


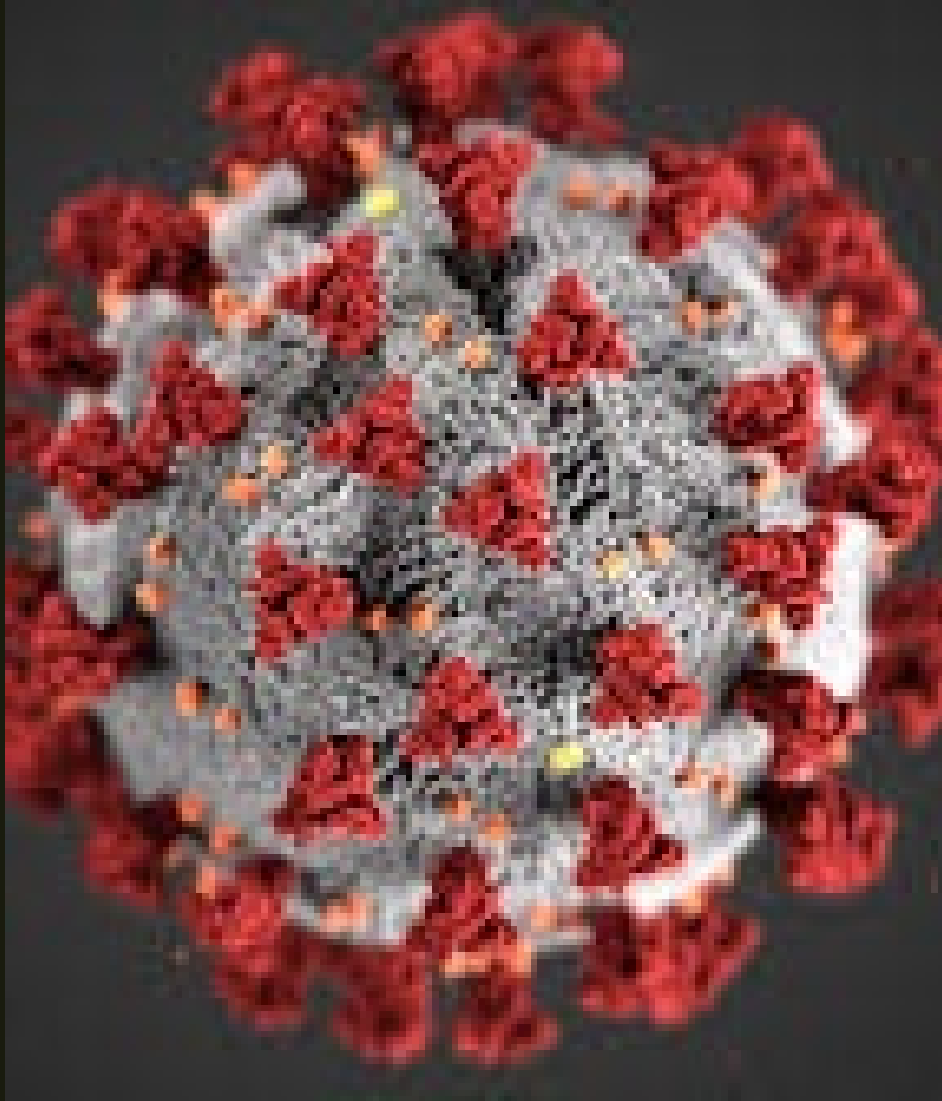


COVID-19 VACCINES

December 16th Northern Inyo Healthcare District Board of
Directors Meeting

Will Timbers, MD

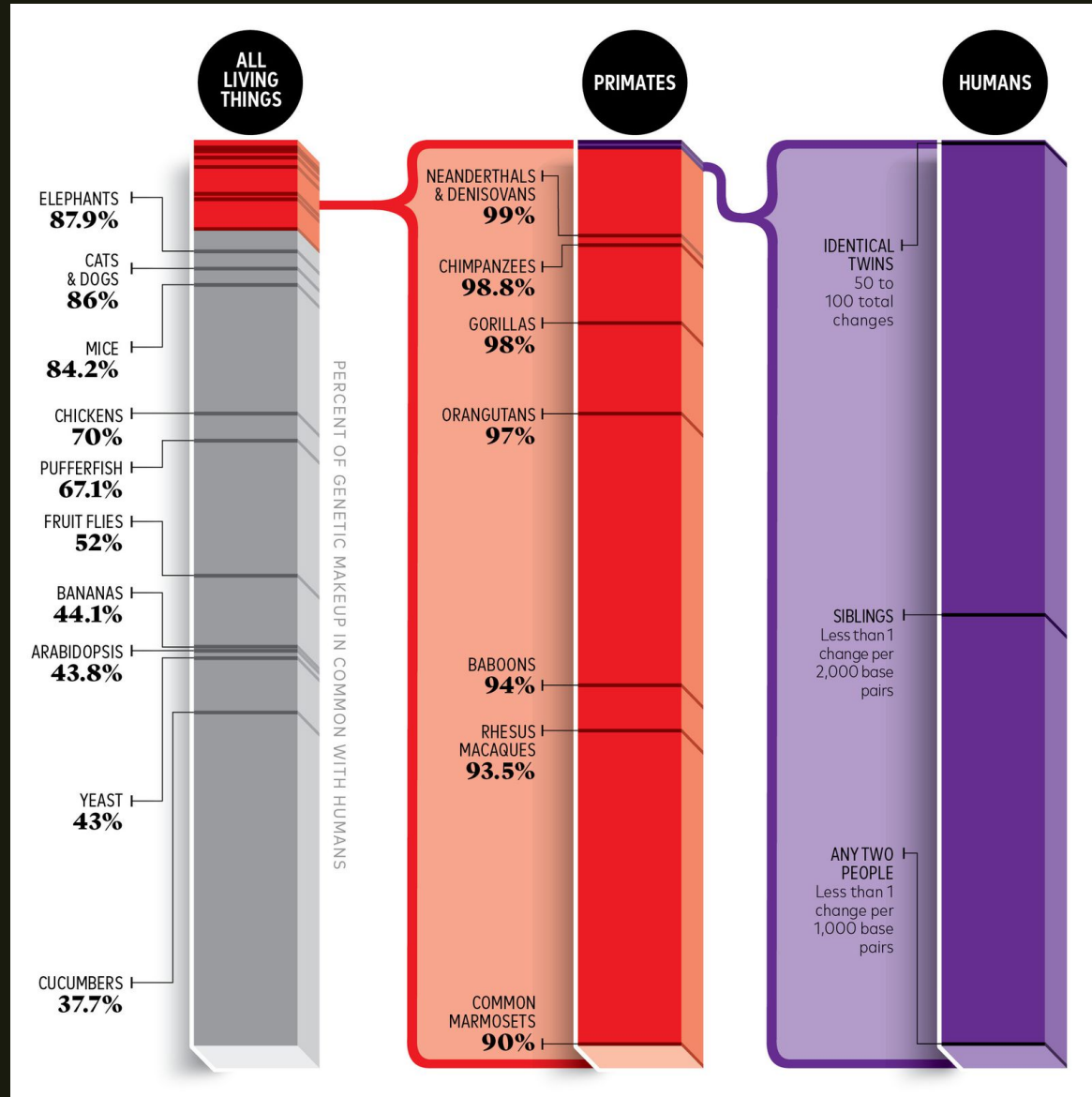




THE IMPORTANCE OF DIFFERENCES

The background of the slide features several axial MRI slices of a human brain, showing the cerebral cortex and internal structures. The images are rendered in a dark blue color scheme. Overlaid on these images is various technical text and labels in a lighter blue font. Labels include 'AF' (Axial), 'RFP' (Right Frontal Pole), '5cm' (a scale bar), and 'STUDY 1'. Technical parameters such as 'FoV 199', '295', '51', 'Tra>Cor(6.1)>Seq(1.5)', 'W 128', 'C 607', and '4VAT' are also visible. The text is semi-transparent, allowing the underlying brain scans to remain visible.

