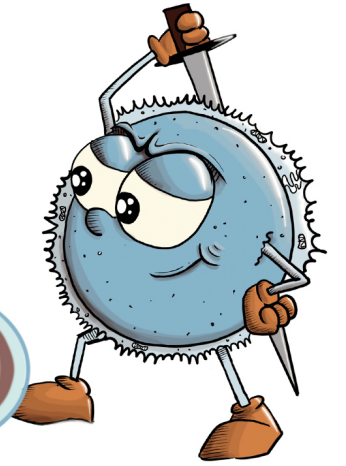


Immune Cartoons

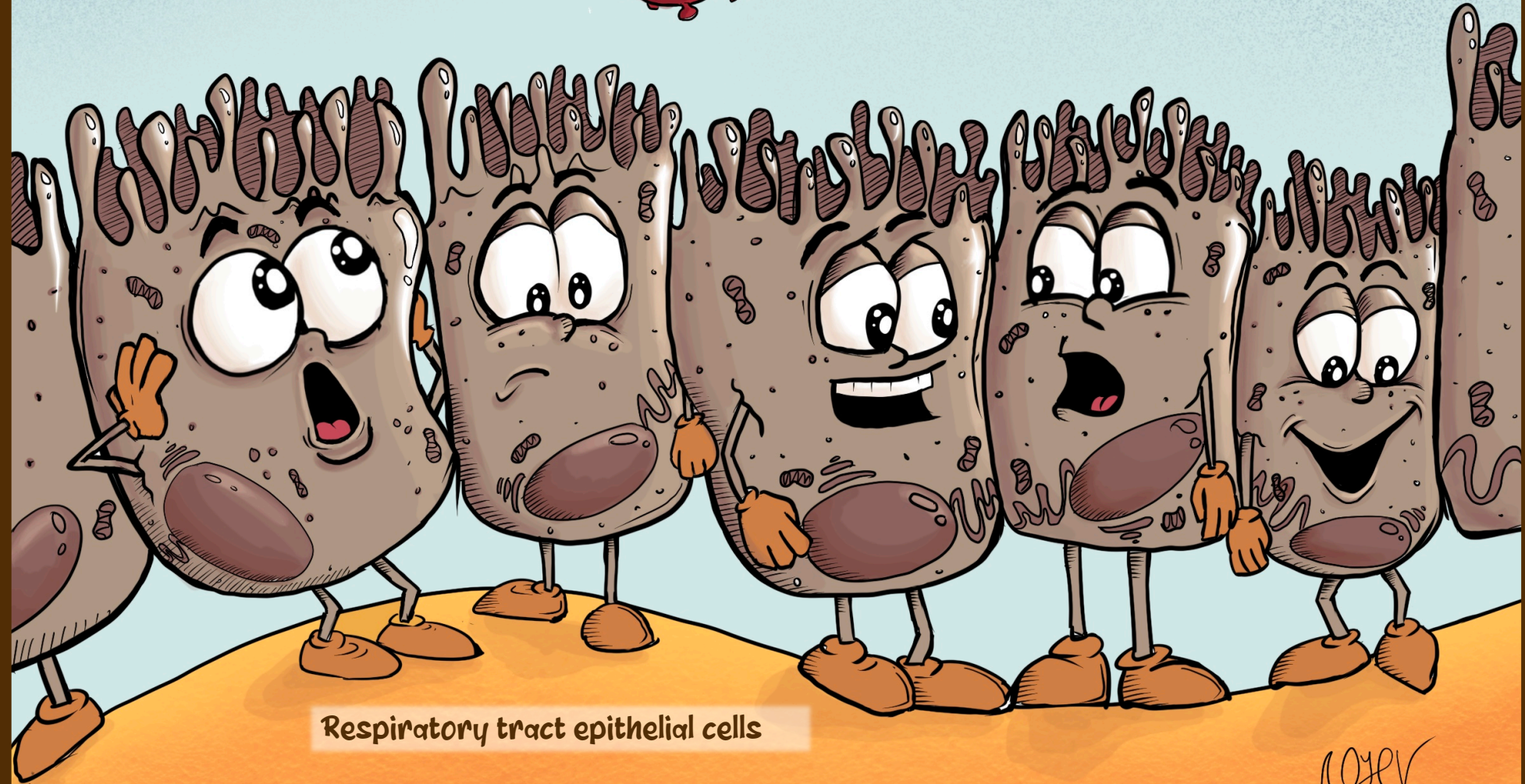
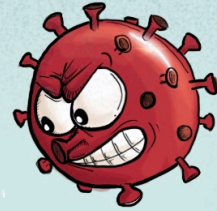


Presents:

COVID-19 immunity and vaccines

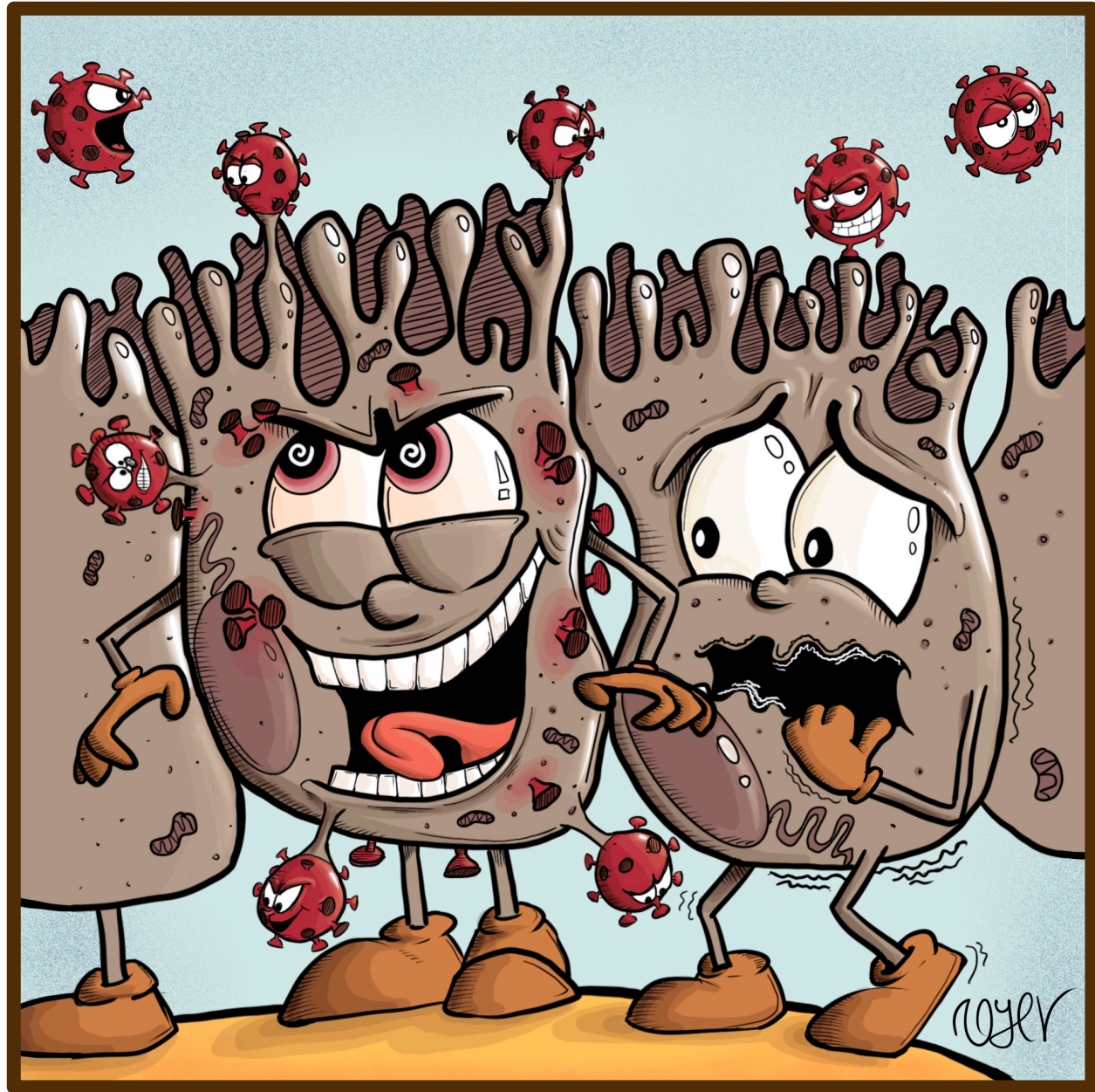
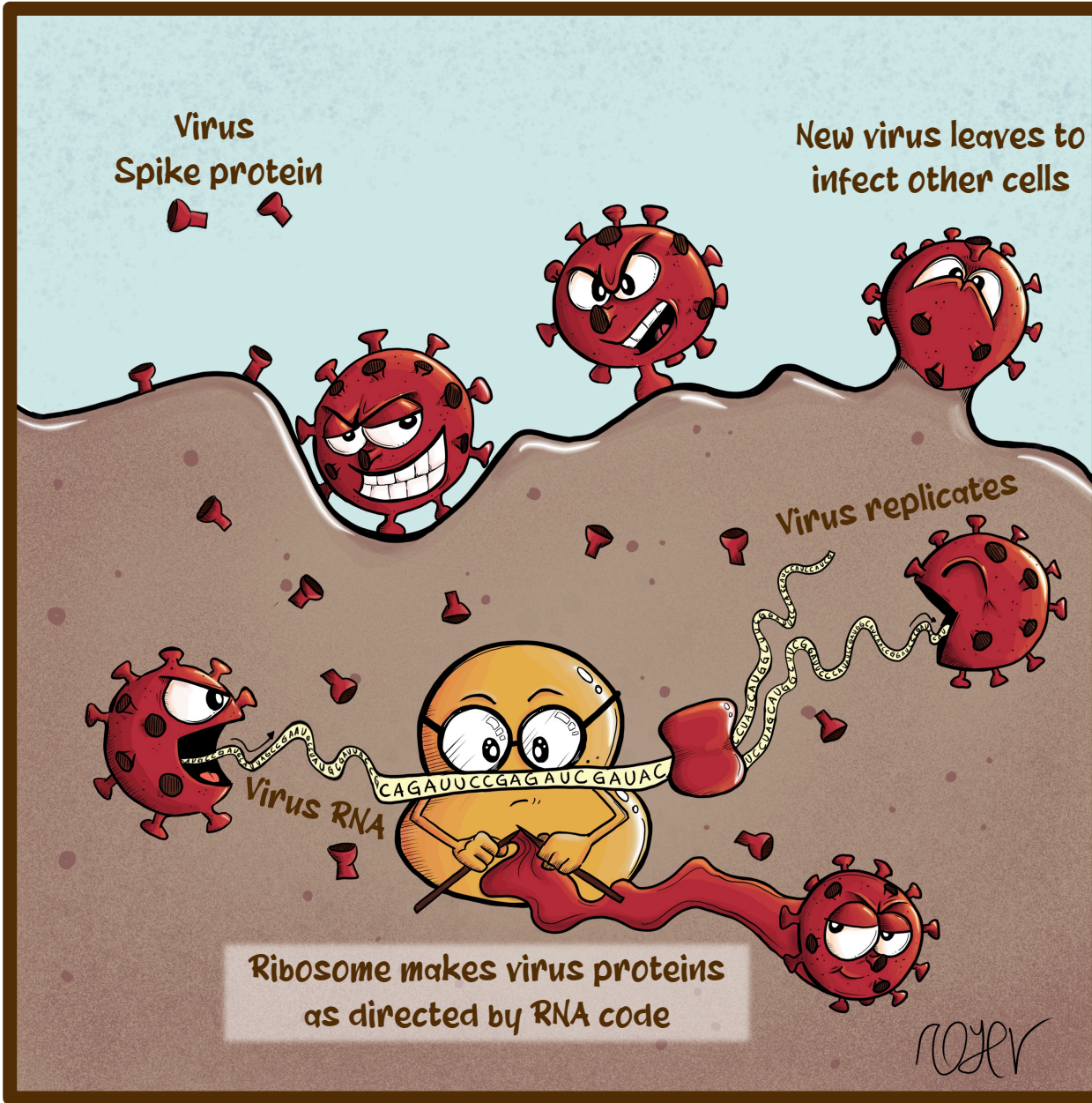
By: Valentina Hoyos Vélez

