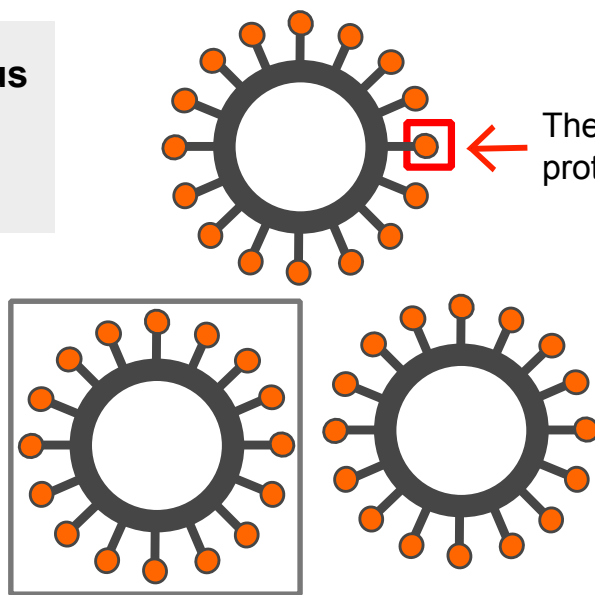


# How does the mRNA vaccine work?

## Contact with the virus WITHOUT being vaccinated

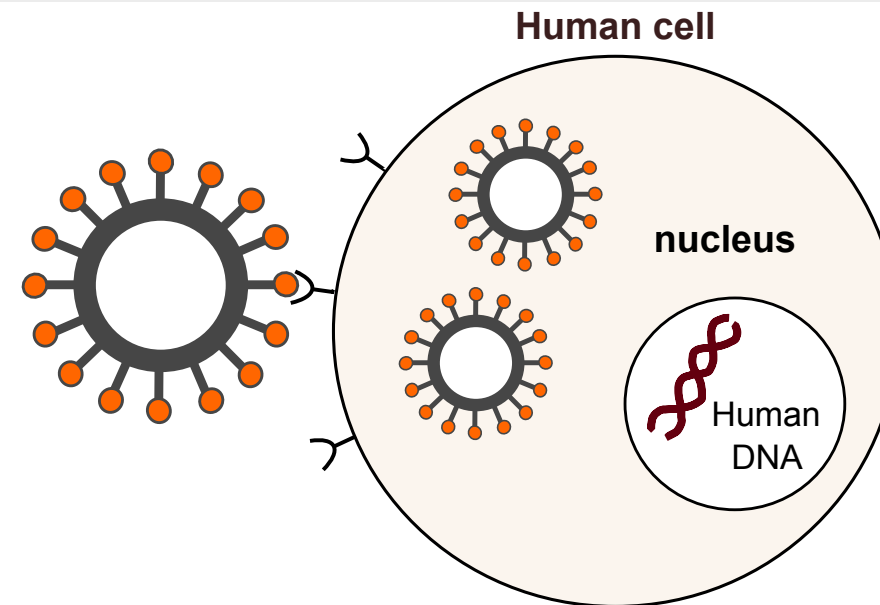
SARS-CoV-2 is the name of the virus that causes the disease called COVID-19

SARS-CoV-2 →



The surface of the virus is covered in proteins called **surface proteins**

① The virus binds to and enters the human cells via the **surface proteins** (●)



②

After binding with the human cell, the virus enters the cell, **starts replicating and damaging the human host**

## Mechanism of vaccination with mRNA vaccine

①



The vaccine is composed of **messenger RNA** (called **mRNA**), which contains the instructions necessary to **produce proteins** which are identical to the ones present on the **surface** of the virus (●)