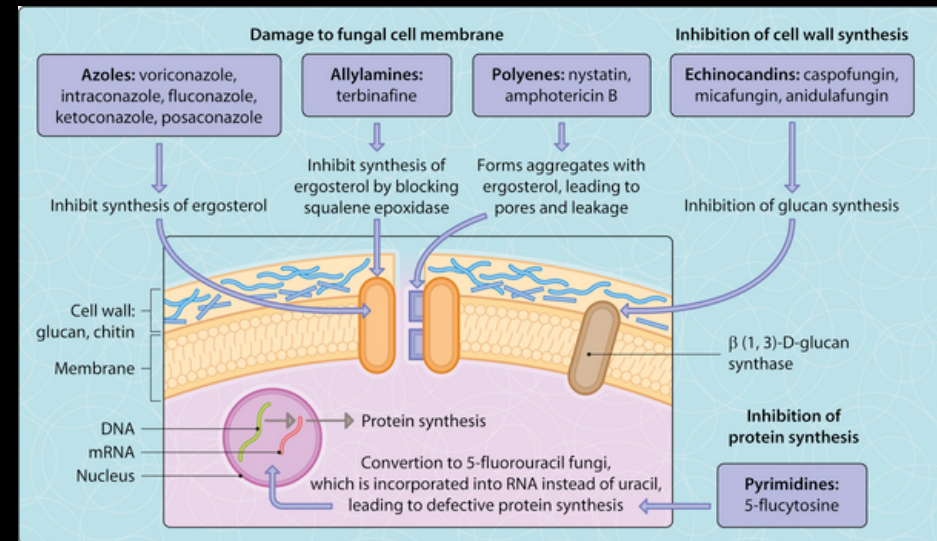
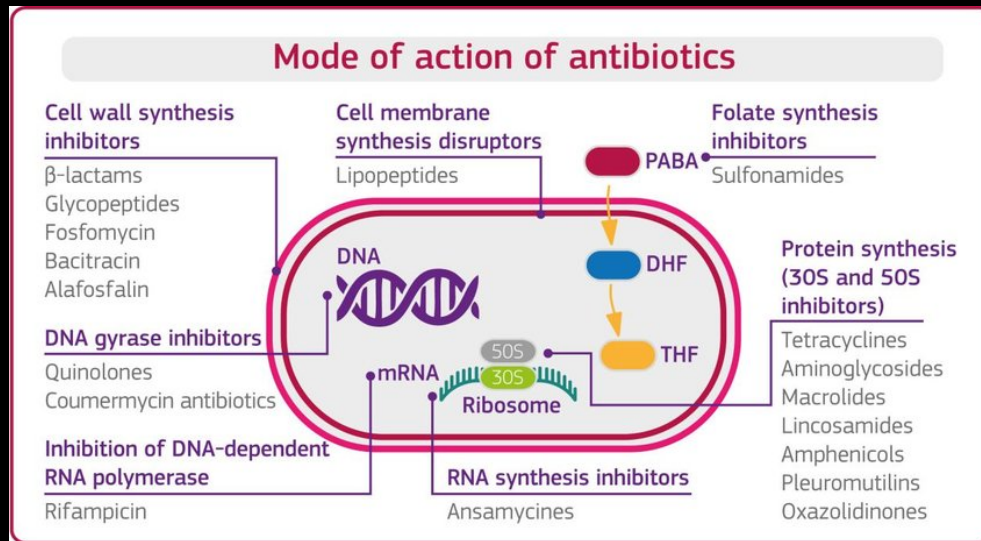
WHEN WE THINK ABOUT HOW TO FIGHT INFECTIOUS DISEASES WE START WITH STUDYING THE DISEASE AND IDENTIFYING DIFFERENCES BETWEEN THAT DISEASE AND US.



DESPITE HOW DIFFERENT OTHER ORGANISMS SEEM WE ACTUALLY HAVE A LOT IN COMMON AT A CELLULAR LEVEL.

Antibiotics target *differences* between bacteria cells and our cells.

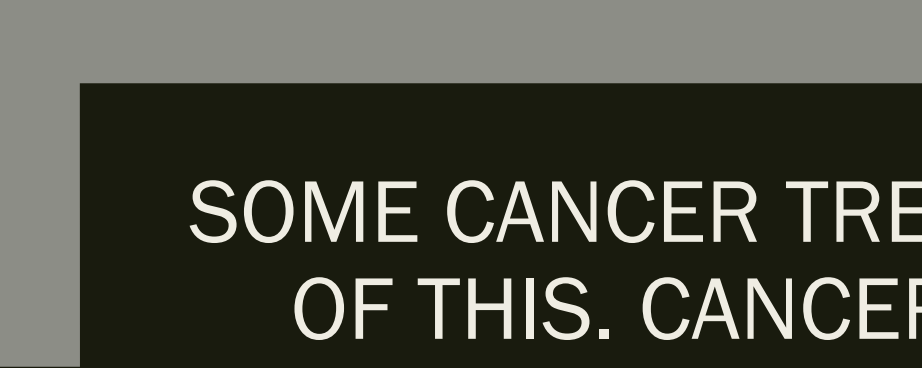
Antifungals target *differences* between fungi cells and our cells.






IF WE DON'T TARGET AND EXPLOIT THESE
DIFFERENCES WE RISK SIGNIFICANT
HARM TO OUR OWN CELLULAR
FUNCTIONS.





SOME CANCER TREATMENTS ARE A GOOD EXAMPLE OF THIS. CANCER CELLS *ARE OUR* CELLS WITH SMALL MUTATIONS AND CONSEQUENTLY FINDING DIFFERENCES TO EXPLOIT IS VERY DIFFICULT. THE RESULT IS MANY CANCER TREATMENTS HAVE SIGNIFICANT SIDE EFFECT PROFILES.