SARS-COV2



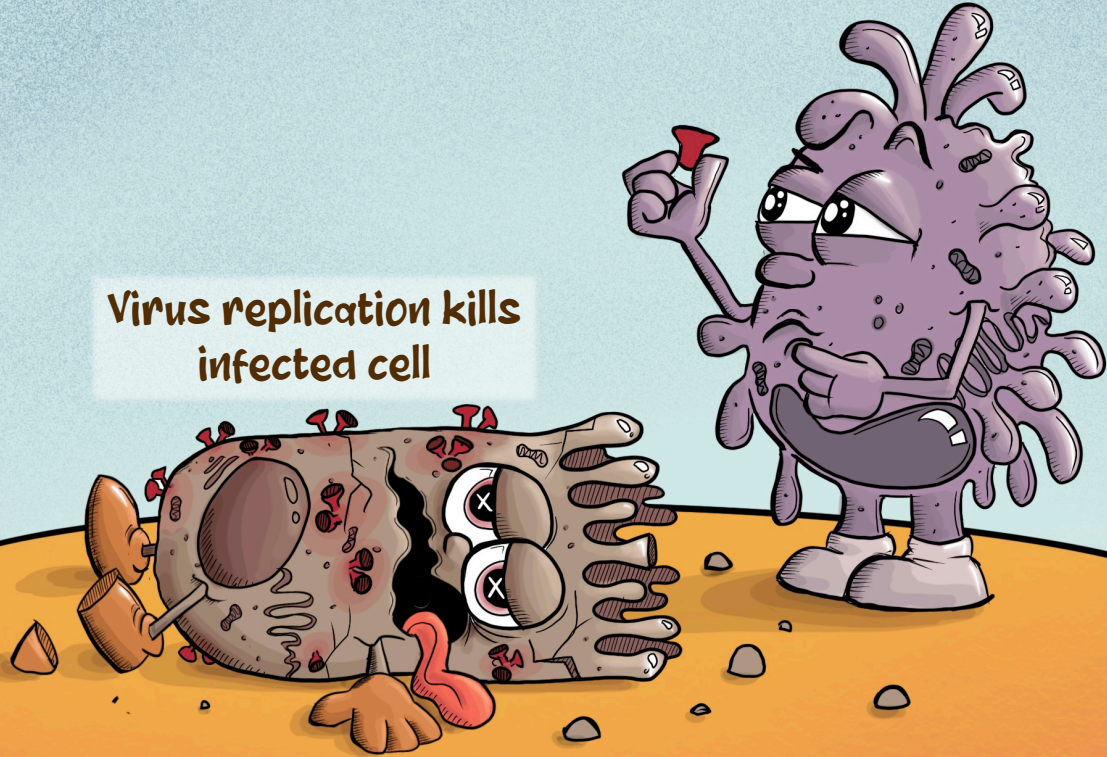
Respiratory tract epithelial cells

royev



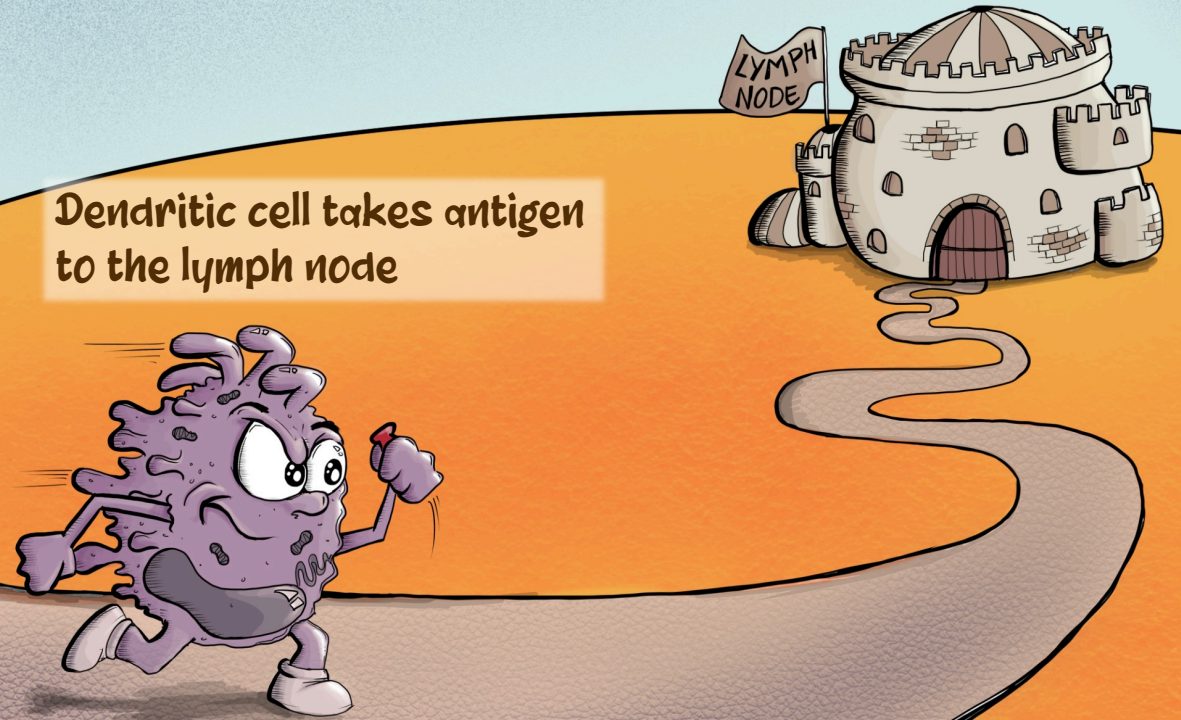
Dendritic cell picks up viral protein

Virus replication kills infected cell

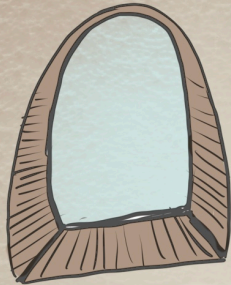


royer

Dendritic cell takes antigen to the lymph node

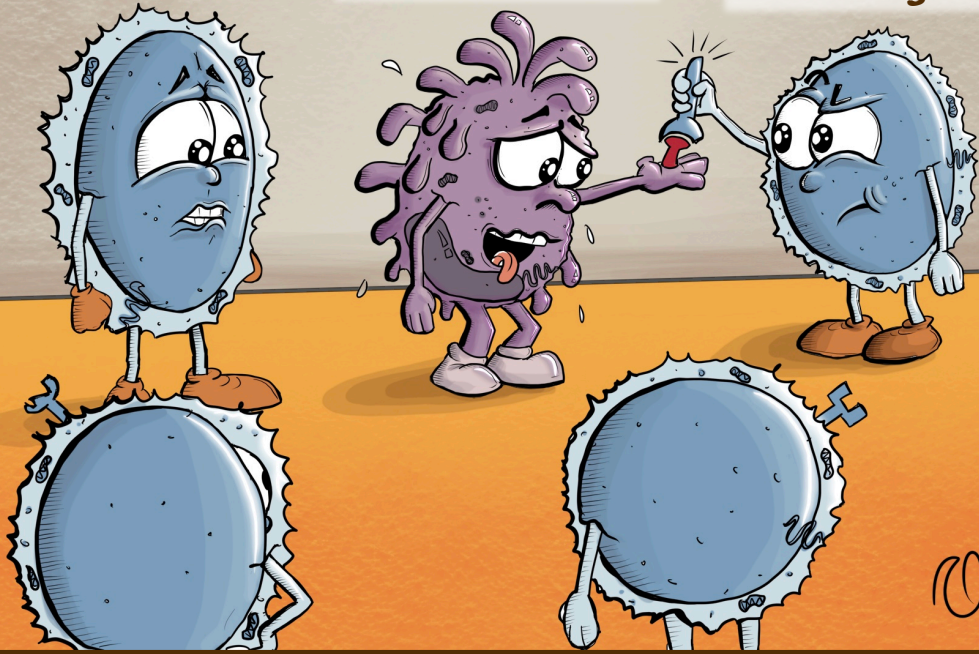


royer

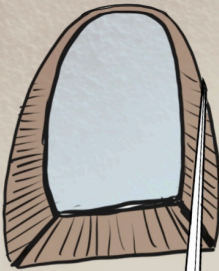


Dendritic cell presents antigen to T Helper cell

