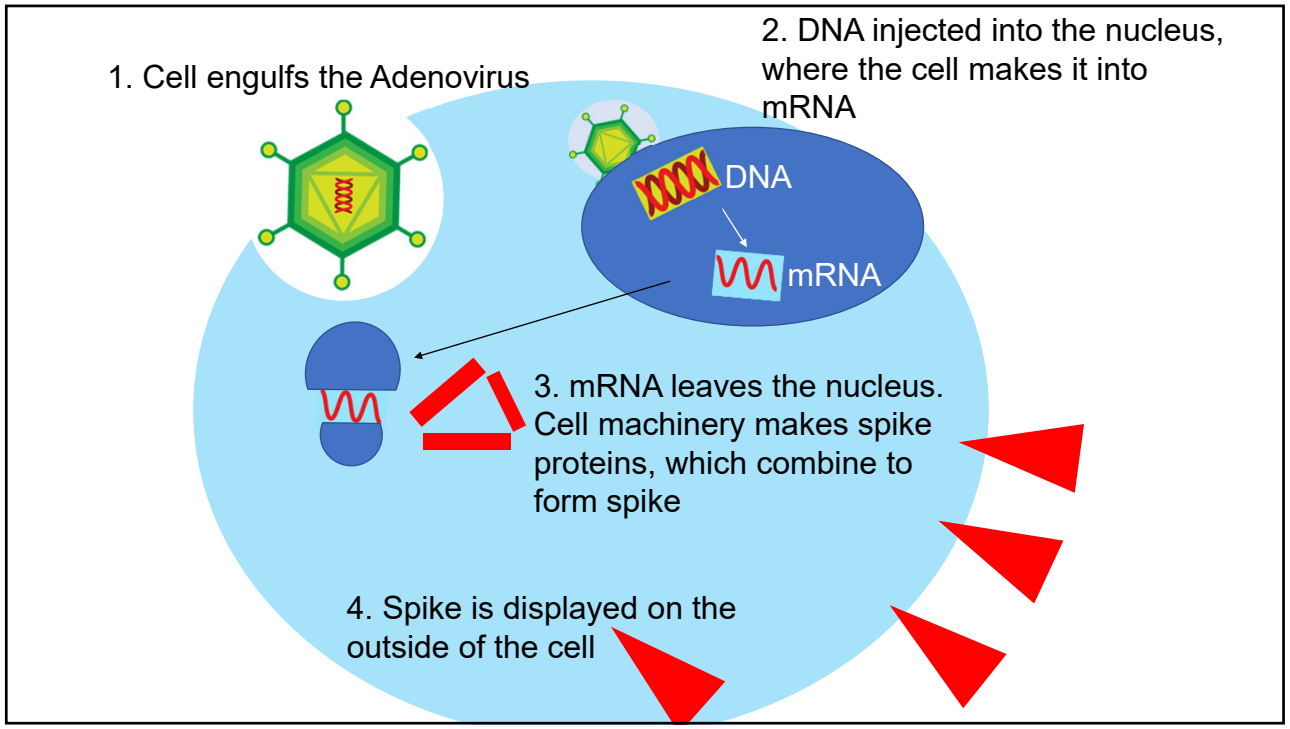
1. Cell engulfs the Adenovirus
2. DNA injected into the nucleus, where the cell makes it into mRNA
DNA
mRNA
3. mRNA leaves the nucleus. Cell machinery makes spike proteins, which combine to form spike
4. Spike is displayed on the outside of the cell

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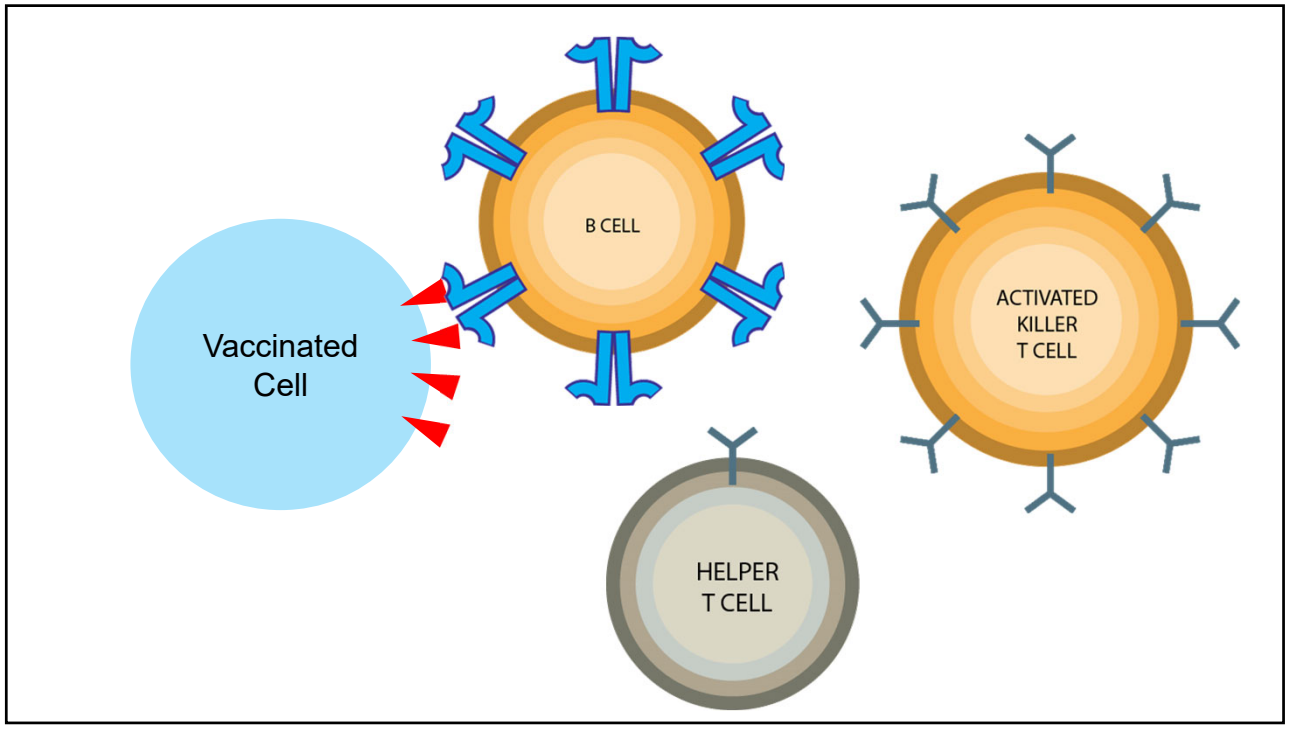
Vaccinated Cell
B CELL
ACTIVATED KILLER T CELL
HELPER T CELL

