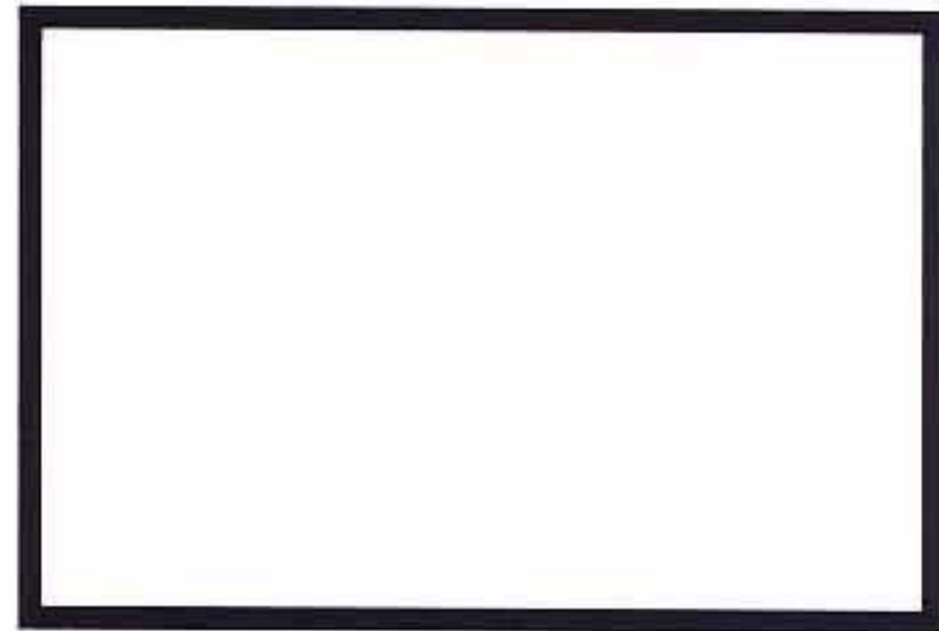
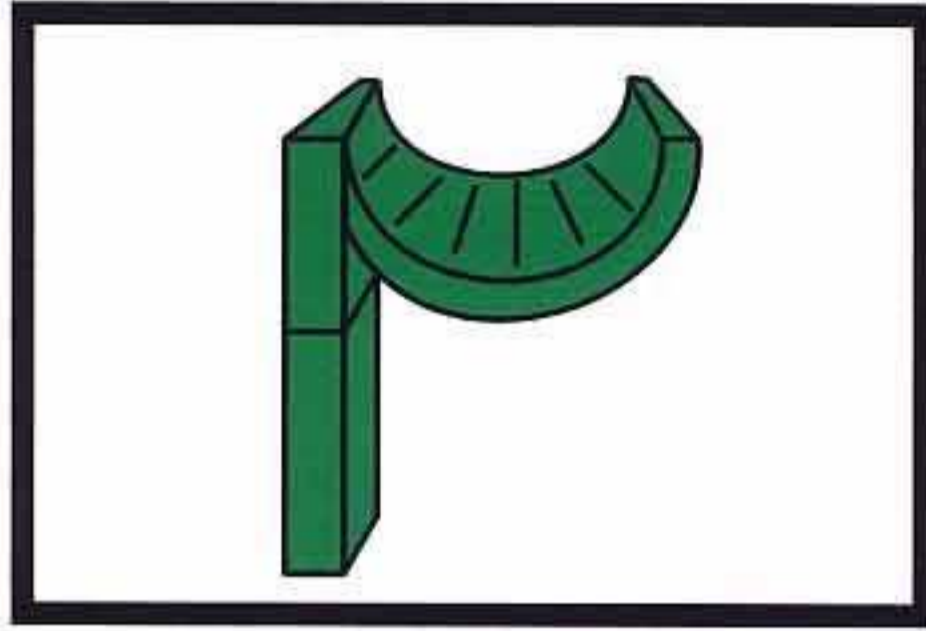