T Helper cell recognizes antigen as foreign



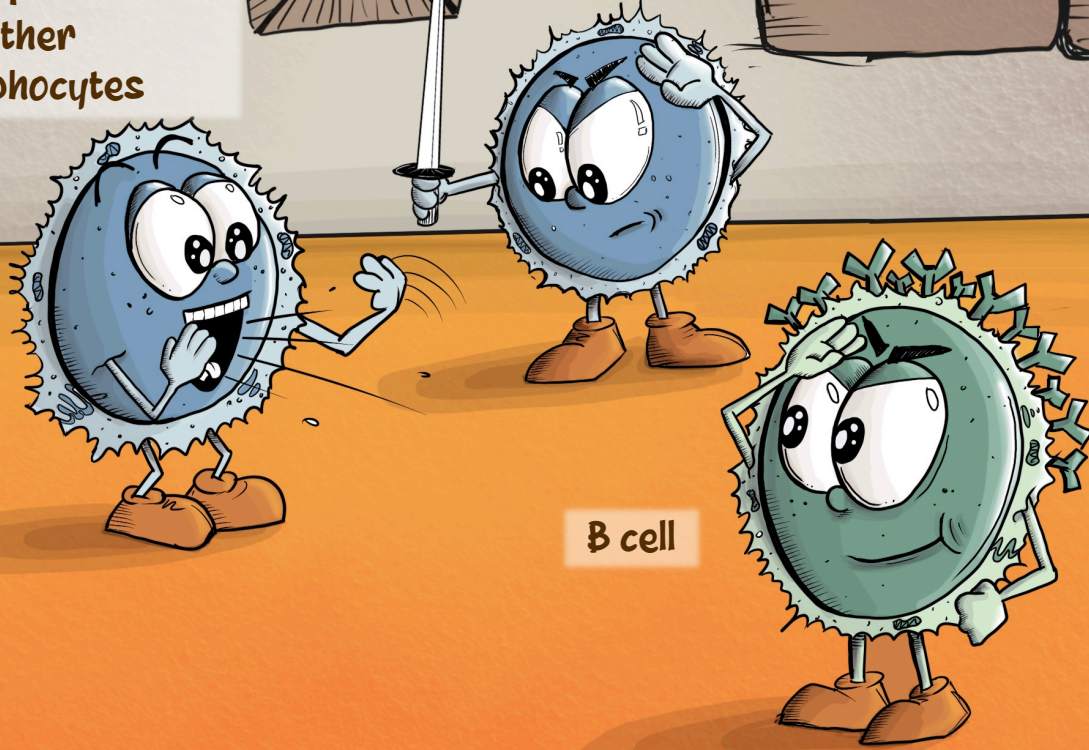
royler



T Helper cell calls on other lymphocytes

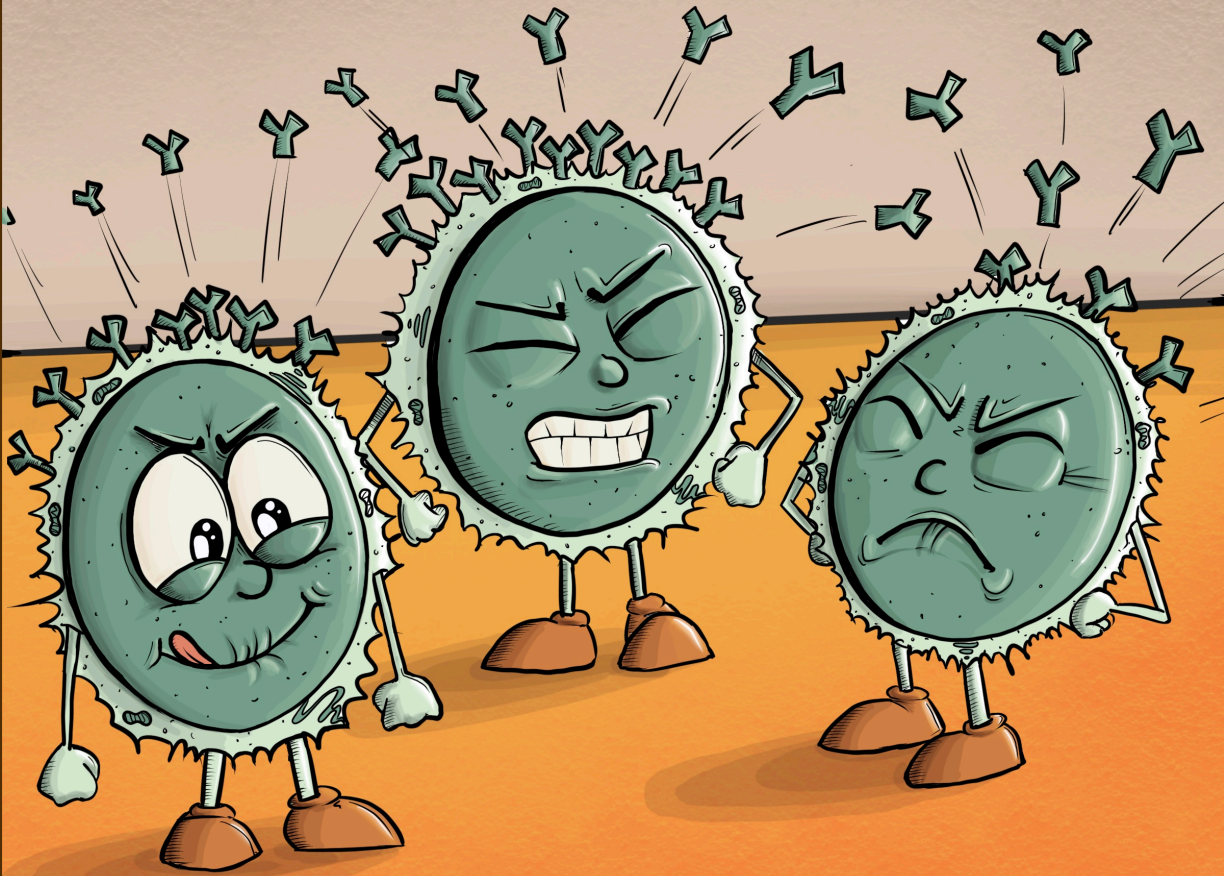
Cytotoxic T cell

B cell



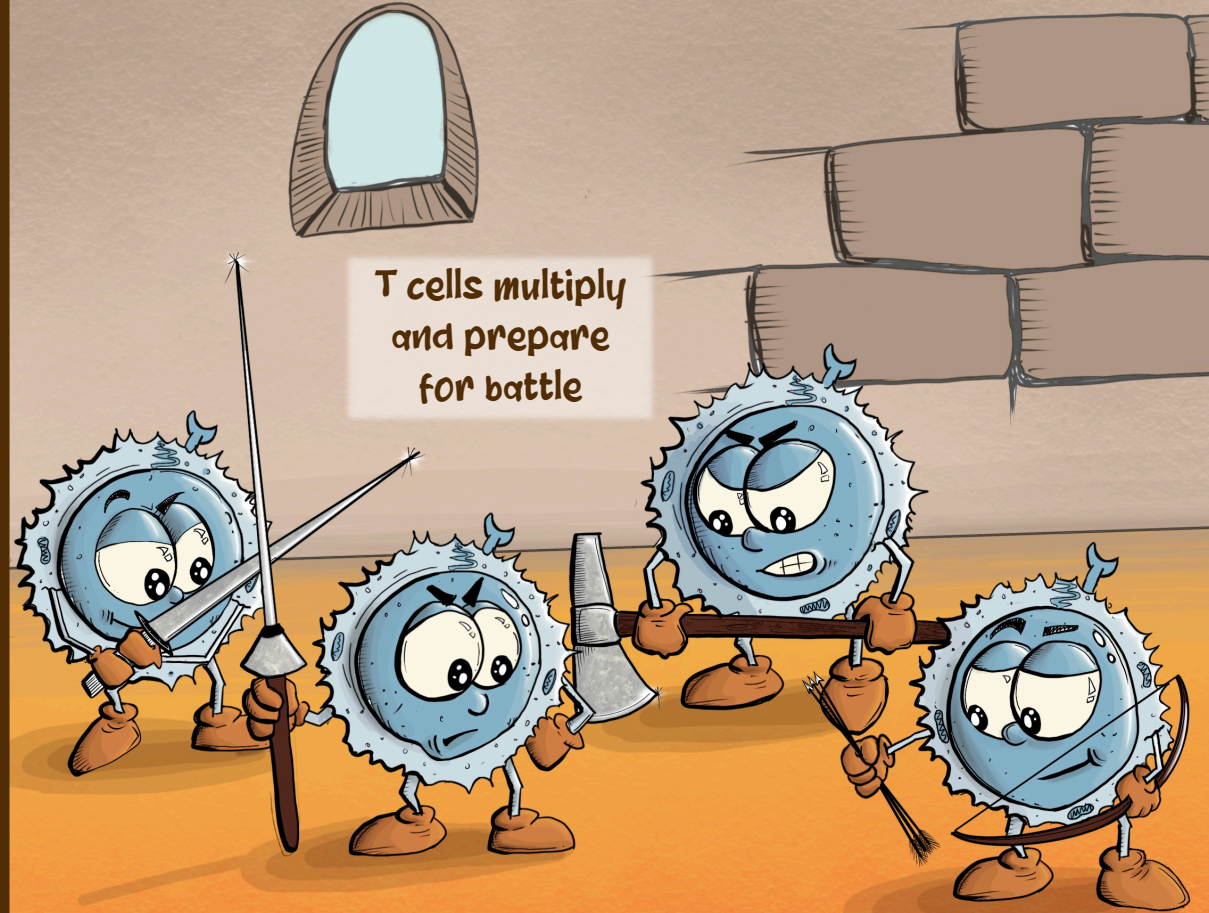
royler

B cells produce antibodies that target the virus



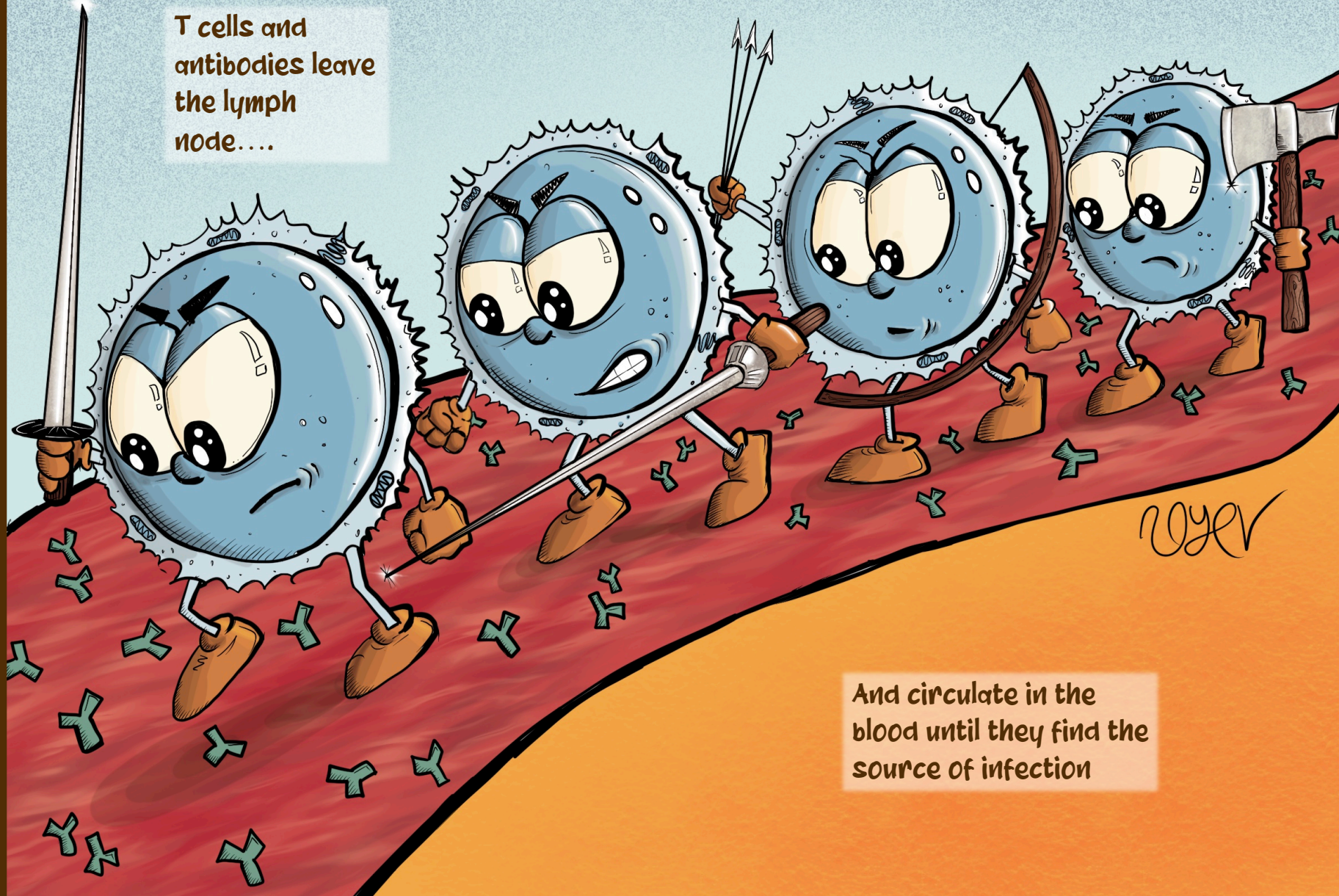
royer

T cells multiply and prepare for battle



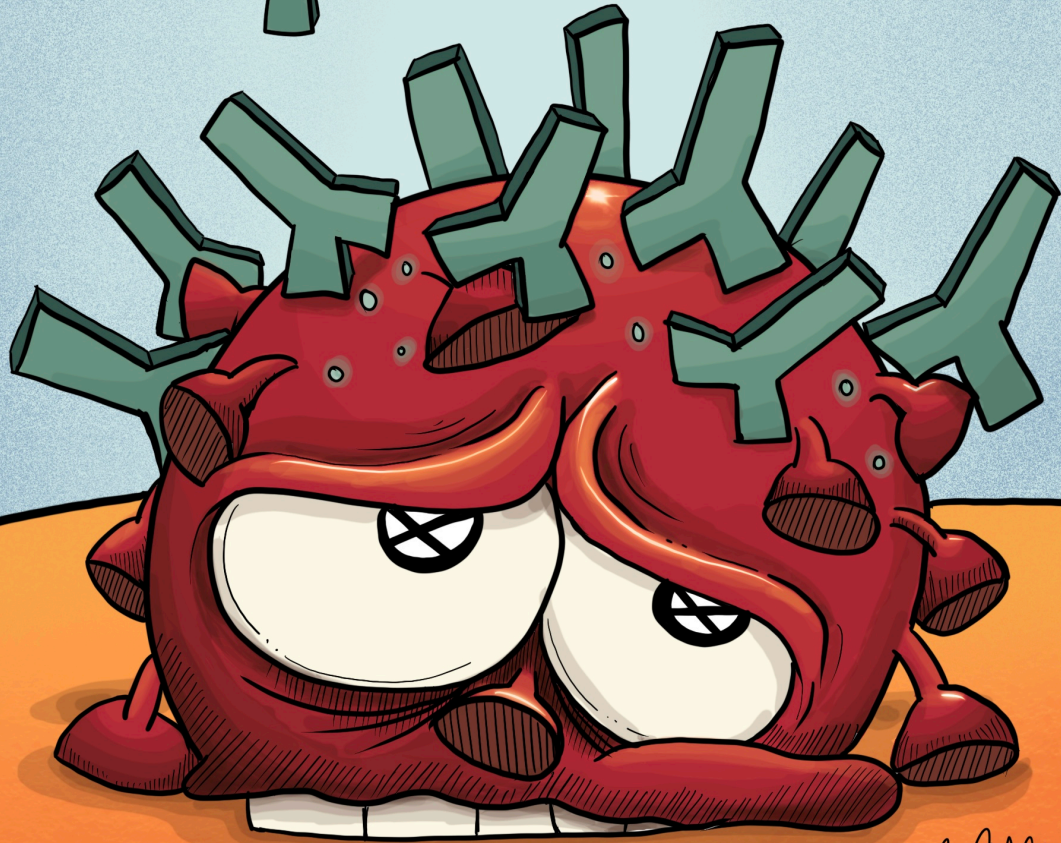
royer

T cells and antibodies leave the lymph node....



