Twitter Thread by Dr. Haryax Pathak



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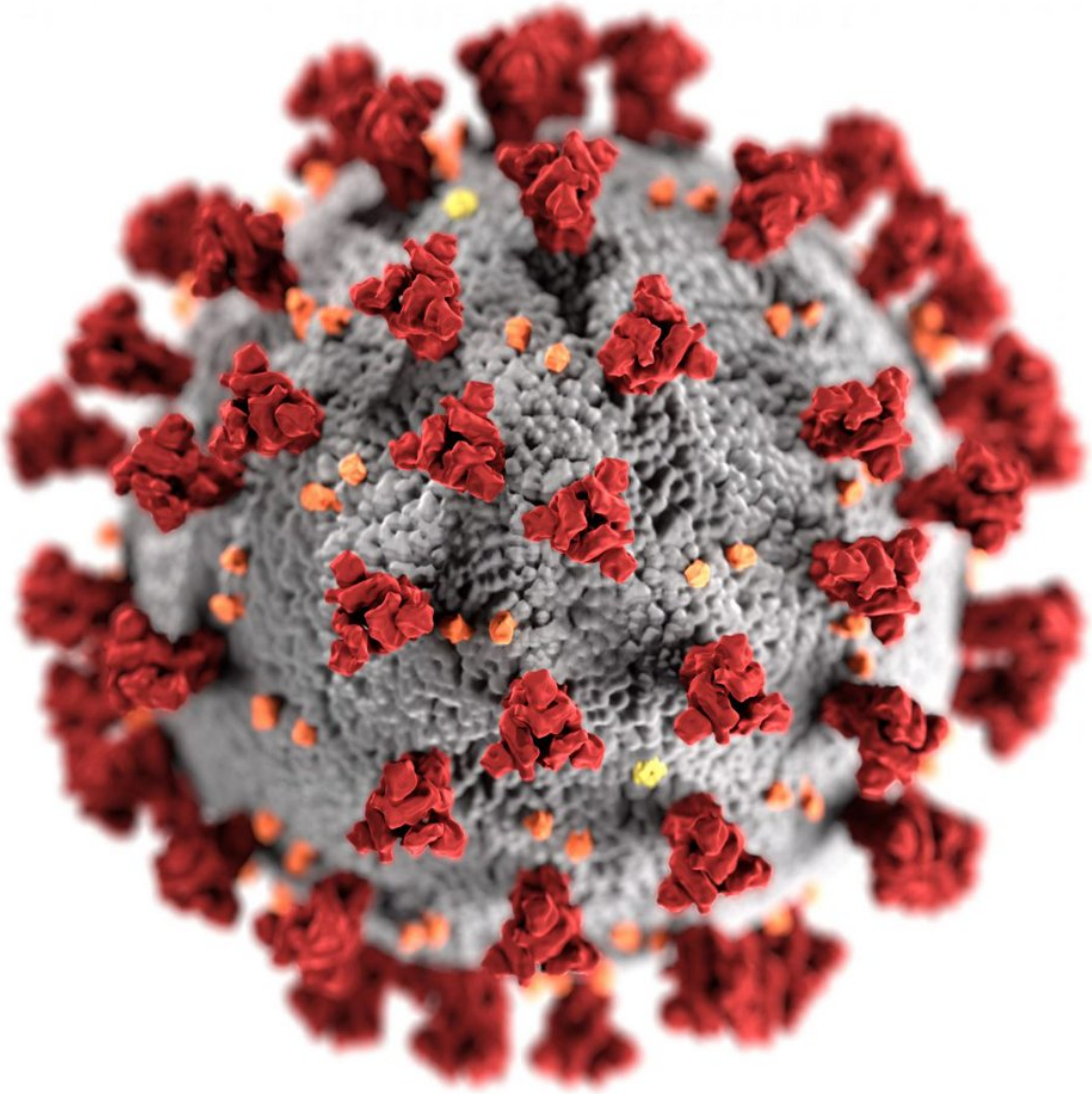
Let's talk about Vaccines.

Still seeing a lot of confusion going around about the Mechanism of vaccines in use. I will attempt to explain it as simply as possible.

Please read, and share.