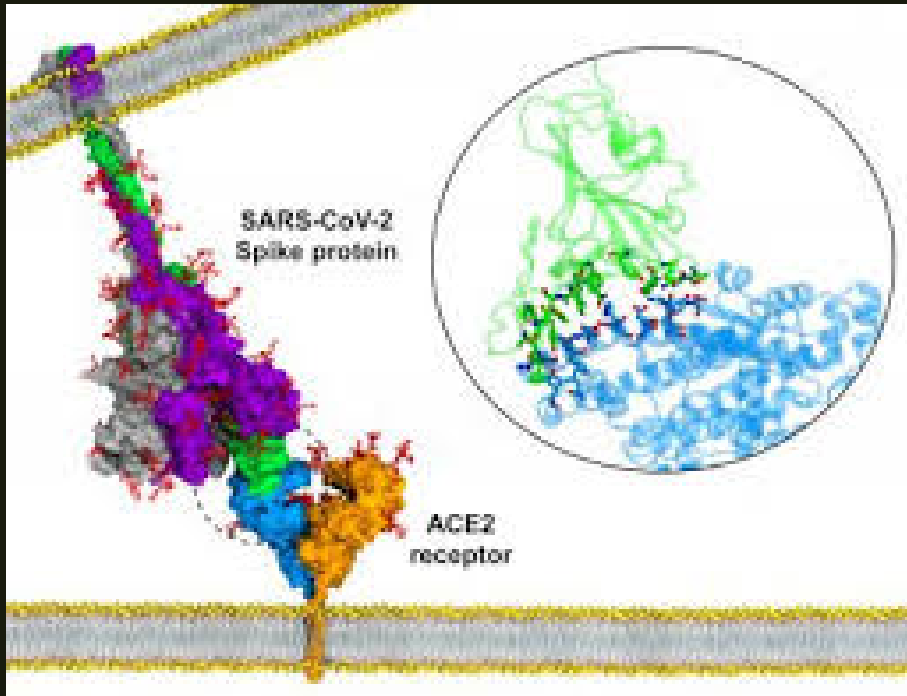


SO WHAT DOES
THIS HAVE TO
DO WITH COVID-
19 VACCINES?

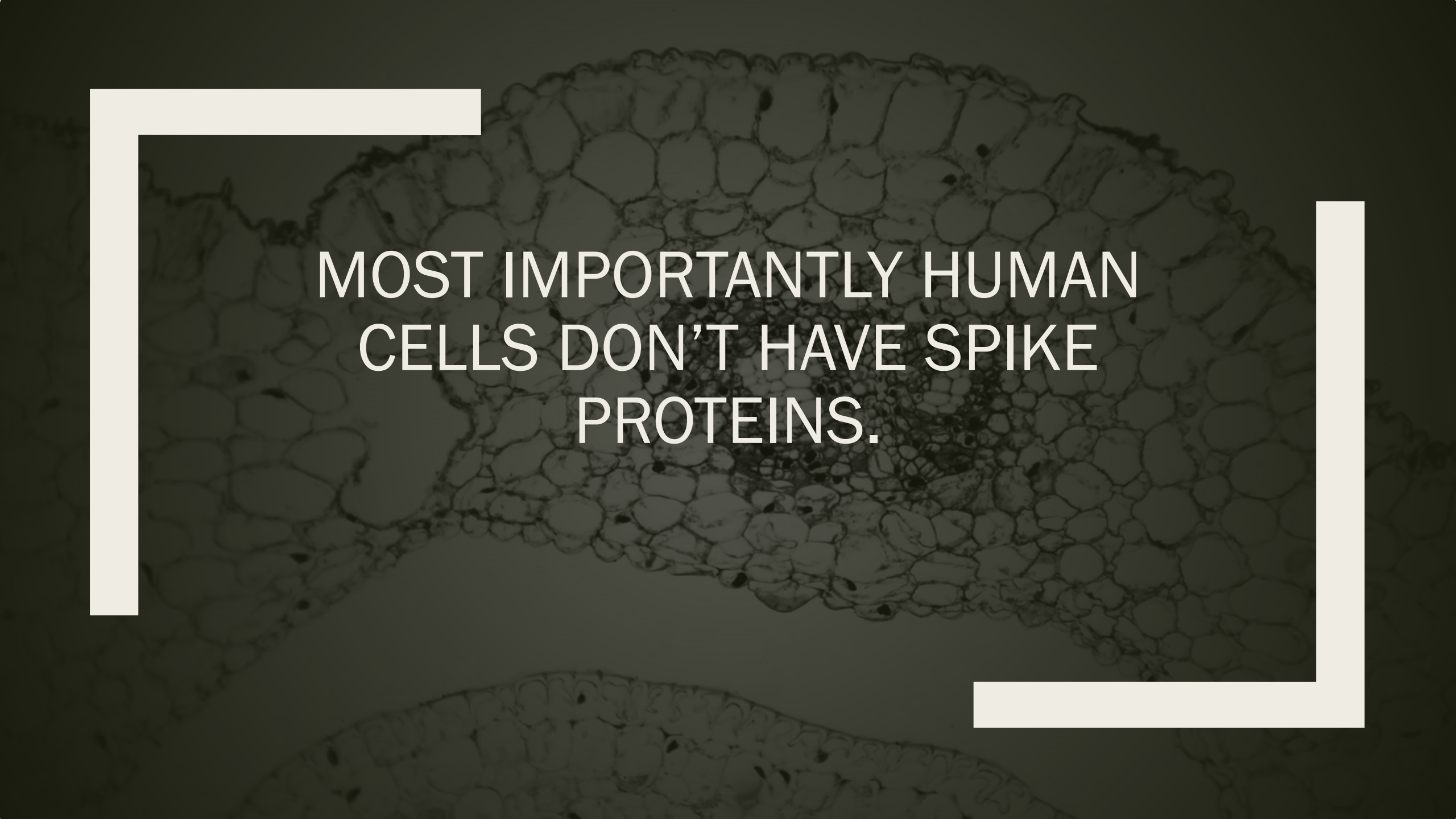
DIFFERENCES ARE
IMPORTANT.