And circulate in the blood until they find the source of infection

Antibodies stick
on to SARS-COV-2
and kill it.



royev

Antibodies also
flag the virus...

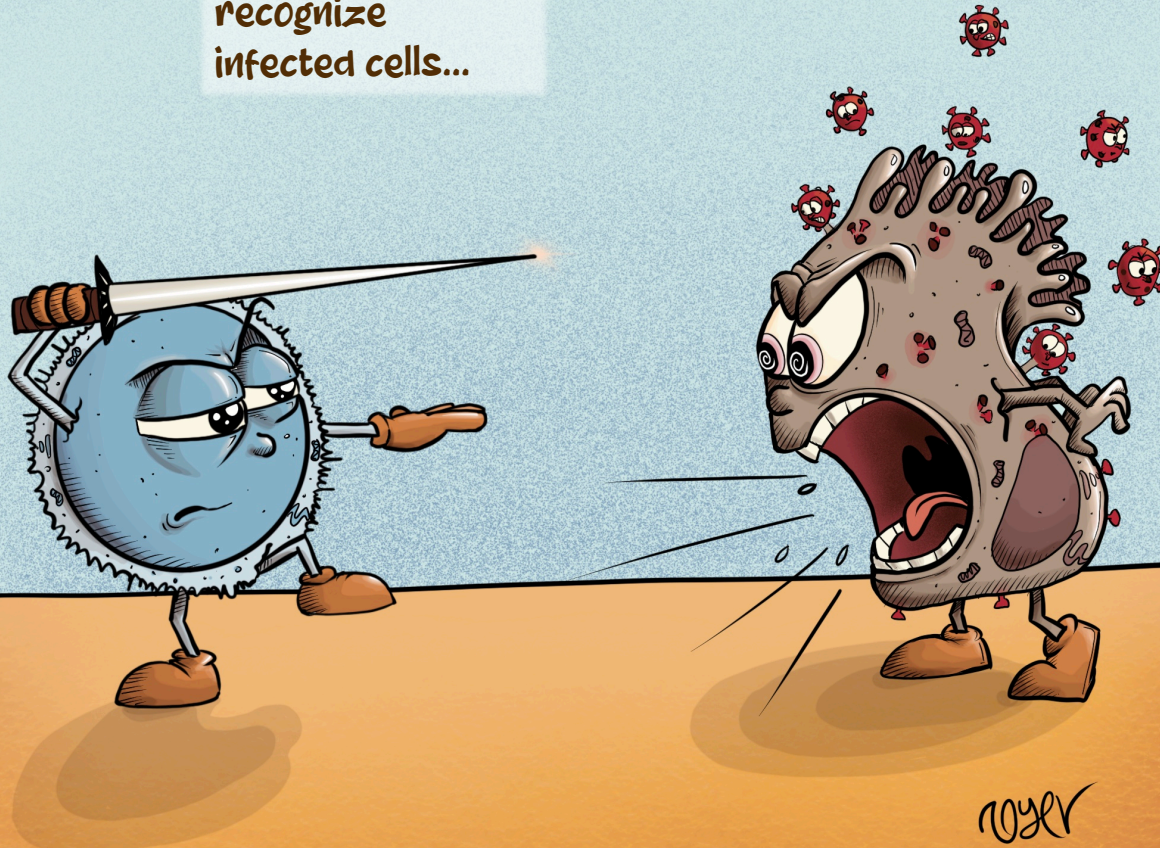


Neutrophil
phagocytosis

...so other
immune cells
can eat it.

royev

T cells find and recognize infected cells...

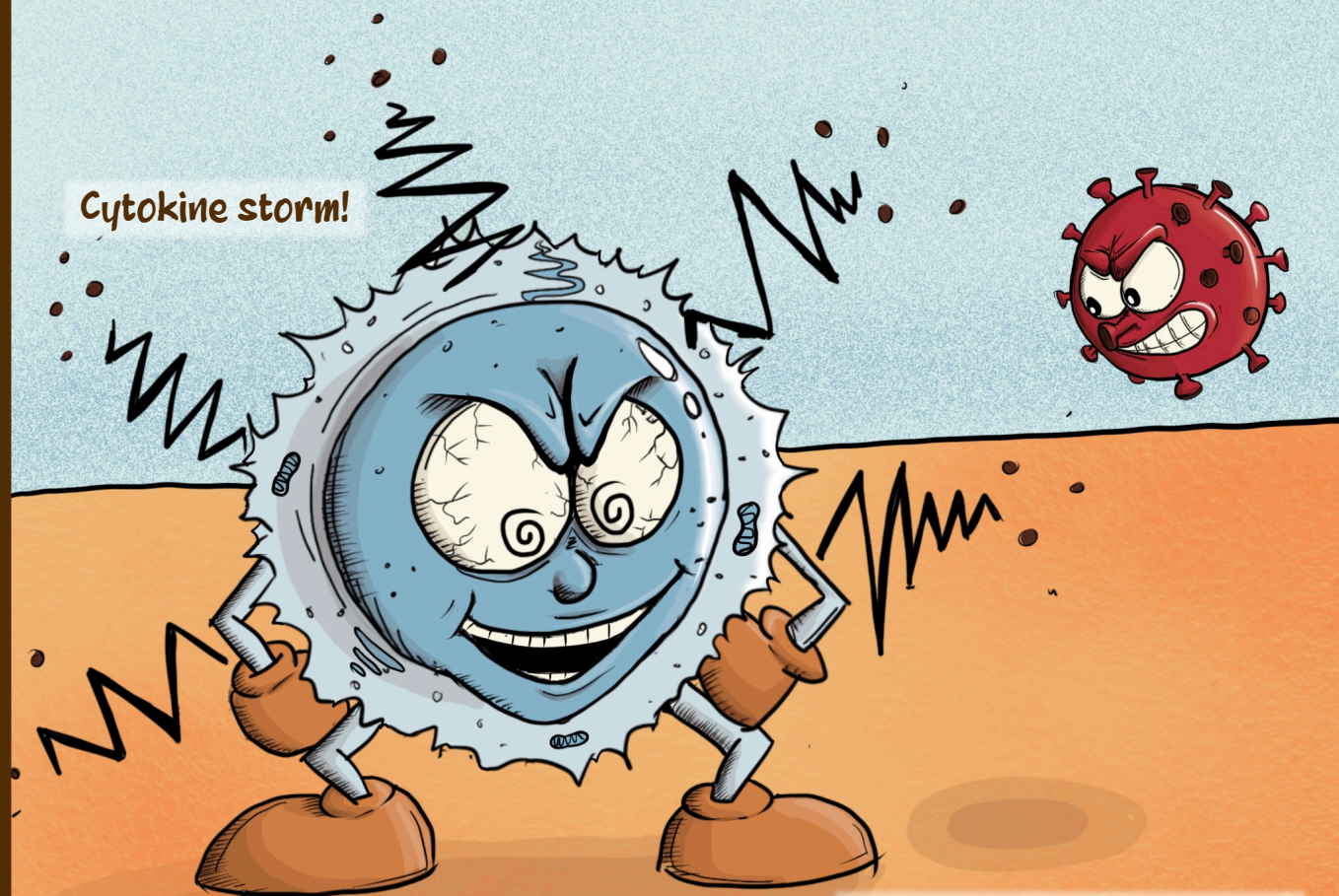


...killing them so the virus can't replicate anymore.



In some people the
reaction against the virus
is exaggerated...