CHAPTER FOUR

THE 'DEFENCE' PROTEIN

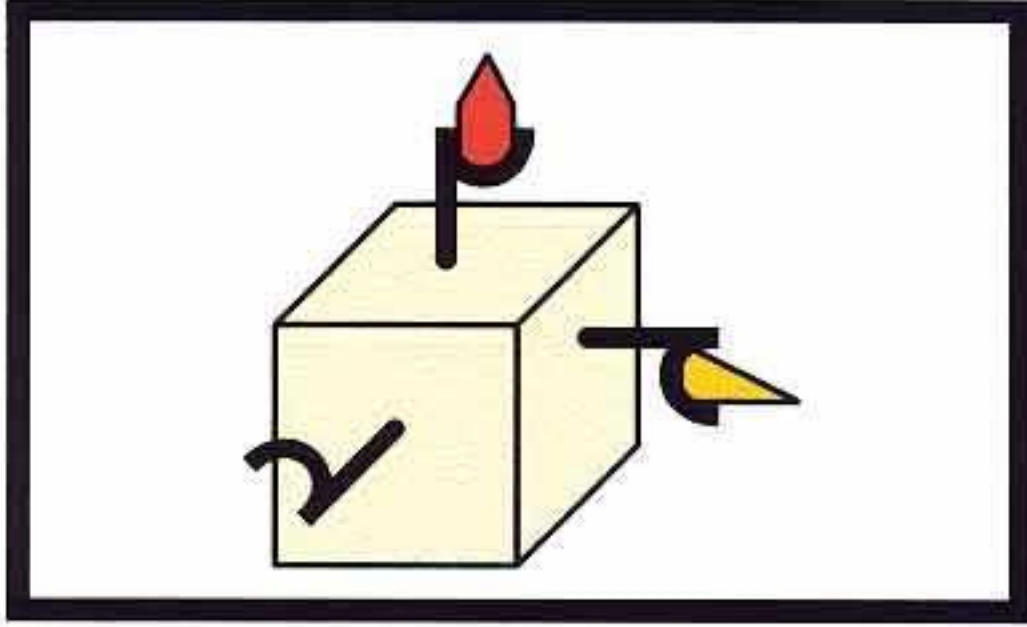


The 'defence' protein is found on the surface of every nucleated cell in the body.

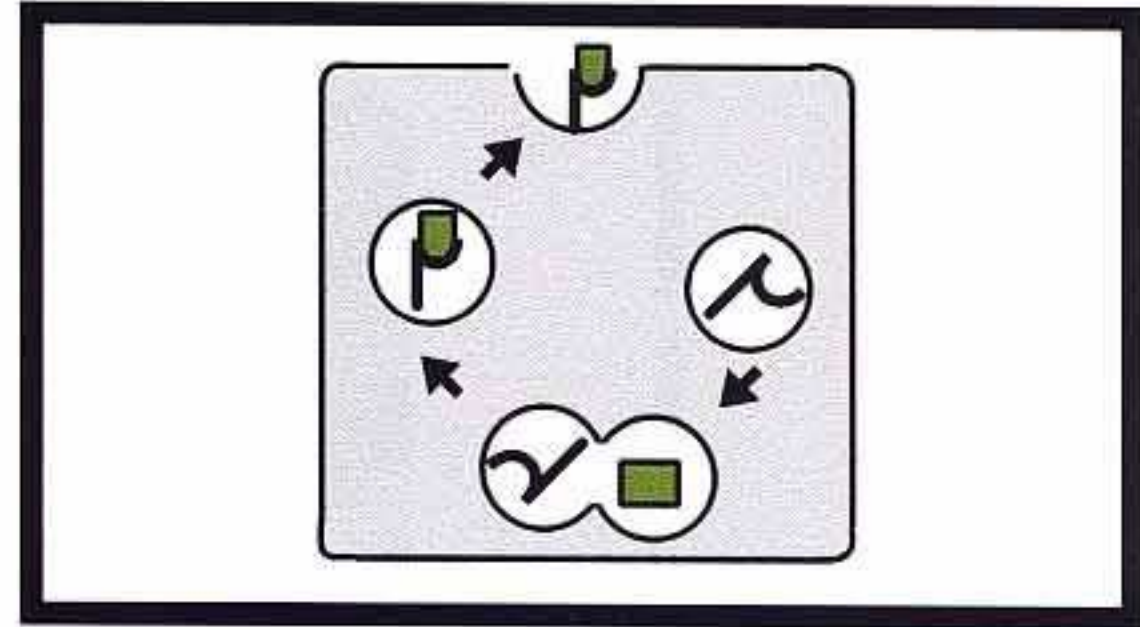
↕ Easy reading

Technical information

The 'defence' protein's technical (official) name, is the major histocompatibility complex (MHC) class 1 protein.