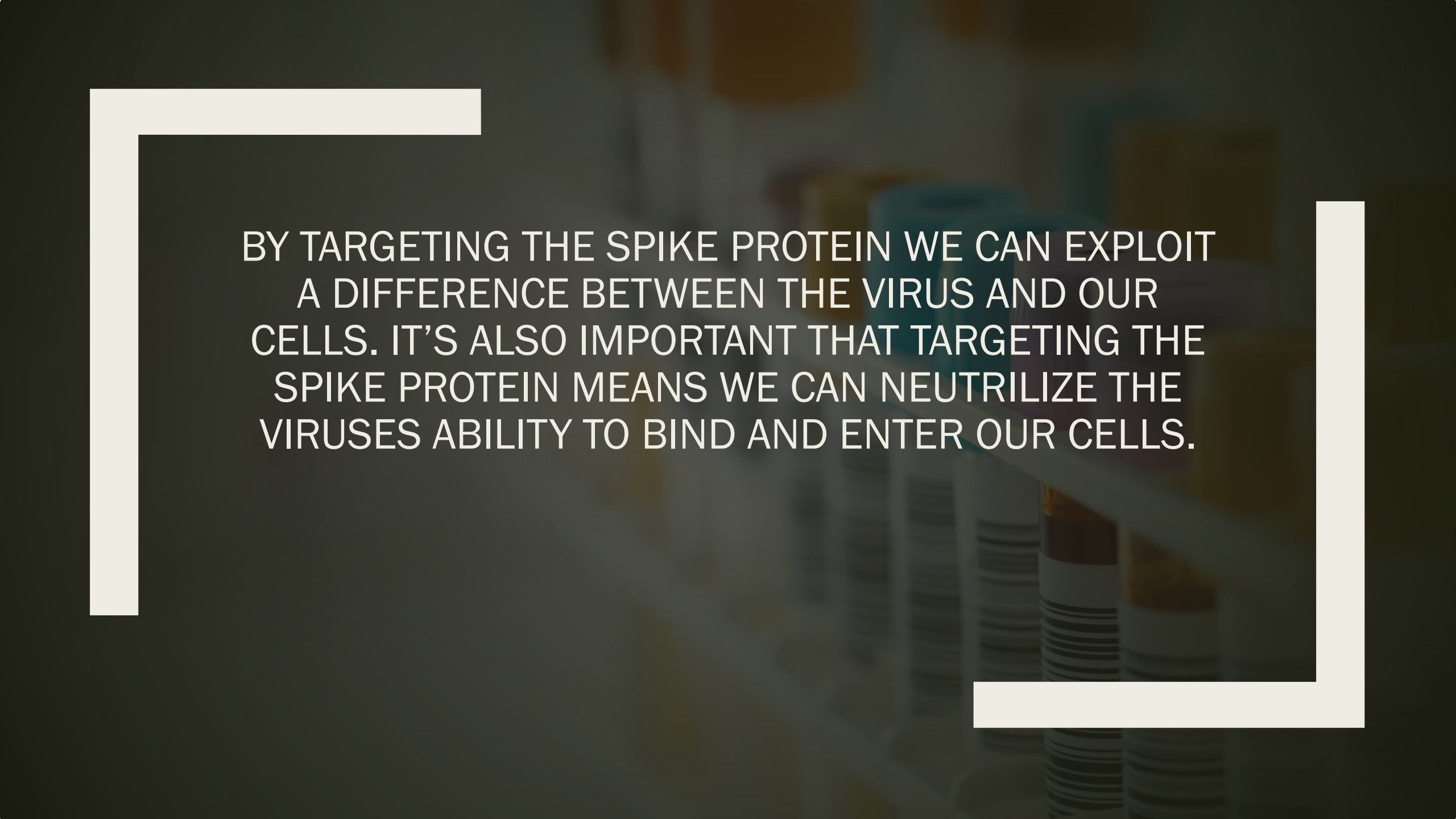
THE SPIKE PROTEINS
ON THE SURFACE OF
SARS-COV-2 ARE
WHAT GIVE
CORONAVIRUSES
THEIR
CHARACTERISTIC
“CROWN”.



