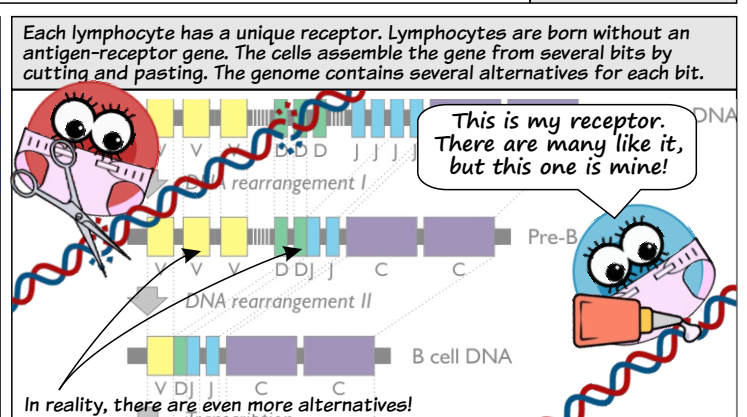
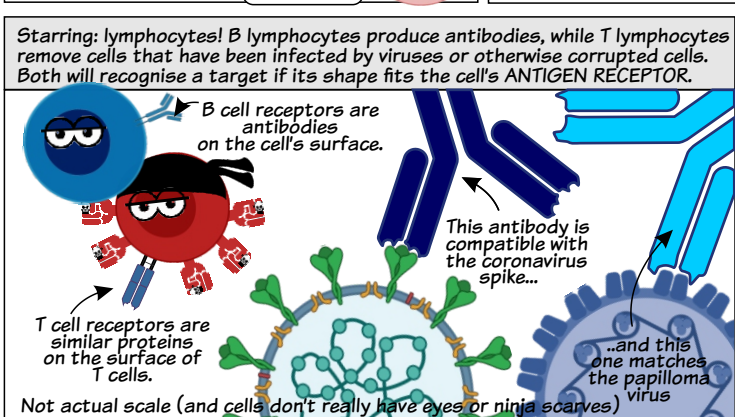
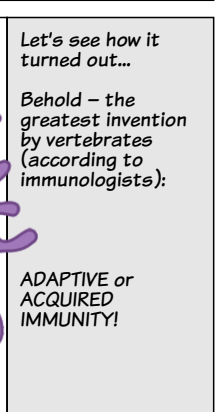
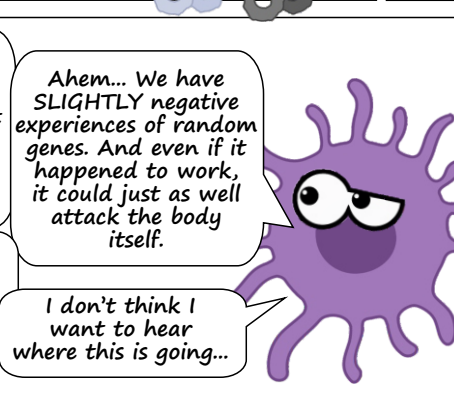
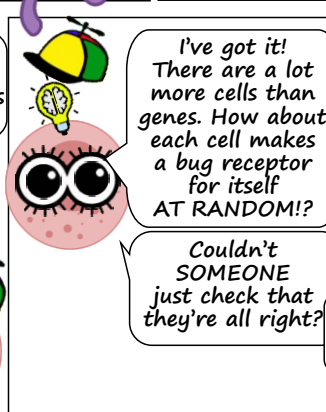
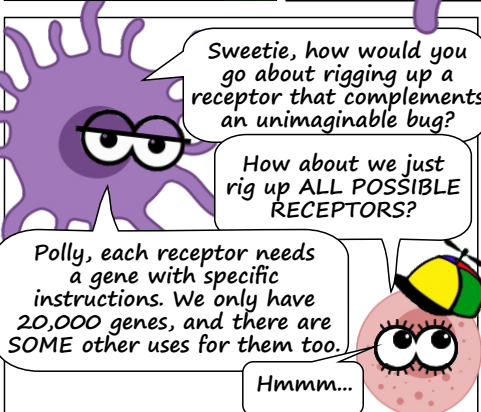
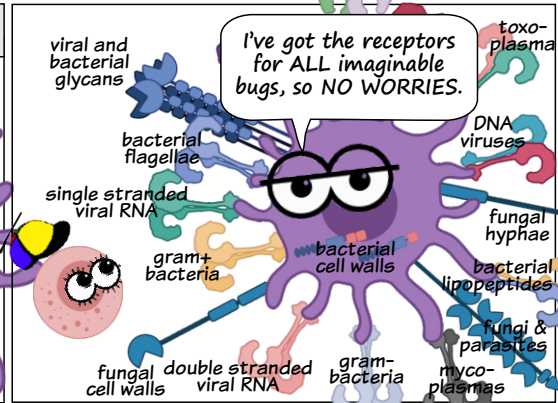
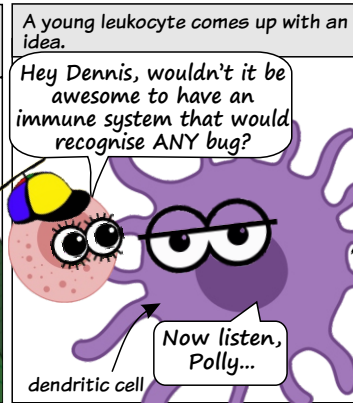
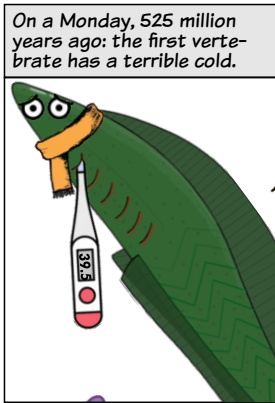