The cleft at the top of the 'defence' protein, often holds small lengths of protein from inside the cell.



These are 'picked up', as the 'defence' proteins continually circulate between the surface and the interior.

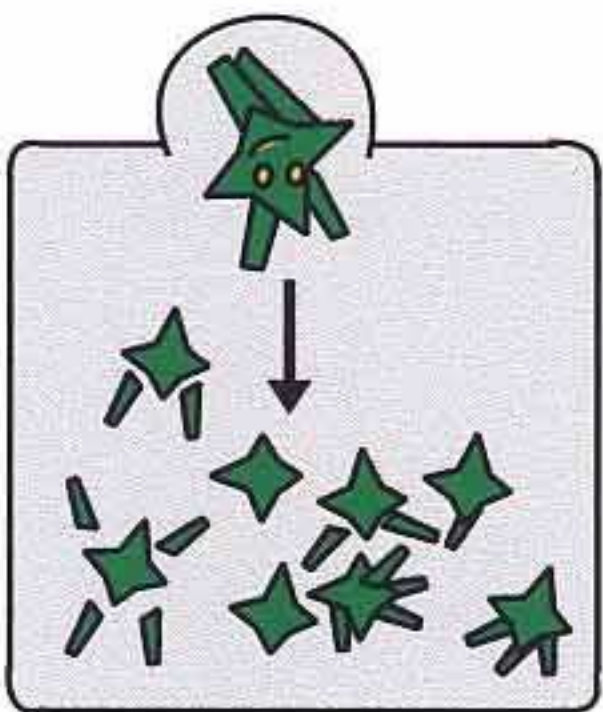
The cleft can hold small lengths of protein, about 10 amino acids long.

NOW MEET T CYTOTOXIC LYMPHOCYTE

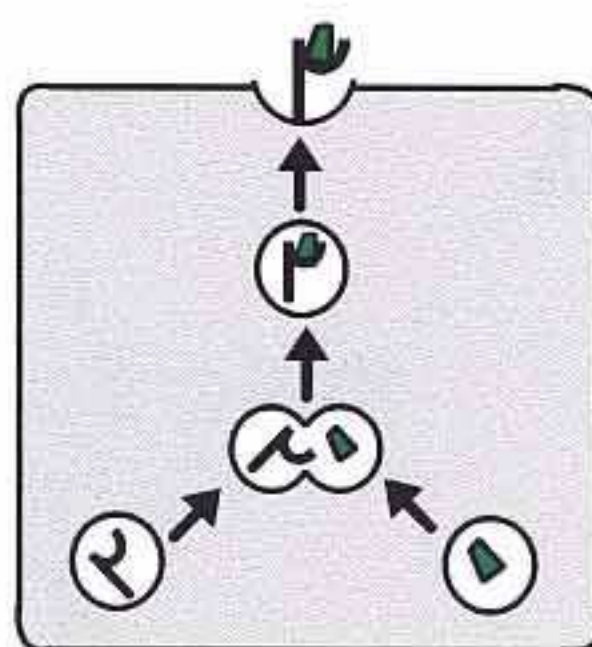


His beat is in the blood.