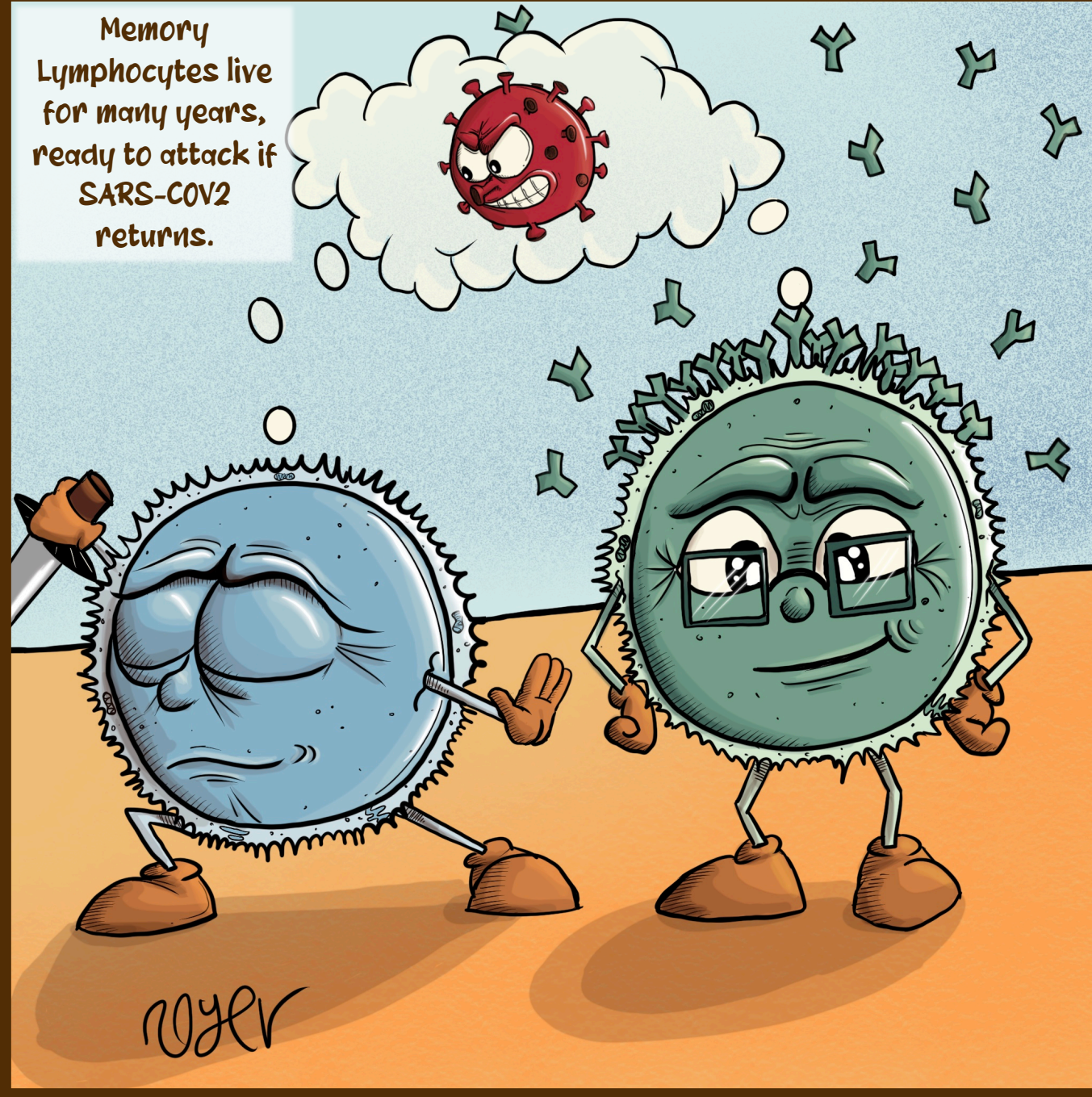
Cytokine storm!



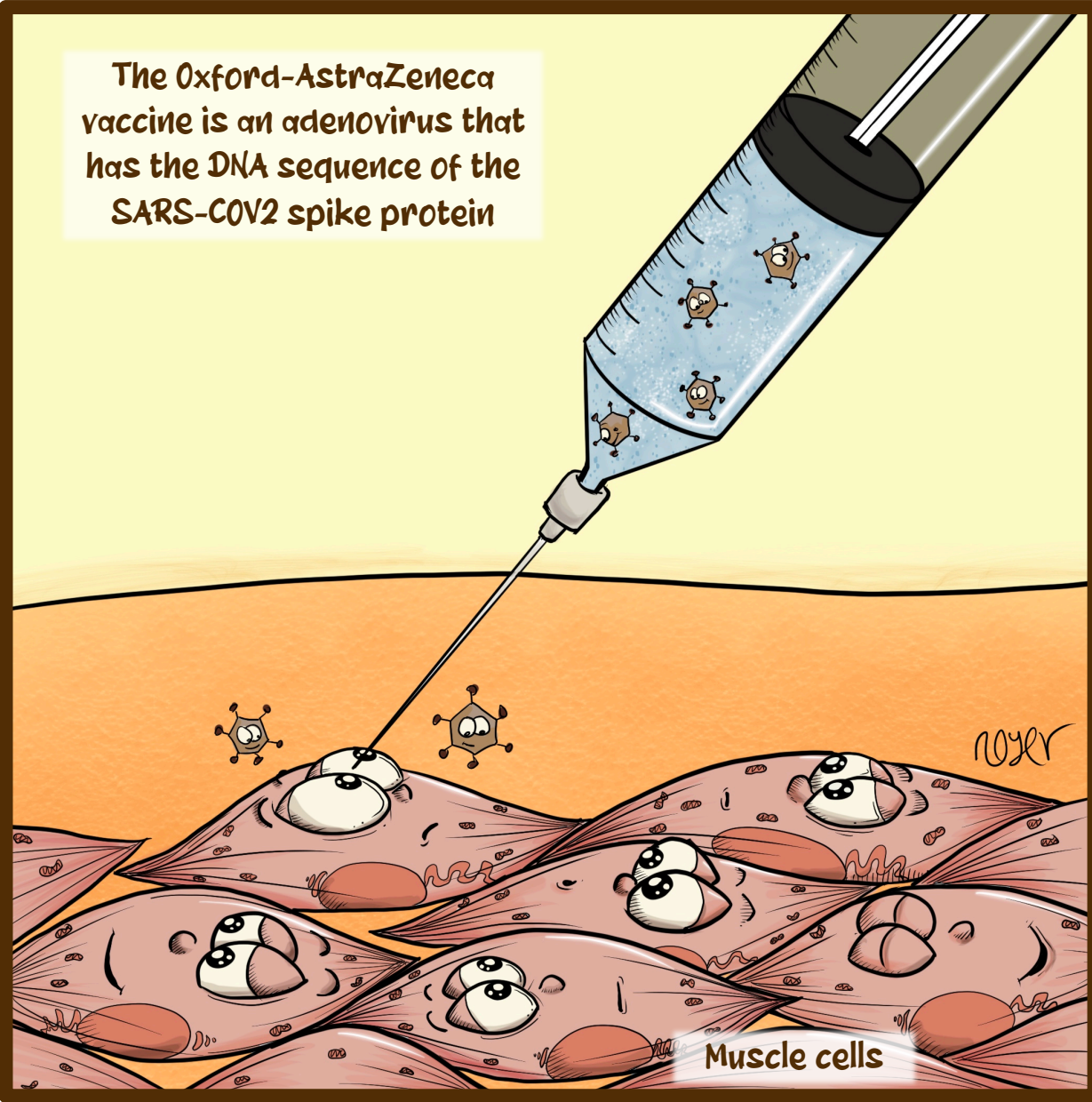
...and leads to more
damage in the tissues.

royer

Memory
Lymphocytes live
for many years,
ready to attack if
SARS-COV2
returns.

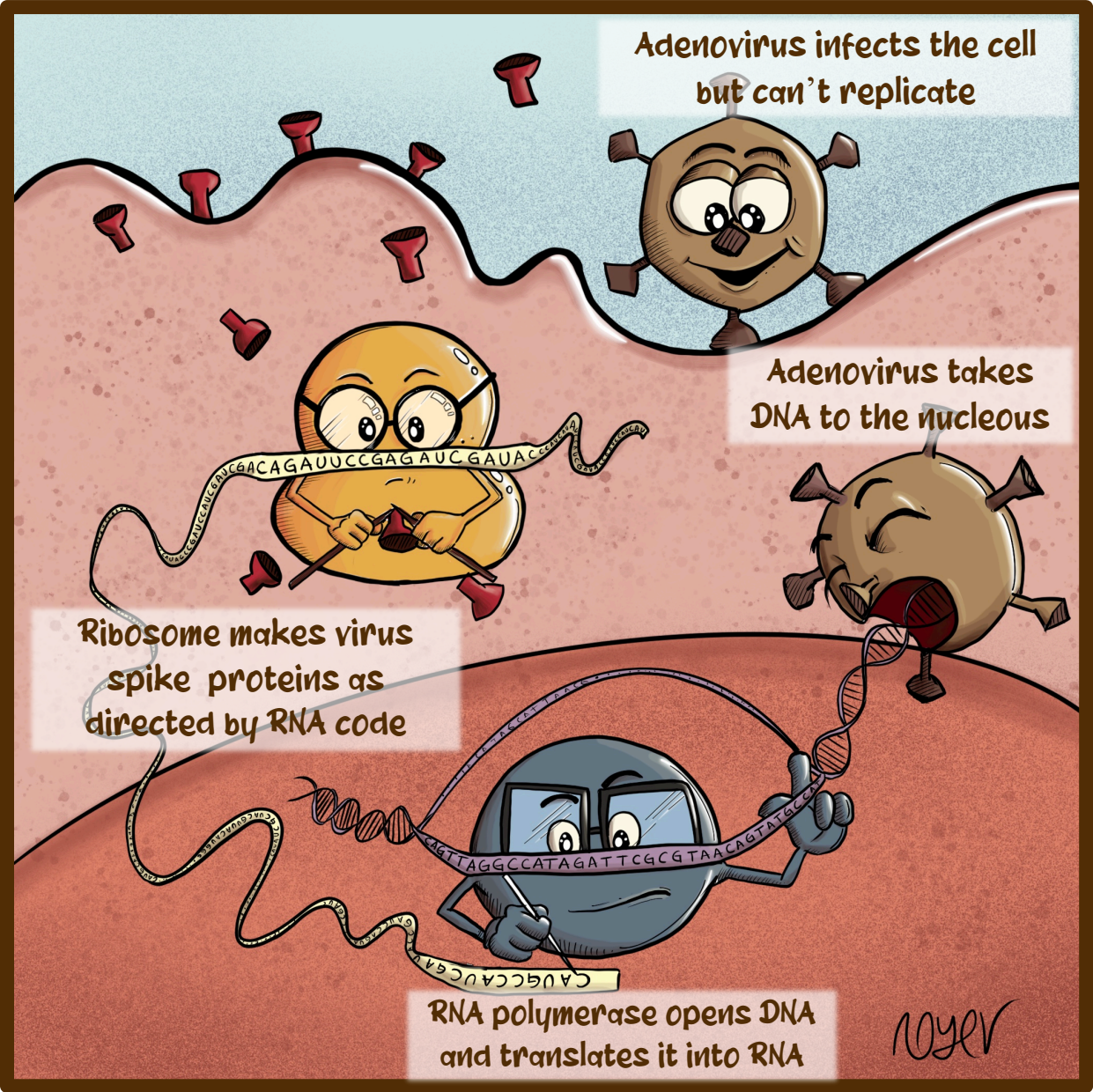


The Oxford-AstraZeneca vaccine is an adenovirus that has the DNA sequence of the SARS-COV2 spike protein