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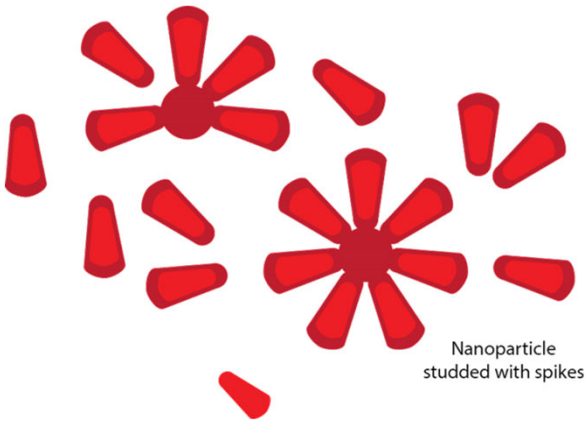
## Protein subunit vaccines

**Novavax**

- Spike proteins connected together by a nanoparticle

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## How well do the vaccines do against COVID-19?

| | Type | Doses | Prevents any COVID? | Prevents severe COVID? | Prevents mortality? |
|---|---|---|---|---|---|
| Pfizer BioNTech (16+) | mRNA | 2 | 91% | 100% | 100% |
| Moderna (18+) | mRNA | 2 | 90% | 95% | 100% |
| Johnson+Johnson (18+) | Adenovirus vector | 1 | 67%[a] | 84% | 100% |

[a]74% among patients in the United States

Is the J+J vaccine worse than the Pfizer or Moderna?

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## What about variants?

| Variant | Any vaccines tested against the strain? | How good was protection? |
|---|---|---|
| B.1.1.7 | Novavax, A-Z | Protection similar |
| B.1.351 | Novavax, J+J, A-Z, Pfizer | Novavax: 60%<br>J+J: 64%<br>A-Z: low efficacy<br>Pfizer:100% but small |
| P.1 | J+J | 68% |

Missing: Moderna

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## How well does vaccination work among stem cell recipients?

Very few patients on immunosuppression enrolled in any vaccine trials.

Potential concerns specific to stem cell recipients:

- Safety
- Efficacy

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## Safety:

The vaccines were produced very quickly. Should I be worried that they haven't been tested enough?

- Theoretical risk of immune reactions
- Other side effects probably similar to the general population:
  - Headache
  - Muscle pain (myalgia)
  - Fevers/chills
- Long term side effects being tracked by CDC and FDA
  - Rare acute allergic reaction (anaphylaxis) identified as a possible side effect (2-5 cases per million)
  - J+J: 6 cases of blood clots → distribution on hold

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## Efficacy:

If I've already had COVID-19, I don't need a vaccine, do I?

- Lower likelihood that patients with history of stem cell transplant will respond
- Patients with recent stem cell transplant, on GVHD meds, or on immunotherapy may need to delay until a better time
  - All patients with history of stem cell transplant should discuss with their transplant doctor
- Caregivers/family members should be immunized when they can be
- Can you tell whether I've responded to vaccine?

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## CDC: What can I do once I'm vaccinated?

You can:

- gather indoors with fully vaccinated people without a mask
- gather indoors with unvaccinated people from one other household without masks
  - UNLESS any of those people has increased risk of severe illness
- If you have been exposed to COVID-19 you don't need to quarantine or get tested unless you are symptomatic
- Travel domestically

cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html

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## CDC: What should I do after vaccination?

After being vaccinated you still need to:

- Mask in public
- Mask or avoid multi-household gatherings

cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html

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## NCCN: What can I do once I'm vaccinated?

- "Data on efficacy of these vaccines in cancer patients remains unknown"
- Continued vigilance after vaccination:
  - Patients and close contacts should still wear masks
  - Maintain social distancing
  - Avoid crowds
  - Family circle should be vaccinated as early as possible
- More studies on vaccine efficacy, use of boosters, re-vaccination, are coming

Nccn.org/covid-19/pdf/COVID-19_Vaccination_Guidance_V2.0.pdf

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## Summary

- COVID-19 remains a major threat, especially among immunocompromised patients
- Can result in life-threatening respiratory infection
- Prevention is the key to control
- Masking, distancing are cornerstone
- Vaccination important
  - Efficacy unknown among immunocompromised patients, but likely lower then general population
  - Contacts should get vaccinated

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# Questions?

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