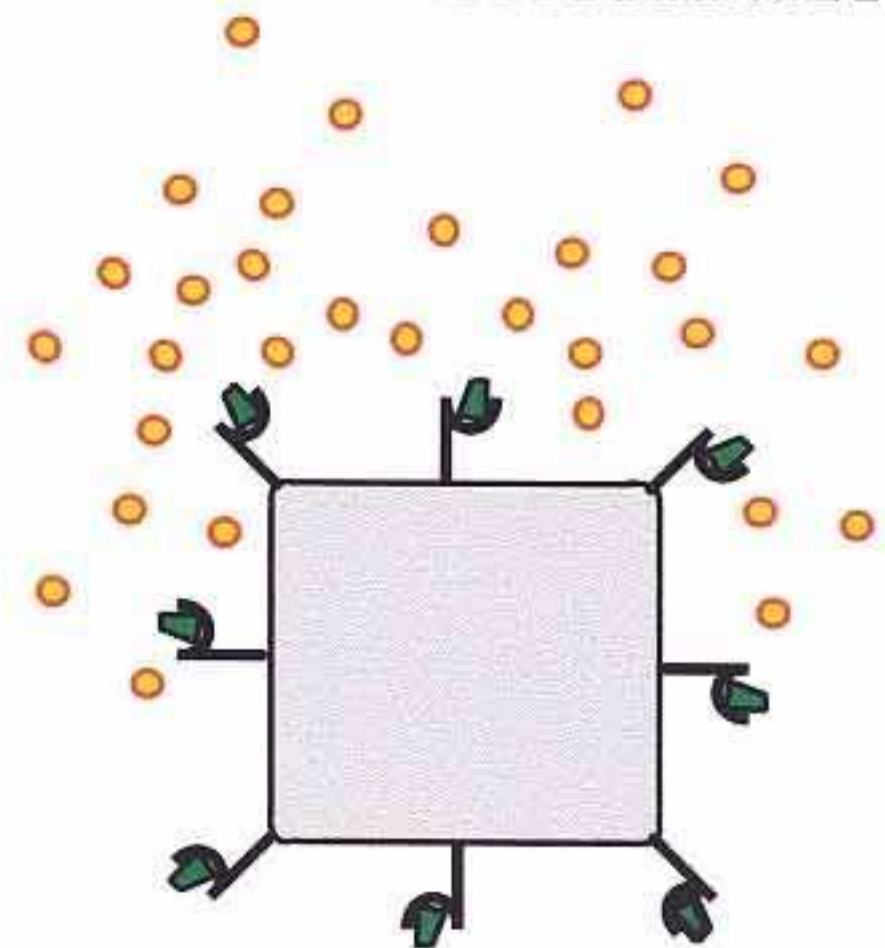
A VIRAL INFECTION



If a virus can get into a cell, it will start to replicate itself.

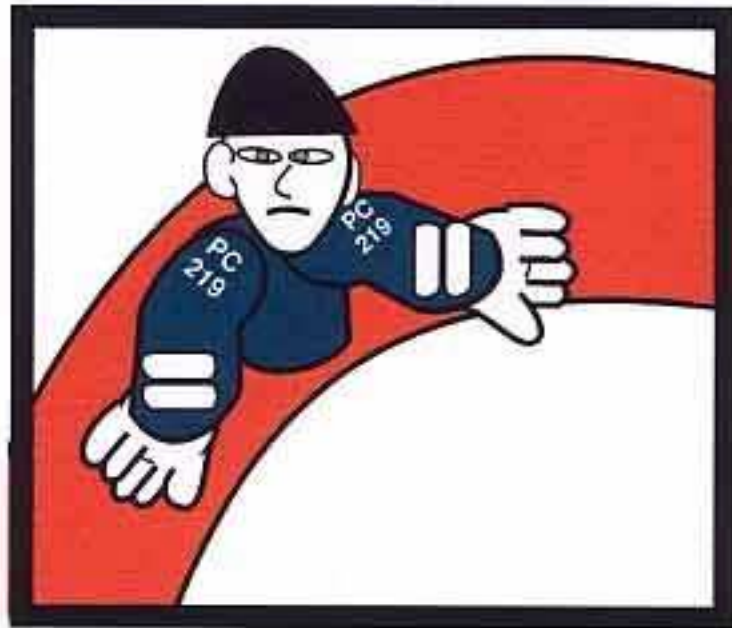


Viral proteins soon appear at the cell's surface, attached to 'defence' proteins.



Infected cells will also release alpha interferon to 'warn' other cells (see page 295).