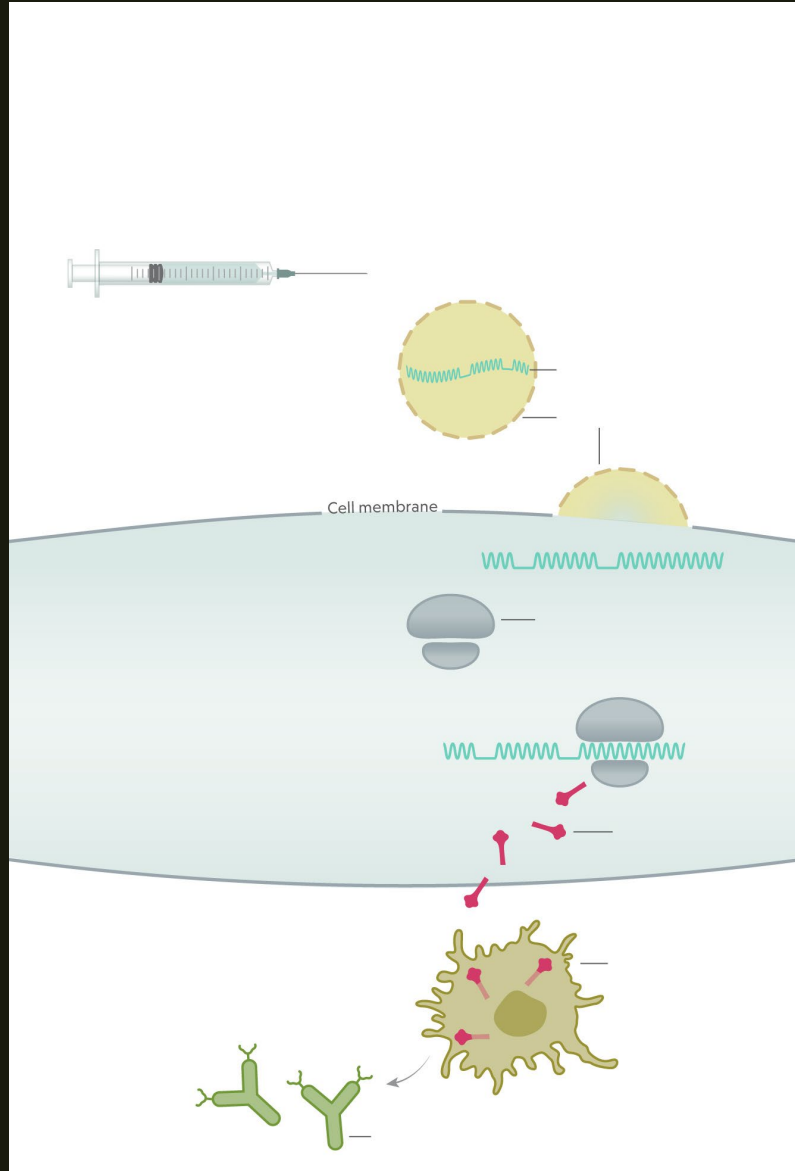
THESE SPIKE
PROTEINS ARE ALSO
THE WAY THE VIRUS
ATTACHES TO OUR
CELLS.

A grayscale microscopic image of plant tissue, showing a cross-section of cells with distinct cell walls and internal structures. The image is framed by a white L-shaped border on the left and bottom. The text is centered over the image.

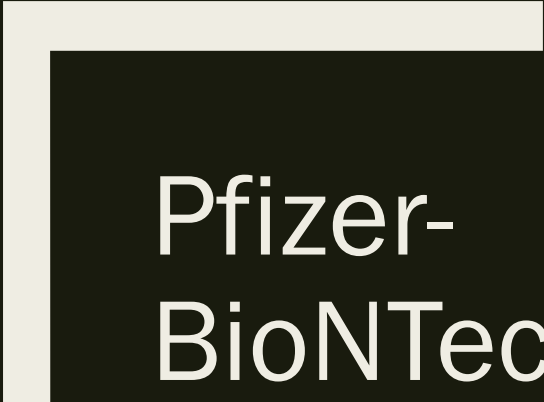
MOST IMPORTANTLY HUMAN
CELLS DON'T HAVE SPIKE
PROTEINS.