Muscle cells

Adenovirus infects the cell but can't replicate

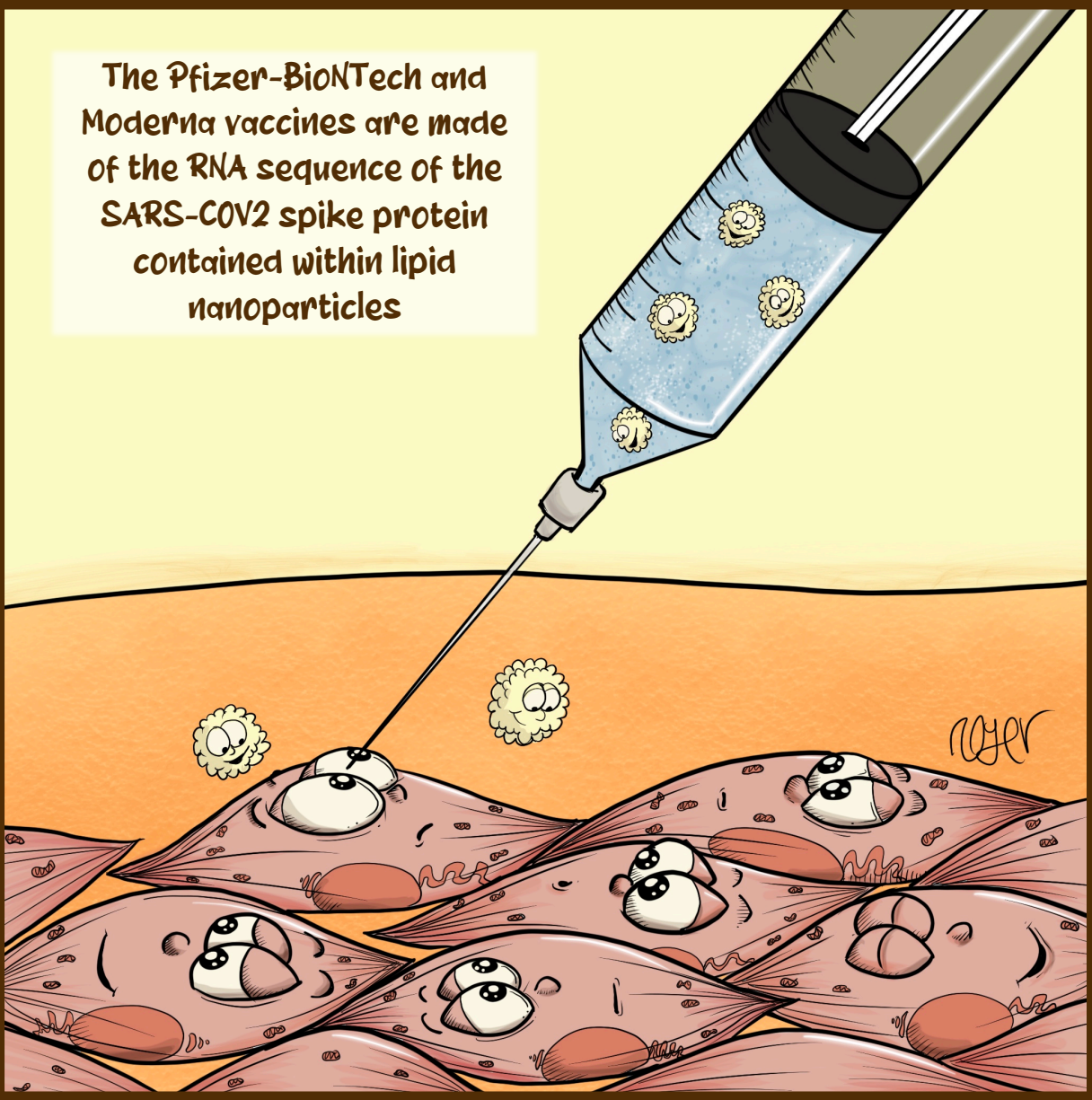


Adenovirus takes DNA to the nucleus

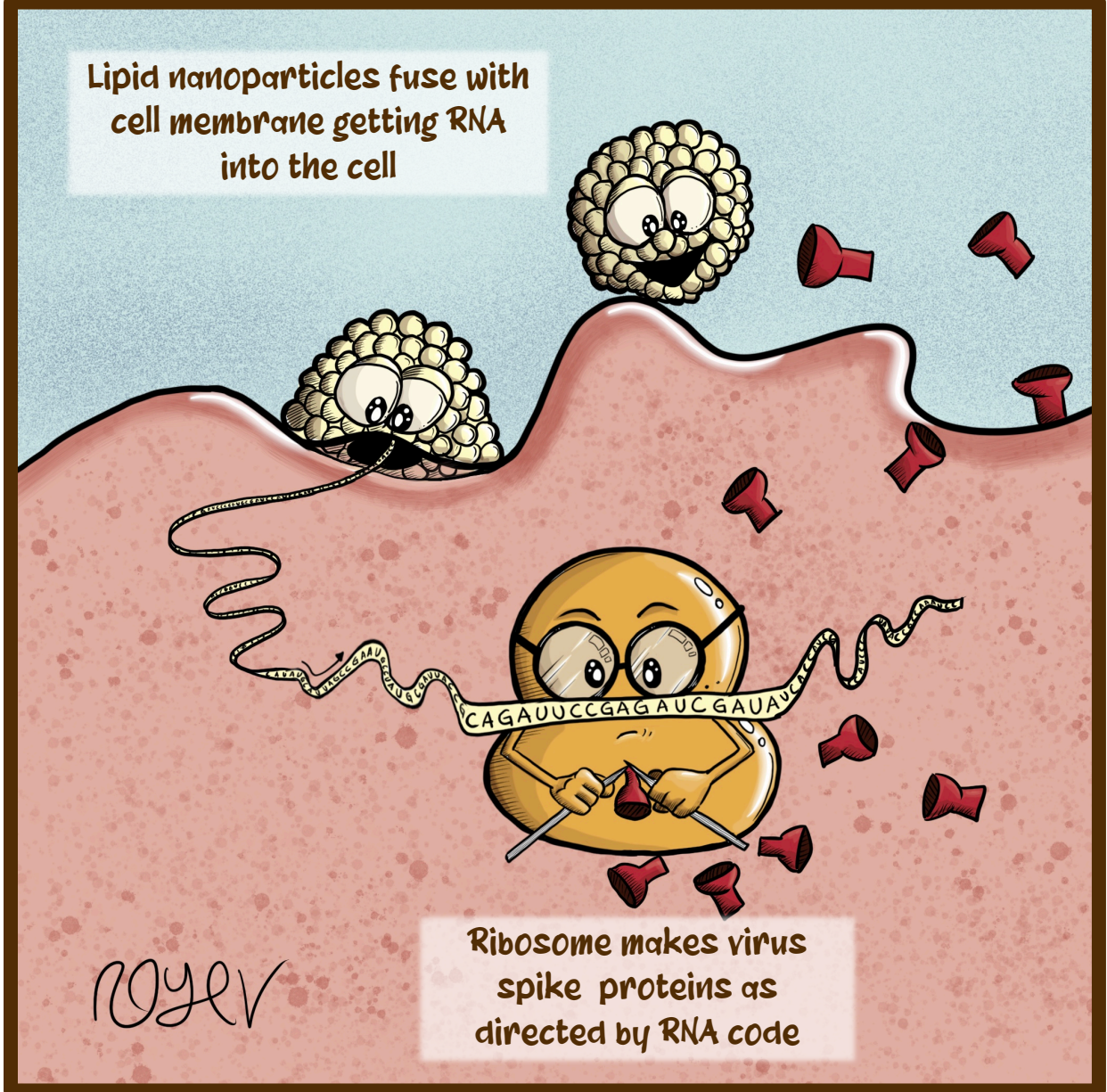
Ribosome makes virus spike proteins as directed by RNA code

RNA polymerase opens DNA and translates it into RNA

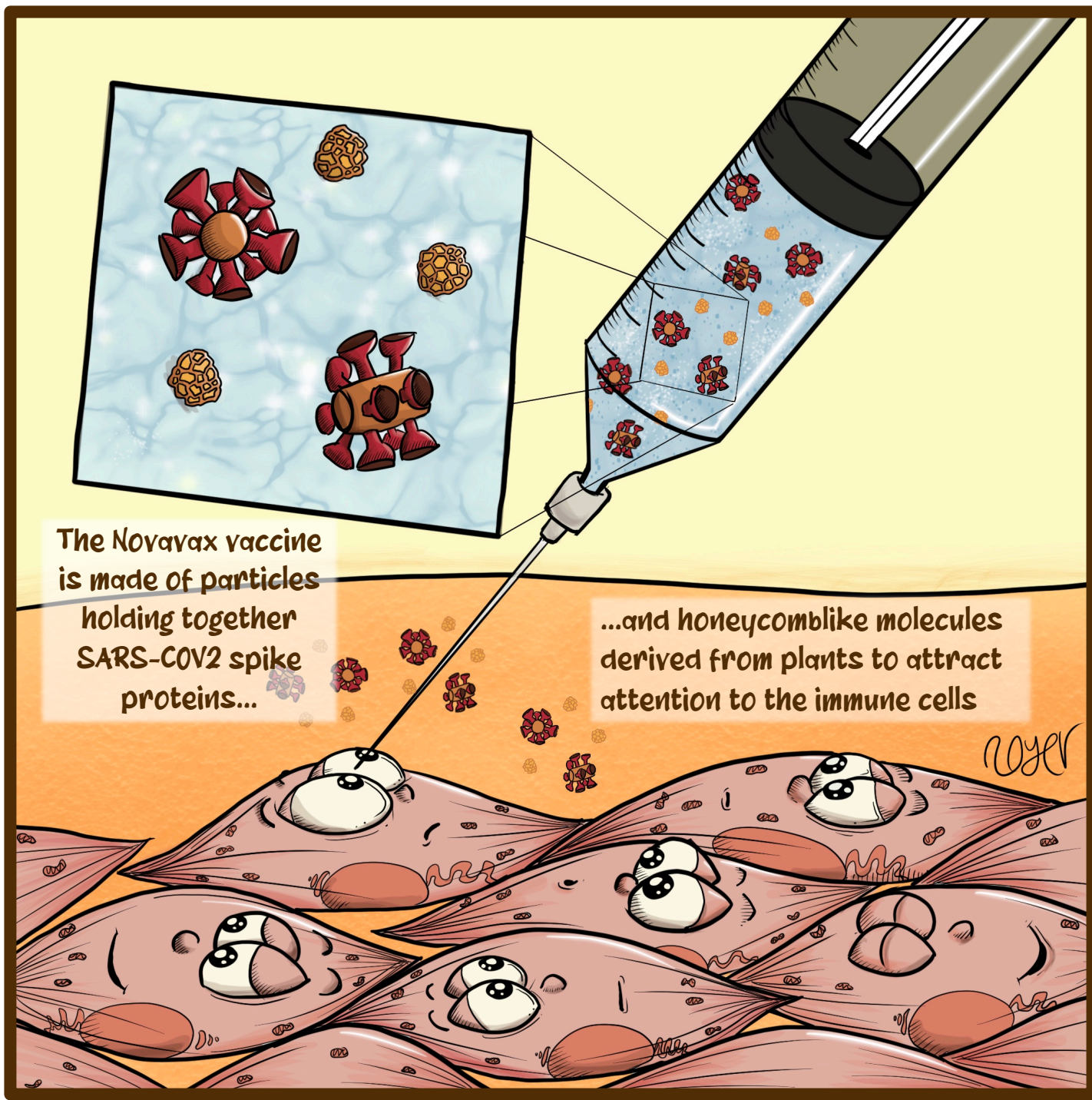
The Pfizer-BioNTech and Moderna vaccines are made of the RNA sequence of the SARS-COV2 spike protein contained within lipid nanoparticles