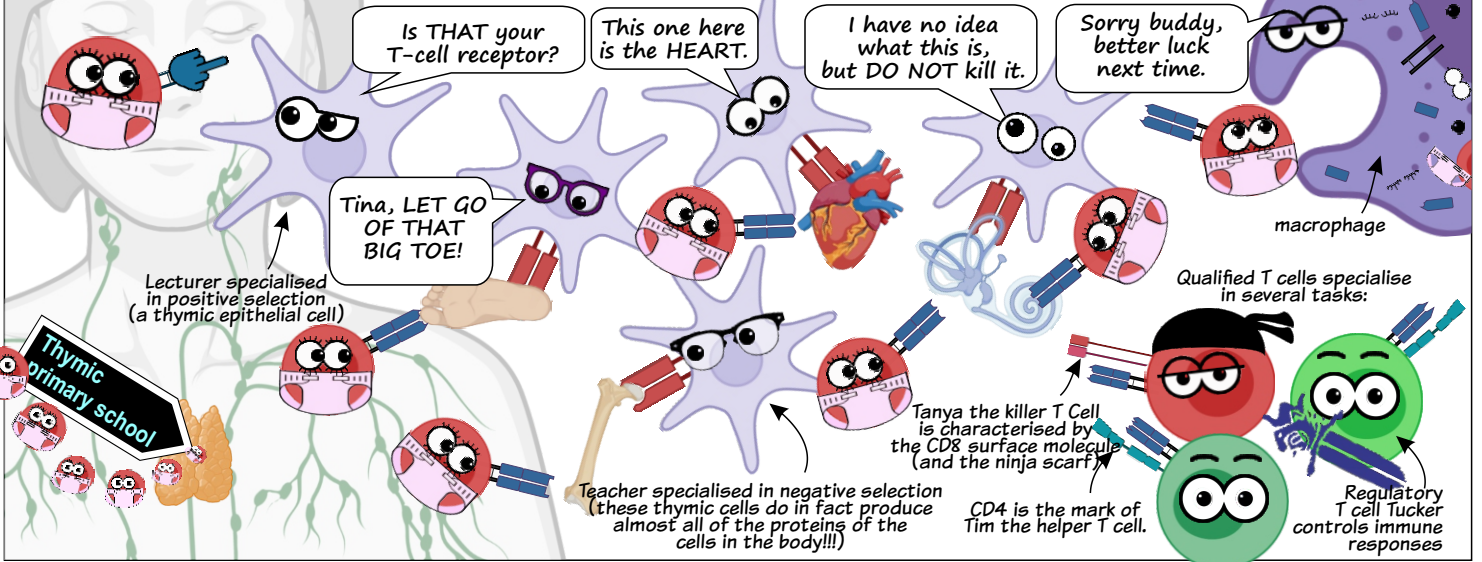
ONCE UPON A TIME... IMMUNITY

@MikaelNiku
Veterinary Biosciences
University of Helsinki, Finland

EPISODE I: A NEW HOPE FROM TIM, TANYA & TUCKER



Young lymphocytes go to school in the lymphatic tissue. The T cell school is in the thymus, while B cells... well, that's a long story. In the thymus, T cells' ability to put together functional T-cell receptors is verified. After that, it is made sure that the receptor does not attach too tightly to any part of the body. The cells that pass the test specialise in different tasks, get their diploma and head off into the world. The unlucky ones end up being recycled.