BY TARGETING THE SPIKE PROTEIN WE CAN EXPLOIT
A DIFFERENCE BETWEEN THE VIRUS AND OUR
CELLS. IT'S ALSO IMPORTANT THAT TARGETING THE
SPIKE PROTEIN MEANS WE CAN NEUTRALIZE THE
VIRUSES ABILITY TO BIND AND ENTER OUR CELLS.

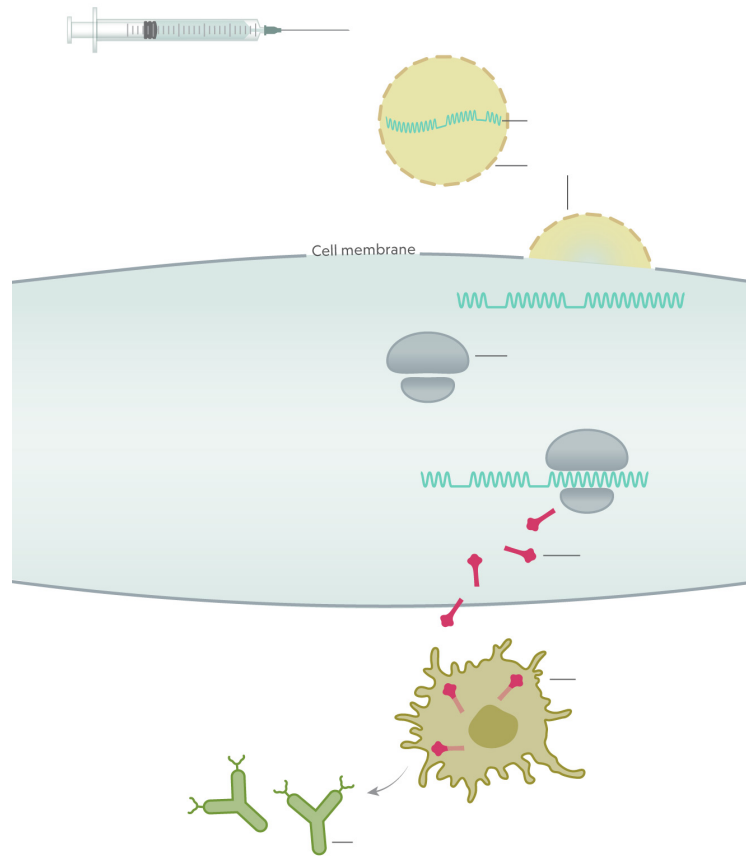


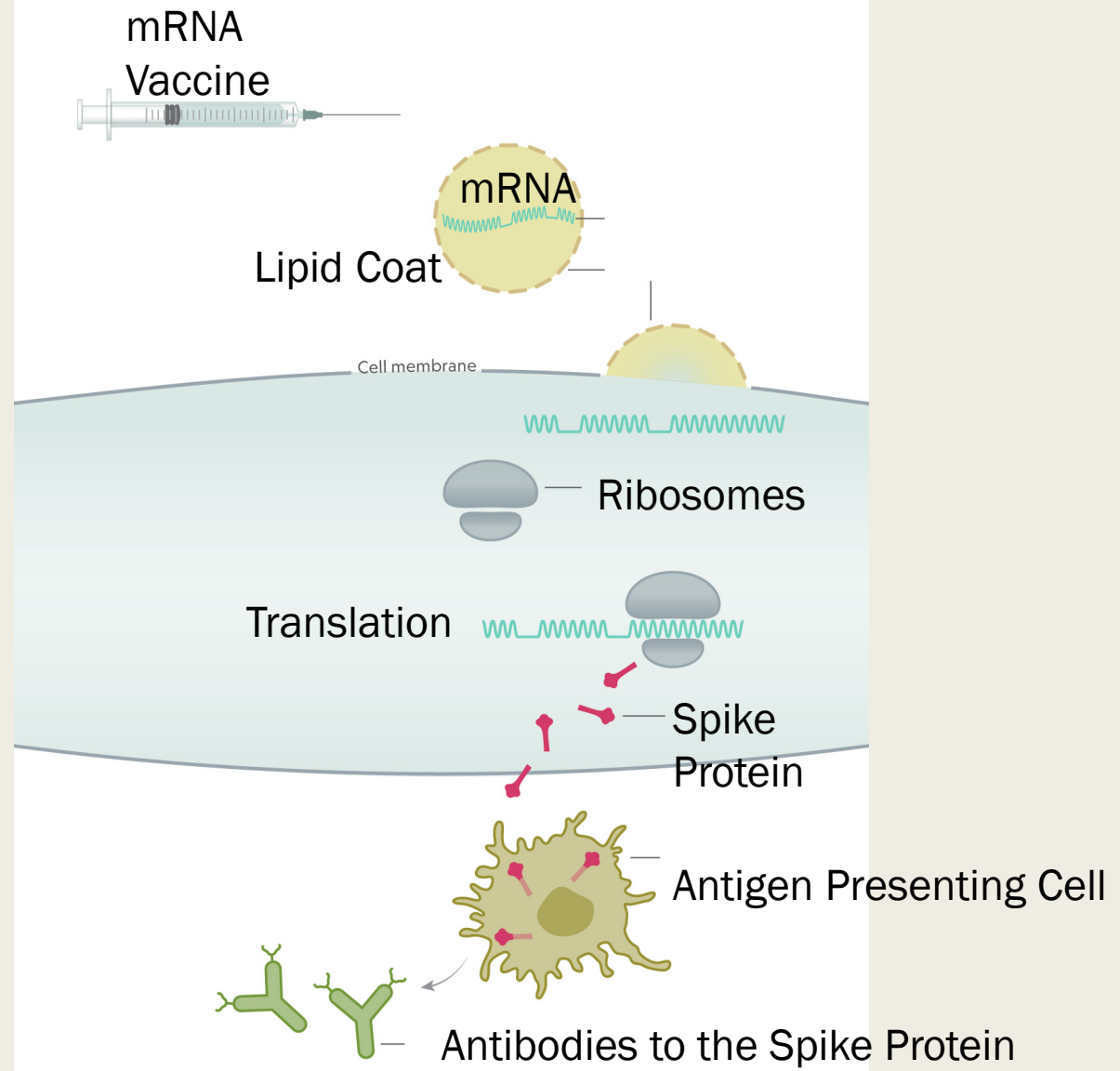
MRNA VACCINES



Pfizer- BioNTech and Moderna Vaccines

- MRNA VACCINES ENCAPSULATED IN A LIPID CARRIER
- MRNA THAT CODES FOR THE REGION OF THE CORONAVIRUS SPIKE PROTEIN THAT BINDS HUMAN ACE2 RECEPTORS
- OUR NORMAL CELLULAR MACHINERY UPTAKES AND TRANSLATES THAT MRNA INTO A PROTEIN.
- OUR IMMUNE SYSTEM RECOGNIZES THAT PROTEIN AS NOT A NORMAL PART OF OUR BODY AND CREATES ANTIBODIES TO IT.
- BOTH VACCINES ARE DONE IN TWO DOSES.
- BOTH VACCINES ARE ~95% EFFECTIVE IN PREVENTING DISEASE AND THERE WAS NO SEVERE ILLNESS IN PATIENTS IN THE VACCINE GROUP.





SOME COMMON CONCERNS.

IS THIS GENETIC ENGINEERING?: NO. THE MRNA DOES NOT INCORPORATE INTO OUR DNA. IT IS RAPIDLY DEGRADED BY ENZYMES IN THE CELL AFTER BEING TRANSLATED.