AT THE SITE OF THE INFECTION



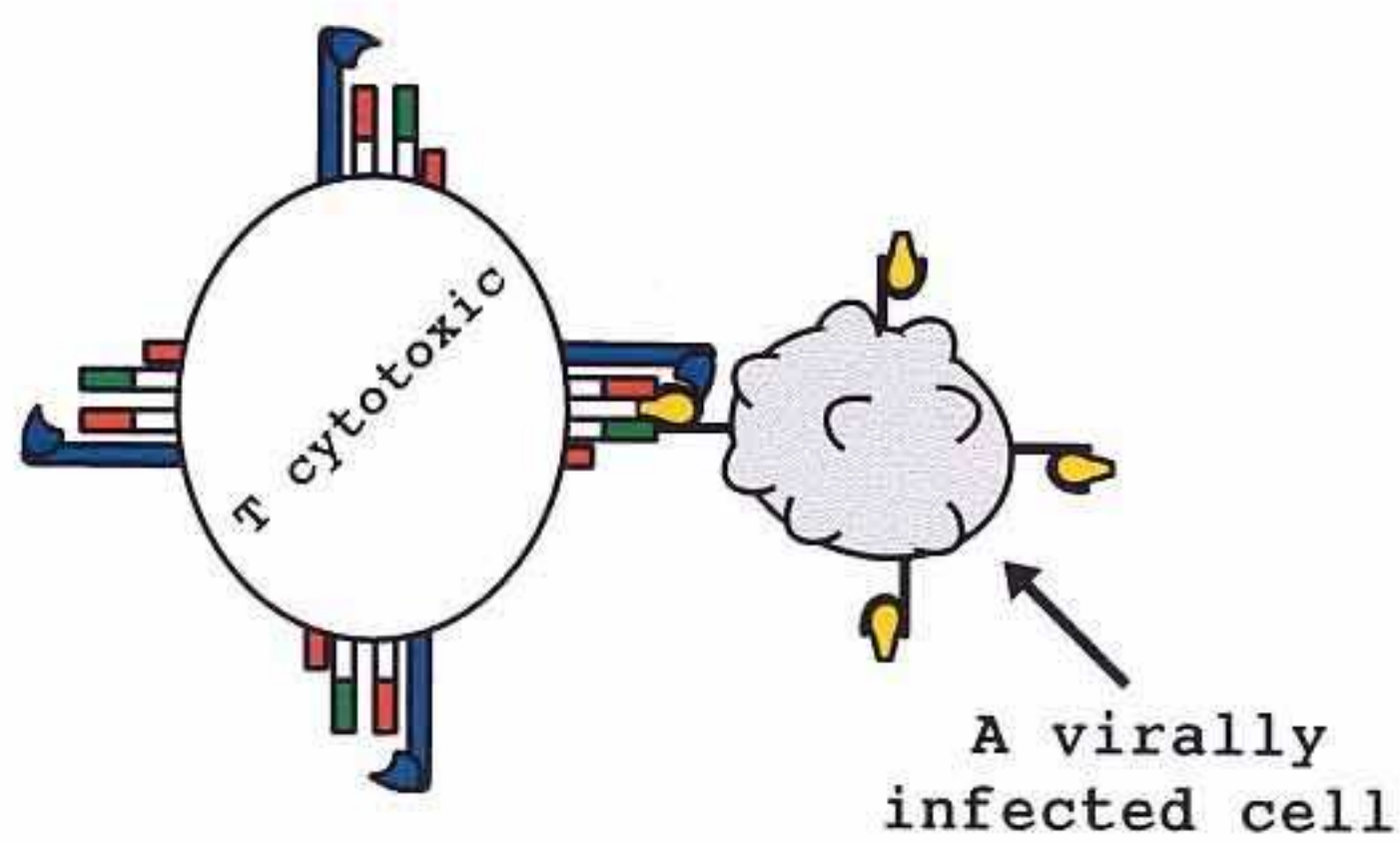
T cytotoxic cell appears from a blood vessel, close to the infection.



But a nearby macrophage is completely oblivious to the 'hidden' danger.



However, it is not long before he starts to find the virally infected cells.



T cytotoxic cells have surface receptors which act like 'hands'.

T HELPER TURNS UP TO SEE IF HE CAN HELP



T cytotoxic shows this T helper an infected cell.