Lipid nanoparticles fuse with cell membrane getting RNA into the cell



Ribosome makes virus spike proteins as directed by RNA code



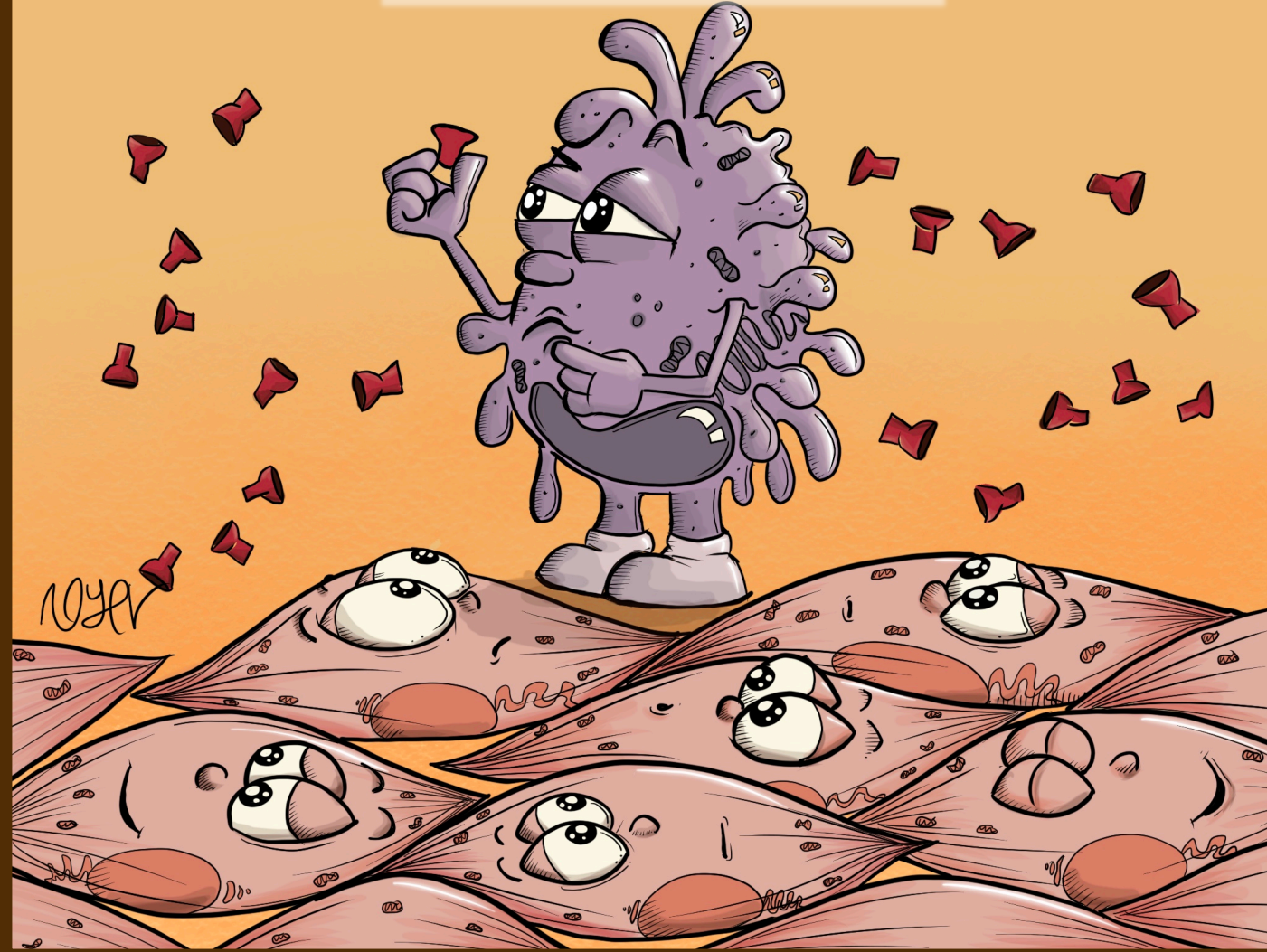
The Novavax vaccine is made of particles holding together SARS-COV2 spike proteins...

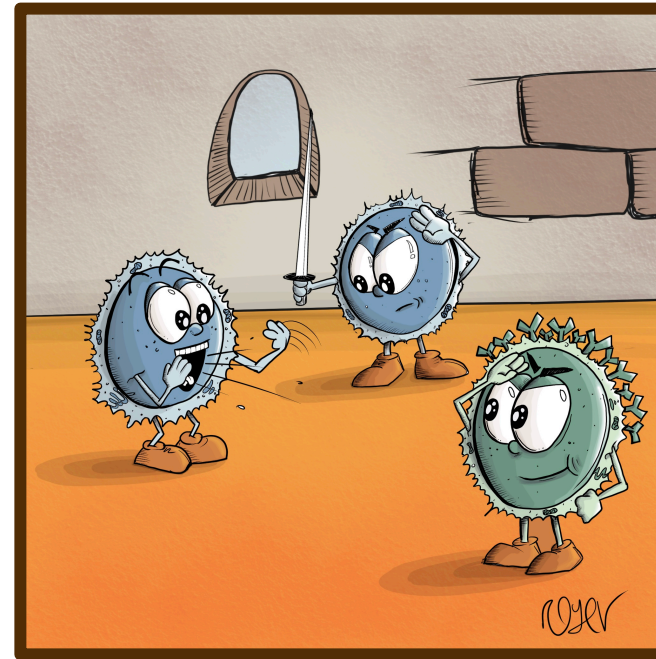
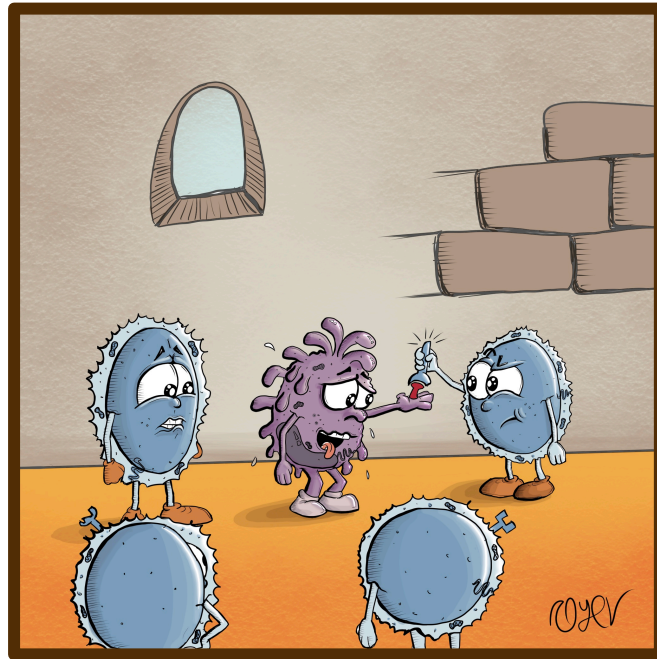
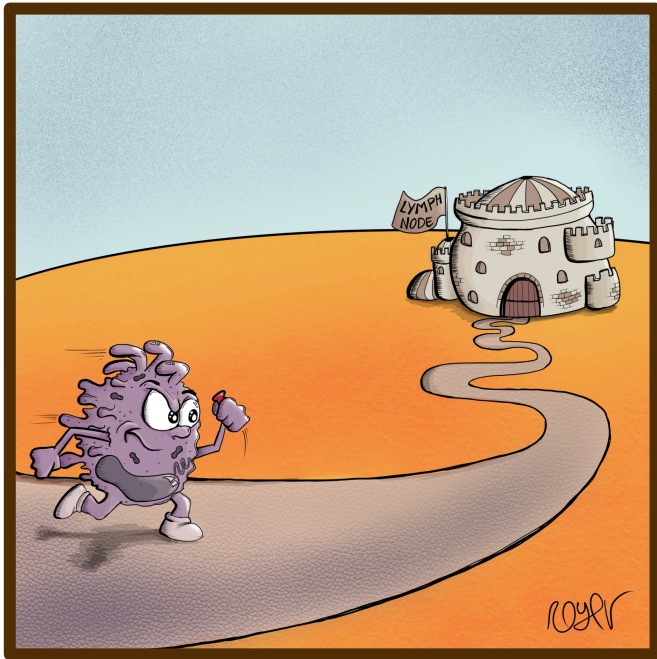
...and honeycomblike molecules derived from plants to attract attention to the immune cells