ONCE UPON A TIME... IMMUNITY

@MikaelNiku

Veterinary Biosciences
University of Helsinki, Finland

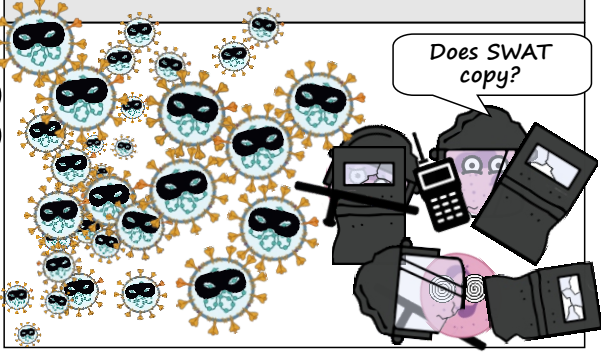
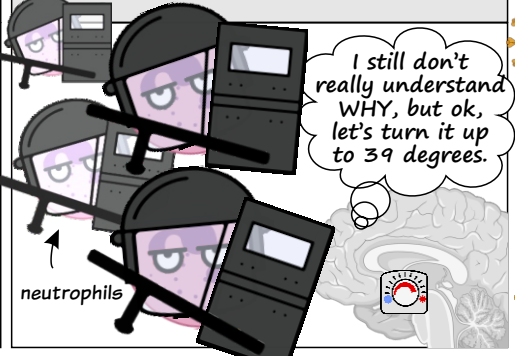
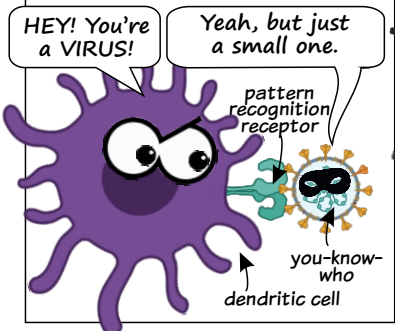
EPISODE II: THE FORCE AWAKENS (OR: ACQUIRED IMMUNITY)



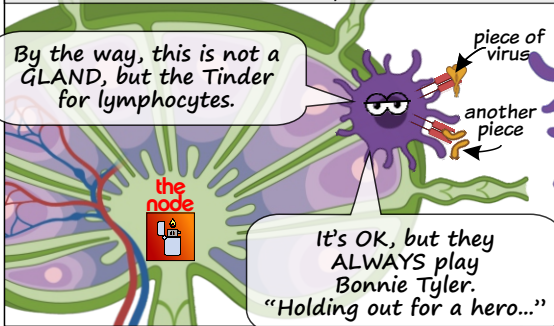
When a bug enters the body, a cell quickly notices it. Dendritic cells and macrophages are usually on guard duty.

The guards alert the riot police and send a message to the brain to engage fever.

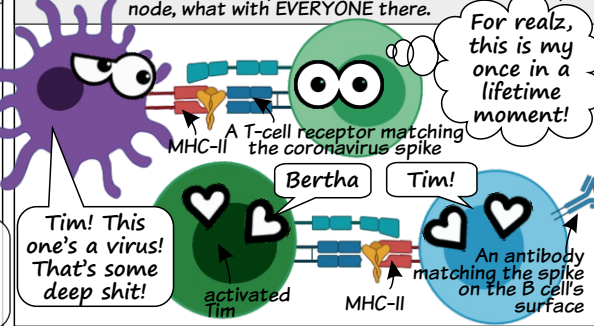
Riot police are usually able to control the situation, but sometimes the shit hits the fan.



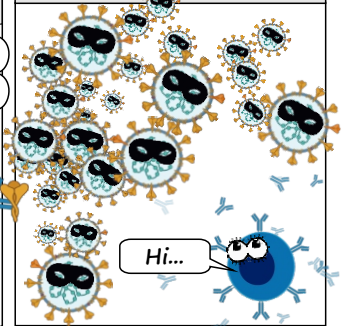
Meanwhile, Dennis has already arrived at the hot spot, that is, the closest lymph node. There, from among millions of T cells, he has to find one with a receptor matching the virus.



As for helper T cells, they have to identify from among millions of B cells a cell that has identified the exact same virus, which they then activate. Hook-ups are a dime a dozen in the lymph node, what with EVERYONE there.