CAN I GET THE VIRUS FROM THE VACCINE?; NO. THERE IS NO LIVE VIRUS IN THE VACCINE.

TO FAST?: THE PROCESS THAT PFIZER AND MODERNA UNDERWENT TO CREATE THESE VACCINES DIDN'T CUT CORNERS. INSTEAD OF WORKING IN SERIES THE PROCESS WAS OFTEN DONE IN PARALLEL. THIS, PLUS THE ENORMOUS RESOURCES DEDICATED TO THIS PROCESS AND THE FACT THAT MRNA VACCINES ARE GENERALLY QUICKER AND EASIER TO MANUFACTURE ALL CONTRIBUTED TO THE REMARKABLE SPEED OF DEVELOPMENT.

WHAT ABOUT SIDE EFFECTS: SIDE EFFECTS SEEM TO BE SIMILAR TO OTHER VACCINES. MOST COMMONLY PEOPLE WILL HAVE NO SIDE EFFECTS. SOME PEOPLE WILL HAVE MILD INFLAMMATORY SYMPTOMS LIKE MUSCLE ACES, LOW GRADE FEVER, HEADACHE. THIS IS ACTUALLY REASSURING AS IT MEANS YOUR BODY IS RESPONDING TO THE VACCINE AND MOUNTING AN APPROPRIATE IMMUNE RESPONSE.

WHO IS ELIGIBLE FOR THE VACCINE?

- ADULTS OVER THE AGE OF 16

- PREGNANT AND BREASTFEEDING WOMEN WERE EXCLUDED*

- INITIALLY WILL BE GIVEN TO 1A INDIVIDUALS FOLLOWED BY 1B AND 1C.



SO WILL I GET VACCINATED?

YES! AND HERE ARE JUST A FEW REASONS WHY.

