

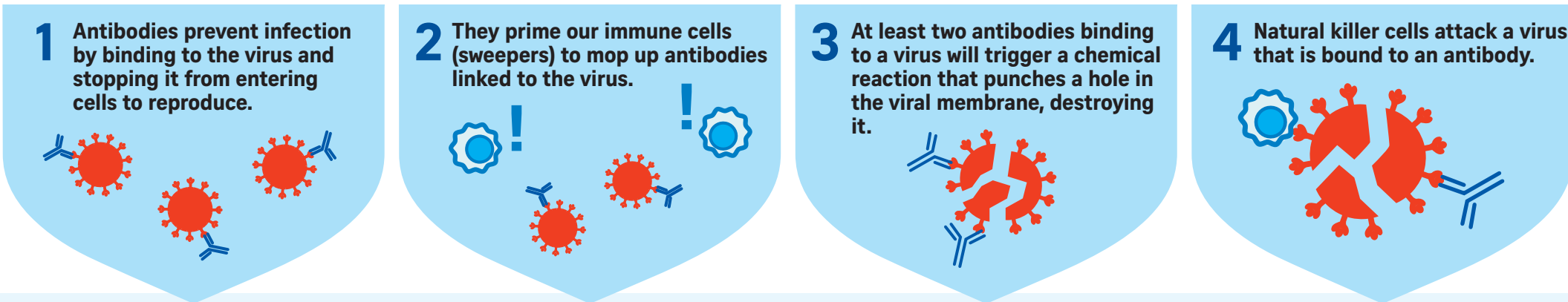
How mRNA vaccines protect against current and future Covid-19 variants

For the majority of healthy adults, three mRNA shots coupled with a previous infection are enough to protect them against current and future Covid-19 variants. Professor Ooi Eng Eong, an expert in emerging infectious diseases at Duke-NUS Medical School, tells **senior health correspondent Salma Khalik** why vaccines confer long-term protection.



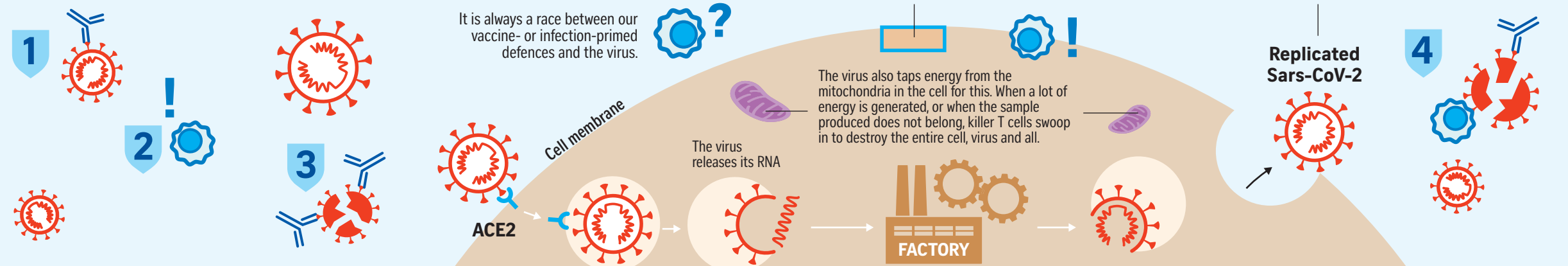
FOUR MAIN WAYS ANTIBODIES FIGHT A VIRUS

Vaccines create antibodies (which wane after a few months of inactivity), prime T cells to recognise the virus, and prepare B cells that can produce more antibodies when the body next encounters the virus.



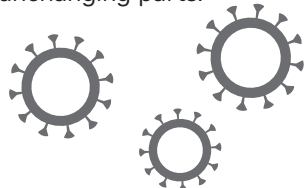
WHY IT'S NOT EASY FOR THE VIRUS TO ENTER CELLS TO REPLICATE

- 1 The ACE2 receptor on the cell surface is the main entry point for the Sars-CoV-2 virus.
- 2 For the virus to reach such a receptor, it is like someone parachuting into Singapore to find Shenton Way, without a map. But if hundreds of thousands are parachuted in, some will land in Shenton Way.
- 3 Once a virus enters the cell, it heads to the "factory" within the cell to get it to produce more virus.
- 4 This factory always puts out a "sample" of what it is producing on its surface (in the human leukocyte antigen protein) so the "police" T cells can check if what is produced belongs to the body.
- 5 Although it takes less than 24 hours for infected cells to die, the virus needs only one round of eight hours to produce thousands of viruses to be released from the cell to invade other cells. More than one round of virus production may occur before the cell dies.

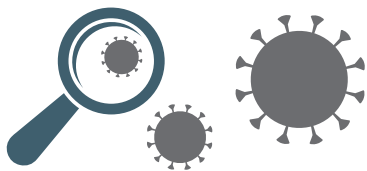


WHY PROTECTION REMAINS AS VARIANTS CHANGE

All Sars-CoV-2 variants retain some basic, unchanging parts.



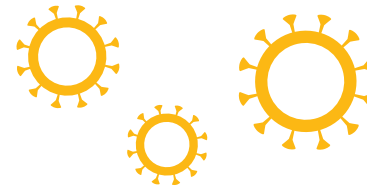
So the first mRNA vaccine would prime our body to recognise the original virus' "grey jacket".



The bivalent vaccine retains the shape of the jacket, but the colour changes – say, green for Moderna and red for Pfizer.



A new variant with a yellow jacket may try to infect us.



Our defences might take a little longer to react as it does not recognise the colour, but it does remember the shape of the jacket and will mount a response.