②

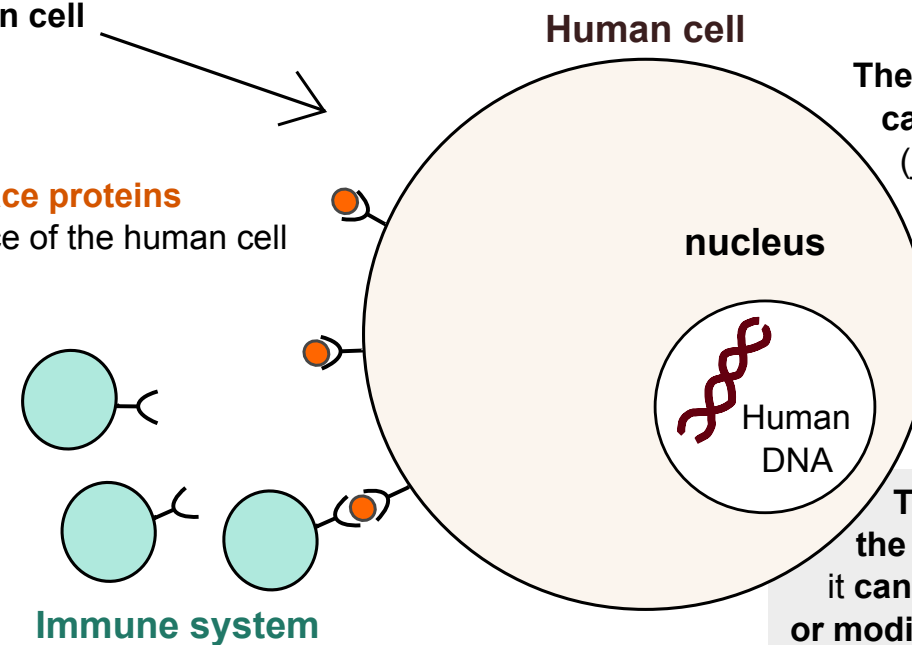
The **messenger RNA** enters the human cell (but not the nucleus), where the instructions are executed

③

Once produced, the **surface proteins** get exposed on the surface of the human cell

④

The **immune system** detects the **surface proteins** and **slowly starts producing antibodies** specific to those proteins. Some cells of the immune system "**remember**" the surface proteins for any future encounter.



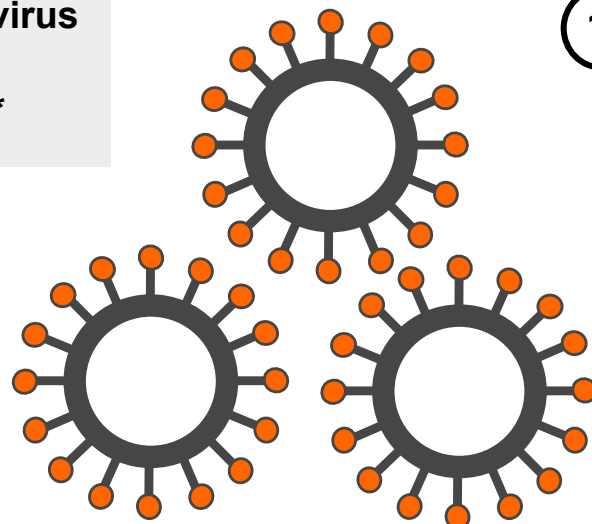
The **surface proteins** alone **cannot cause any infection** (just like the wing of an airplane cannot fly alone)

After producing the **surface proteins**, the **messenger RNA** is destroyed by the cell

The vaccine does not enter the nucleus of the cell, therefore it cannot interact with, damage, or modify the human DNA

## Contact with the virus AFTER being vaccinated\*

\*after the vaccination, some time is needed (usually a few weeks) for the immune system to build immunity

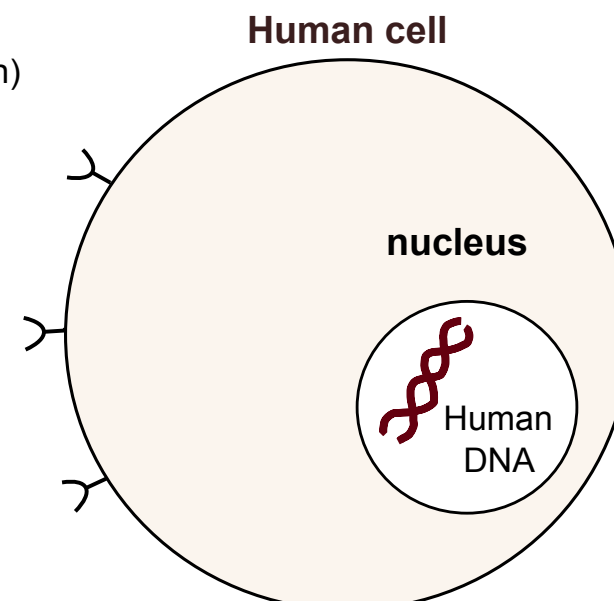
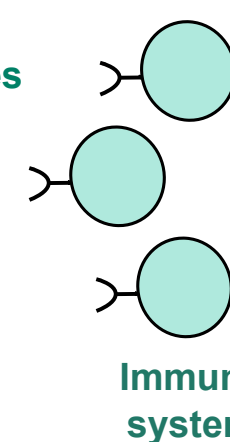


①

The **immune system** recognizes the **surface proteins** on the virus (having encountered them already at the time of vaccination) and **rapidly starts producing antibodies** specific for the virus

②

The antibodies surround the virus and prevent the binding with the human cell



③

After being surrounded by antibodies, the **virus is destroyed** by the human body