royer

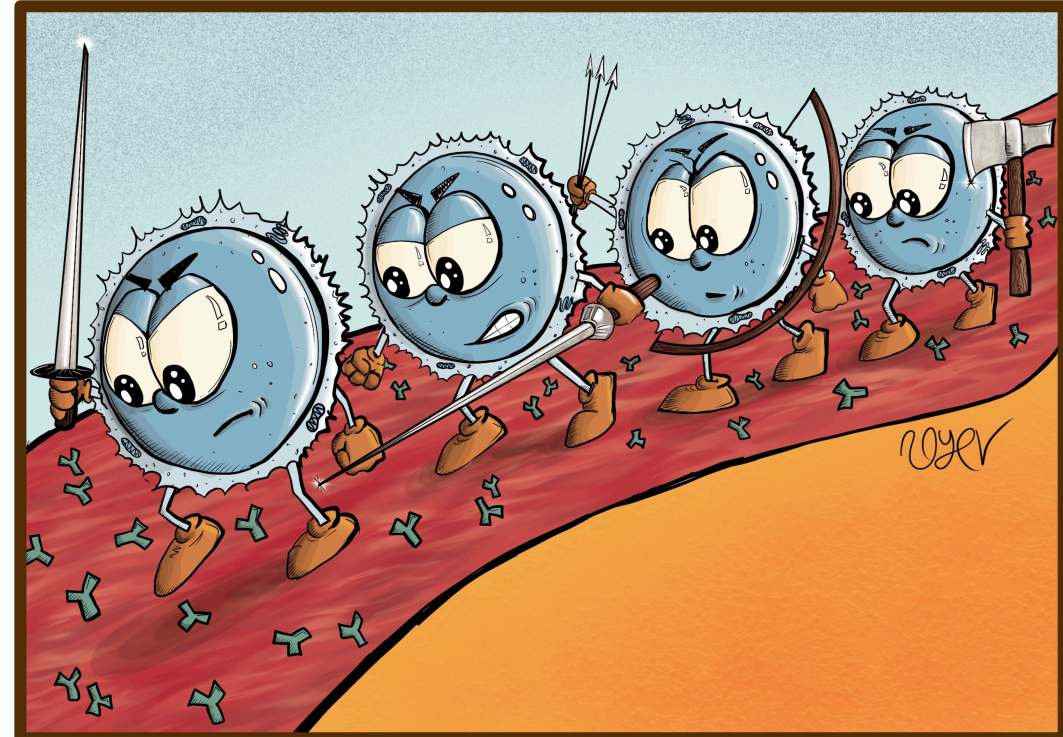
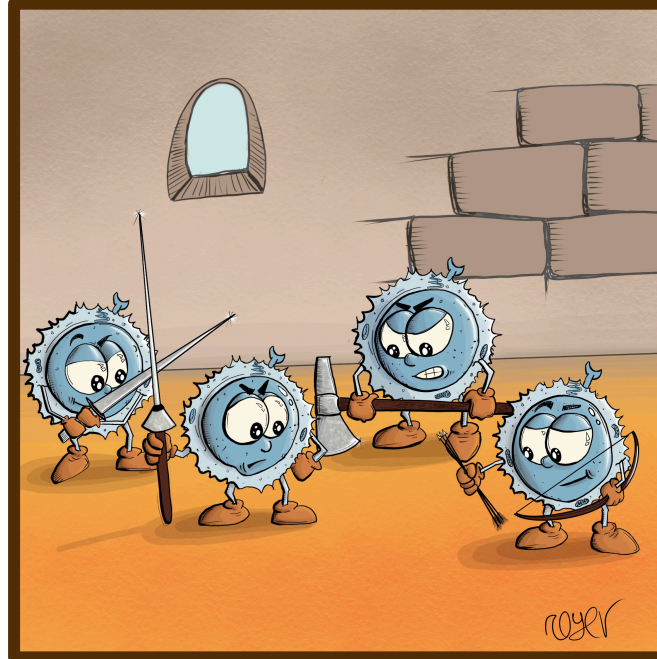
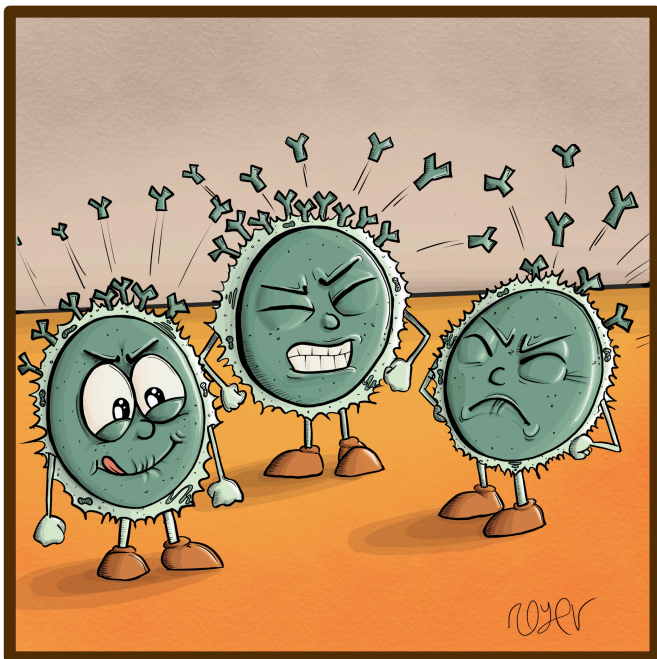
All these vaccines have the same
end result...

...a dendritic cell picks up the
spike protein antigen.

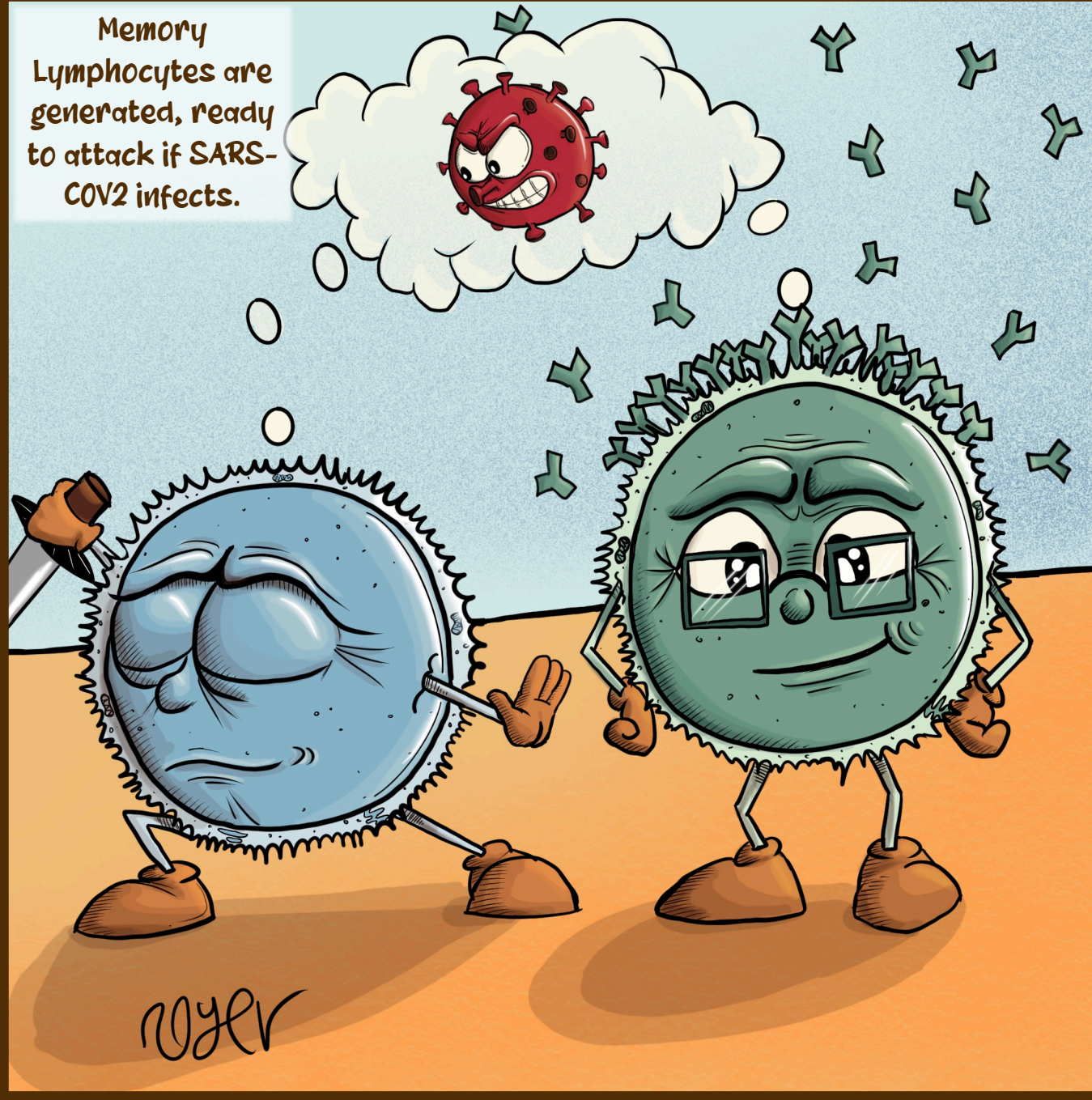




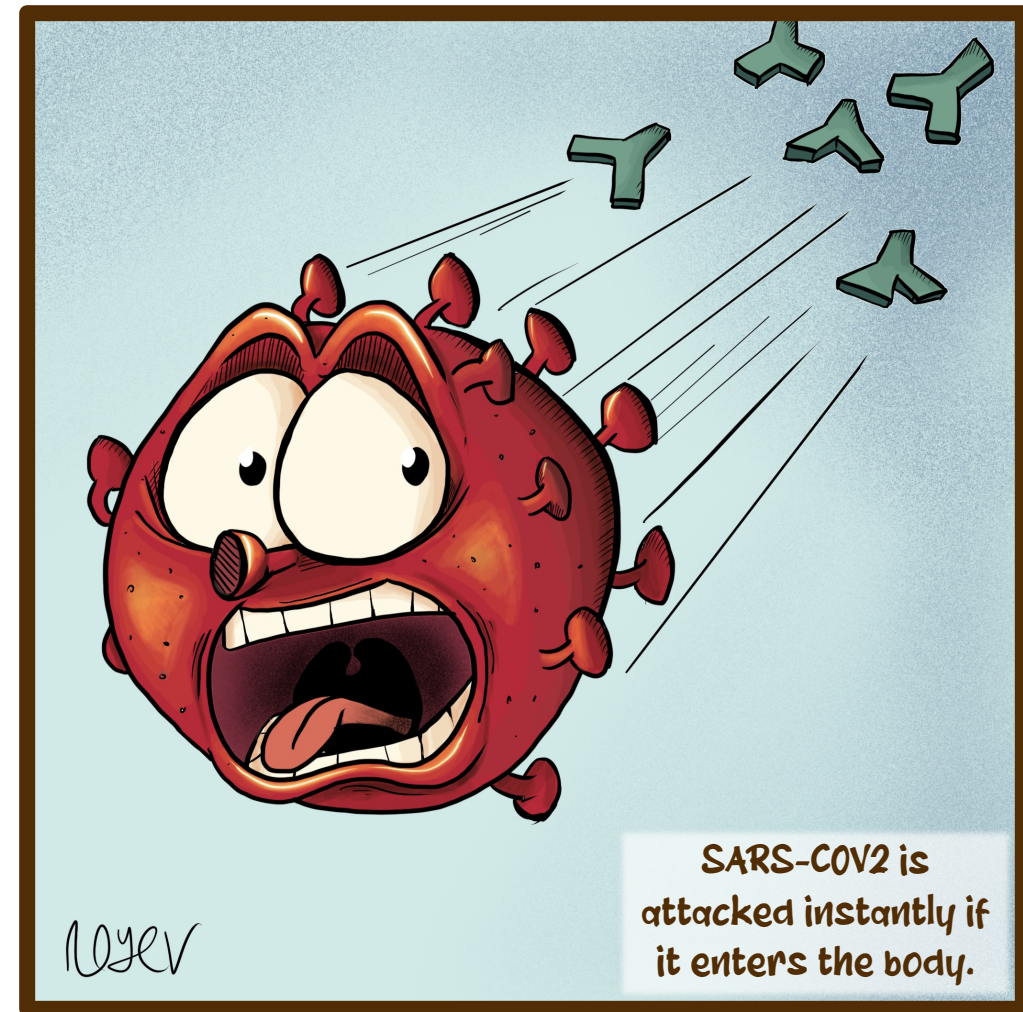
There is an immune reaction generated against the spike protein, producing antibodies and T cells that can recognize and attack SARS-COV2



Memory
Lymphocytes are generated, ready to attack if SARS-COV2 infects.



royer



SARS-COV2 is attacked instantly if it enters the body.

royer