So, think of the SARS-CoV-2 virus as Ferrero Rocher. ■■

1/n

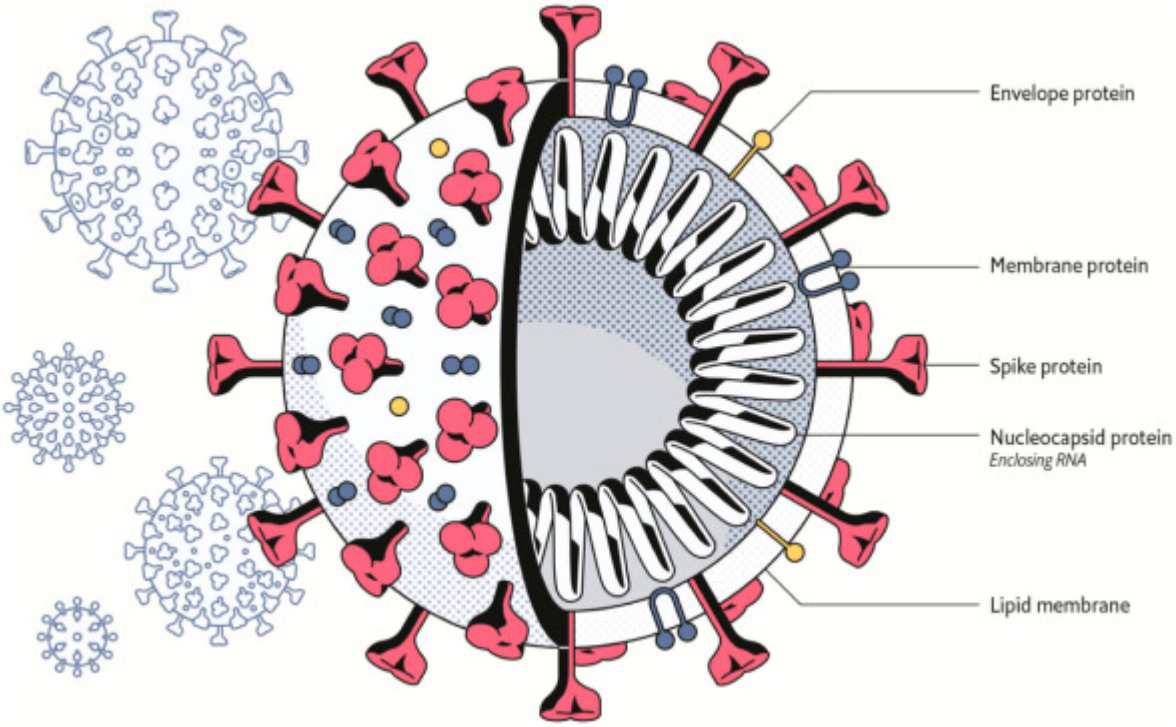


Let's see the structure of the virus first.

Spike Protein = Nutty spikes
Lipid Membrane = Outer Chocolate Layer
Nucleocapsid = Wafery Layer
RNA = Innermost Chocolate

That's putting it very simply for the purpose of understanding.

2/n



Let's see how the virus causes infection.

The virus enters through our respiratory tract. It needs to enter a cell to replicate. For that, it uses the SPIKE PROTEIN (nutty spikes).

Spike protein allows the virus to enter the cell and cause infection.

Sweet and simple.

3/n

The aim of vaccines is to try and prevent infection in your body.

Hence, most of the vaccines are targeting the Spike Protein (nutty spikes).

Scientists sequenced the RNA of the virus and identified the genes making the Spike Protein.

Let's see some vaccines now.

4/n

➡■Imagine if someone took away all taste and flavour of Ferrero Rocher. It is now lifeless, tasteless.

That's COVAXIN.

They killed the SARS-CoV-2 virus, took away its ability to cause infection. Body can still identify it and mount an immune response against it.

5/n

COVAXIN has been developed by Bharat Biotech.

It is the only vaccine in use right now that uses an inactivated virus.

All the other vaccines we'll see below - target only the Spike Protein (nutty spikes).

6/n

➡■What if I use the crunchy nuts of Ferrero in another chocolate? Maybe Snickers?■

That's COVISHIELD.

The genes making the Spike protein are mixed into an adenovirus that can't cause infection in humans. It makes the Spike Protein in our body.

7/n

The vaccines SPUTNIK V and JANSSEN are similar to COVISHIELD.

COVISHIELD uses a Chimpanzee Adenovirus.

SPUTNIK V and JANSSEN use a Human Adenovirus.

The mechanism is the same - adenovirus is used as a vehicle to send the spike protein gene to our body.

8/n

➡■What if I can somehow teach my own body to make those crunchy Ferrero nuts? ■

That's mRNA vaccines - Pfizer and Moderna.

The genes making Spike Protein are encoded into an mRNA. mRNA = messenger RNA -> makes proteins in our body. It makes the Spike Protein in our body.

9/n

A similar mechanism is also used by ZyCoVD vaccine by Zydus Cadila.

Instead of mRNA, ZyCoVD uses plasmid DNA (a free-floating piece of DNA) that contains the code for the Spike Protein.

ZyCoVD is still undergoing trials in India.

10/n

➡■What if I just want to eat the ready-made nuts of Ferrero?

That's COVOVAX.

They took the code for the Spike Protein, put it into another virus called baculovirus that infected moth cells. Spike proteins made were collected, made into nanoparticles, and used as vaccine.

11/n

In the simplest of words - they made the spike protein outside the body, in a lab - and then inject it as a vaccine.

COVOVAX is the brand name of the vaccine developed by Novavax, USA, and manufactured in India by Serum Institute - undergoing bridging trials in India.

12/n

Here's an excellent graphical presentation from Reuters that explains the approaches to making vaccines as above.

https://t.co/x3Gl0rH5yX

13/n

So, as you can see from above -

NONE of the vaccines have a complete, living virus that can cause infection.

Covaxin has the killed virus - unable to cause infection.

All others - barely have 1 component of the virus - the Spike Protein.

VACCINES CAN'T CAUSE INFECTION.

14/n

So, all in all, this is how the vaccines in use/undergoing trials work.

They are safe.
They are efficacious.

Get vaccinated when you can.
And, implore others to get vaccinated as well.

■■■

15/n