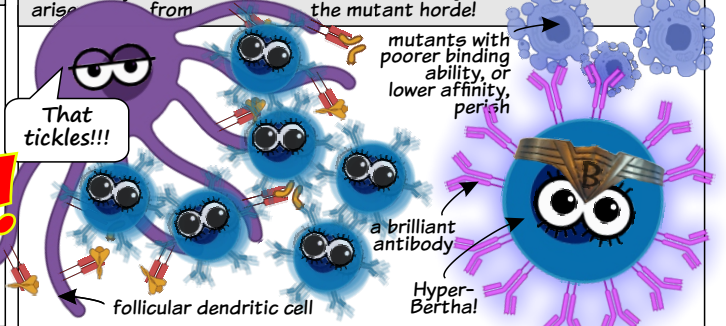
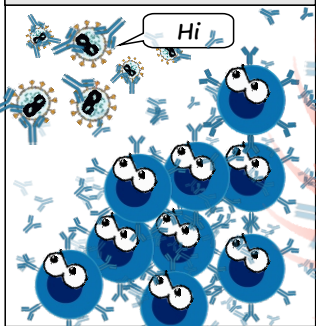
Activated B cells produce antibodies, but a single cell doesn't get far on its own...



However, Bertha multiplies into a countless number of clones, all of which strike the virus!

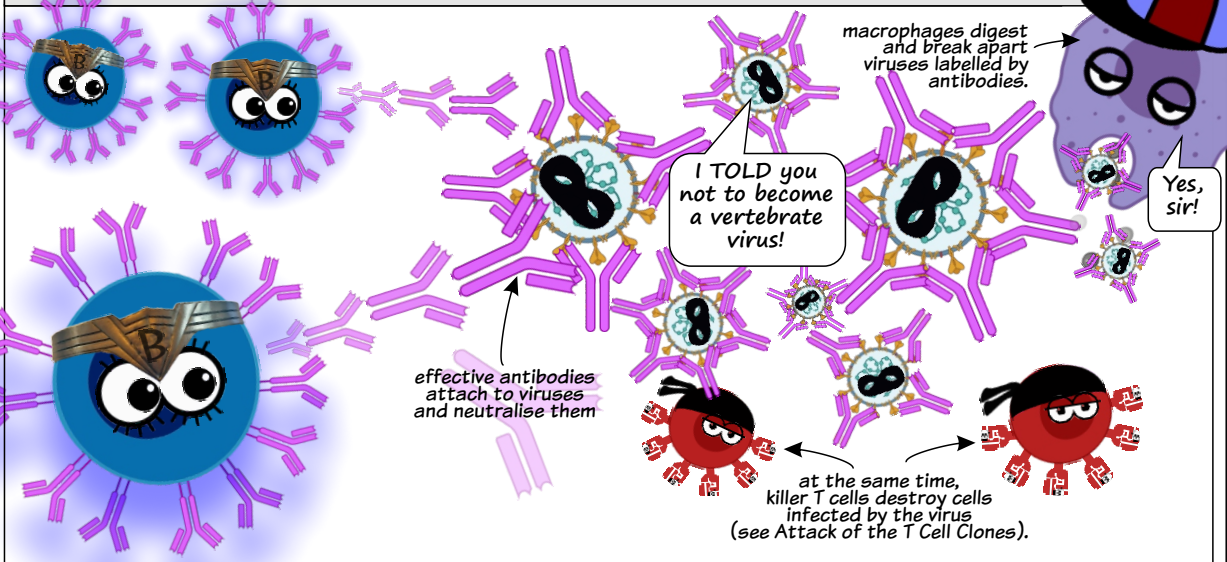
Some of the Berthas stay in the lymph node, where their antibody genes start to undergo hypermutation!

The mutant-Berthas whose antibodies attach most effectively to the viral components presented by antigen-presenting cells in the lymph node are qualified for the next round. Eventually, HYPER-BERTHAS arise from the mutant horde!



As a result of instant evolution, the antibodies produced by Hyper-Berthas attach extremely efficiently to the virus. They prevent the virus from binding to the surface of cells, blocking its entrance to the cells to multiply. The antibodies also label the virus for destruction.

The creation of Hyper-Berthas takes a couple of weeks. Once the virus has been eliminated, some Hyper-Berthas become long-lived memory cells, which remain in the body in case the same virus makes another attempt later. If it does, effective defences will be raised much quicker, making the body immune to this particular virus.



A vaccine initiates the creation of Hyper-Berthas similarly to actual viruses, but in a much safer way. In other words, you should get vaccinated if a vaccine is available!

English translation by Lauri Mäkelä, edited by Julie Uusinarkaus, University of Helsinki Language Services

Created with ©BioRender.com & Noun Project

Also check out 'Once upon a time... An RNA vaccine!'