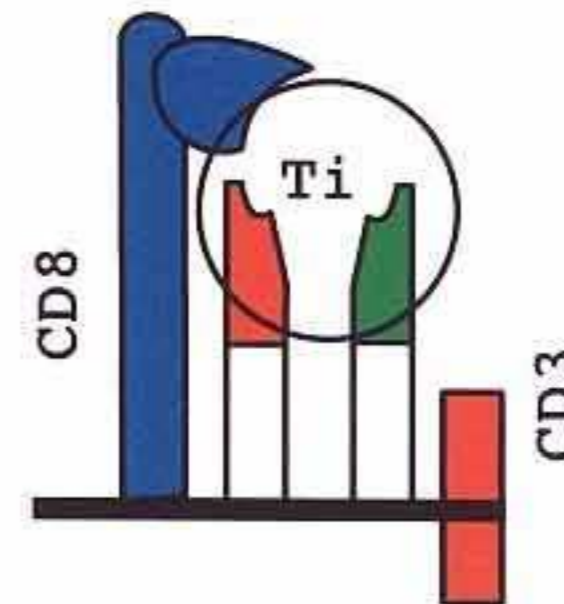
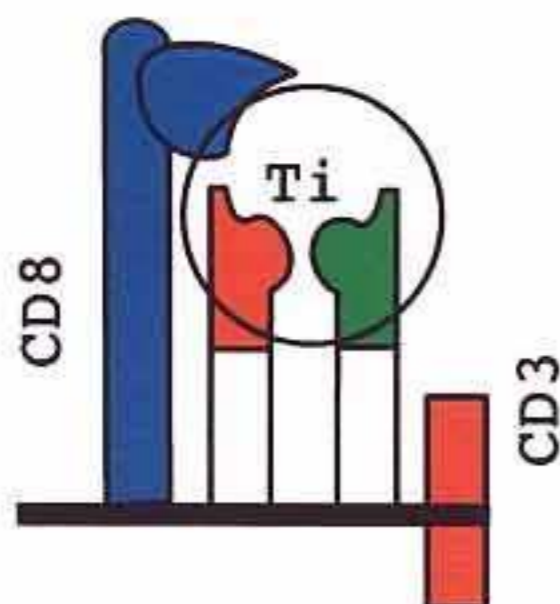


Satisfied that it is infected, T helper releases cytokines like interleukin-2.



Both cells now start to feel very strange!

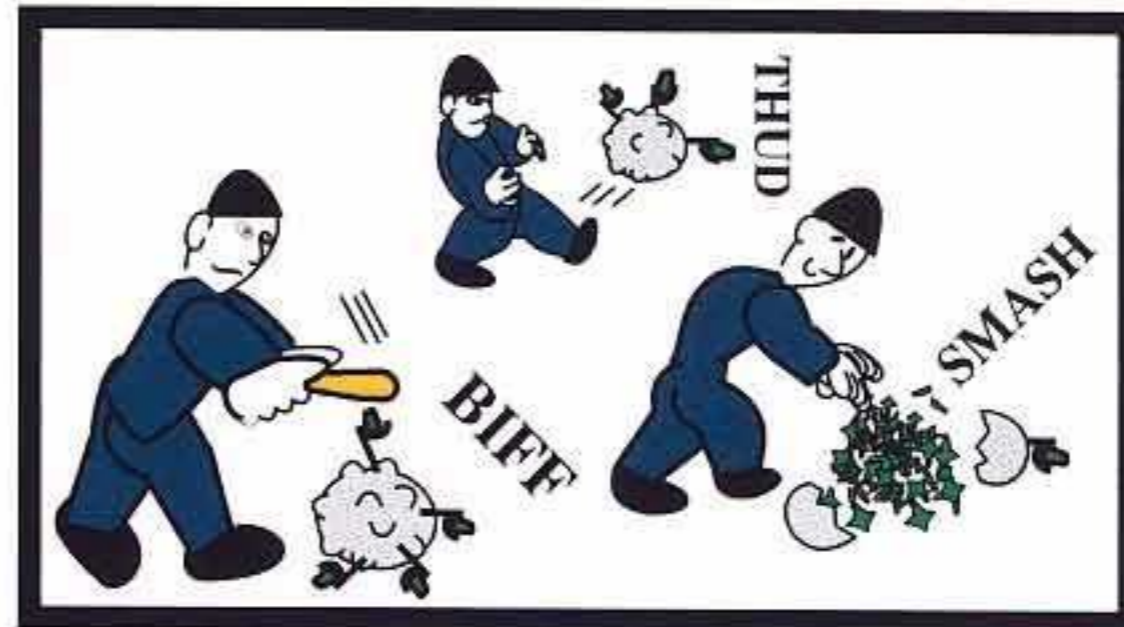
2 T CYTOTOXIC CELL 'HAND' SHAPES



Although all T cytotoxic cells have 'hands' (ie CD3, CD8 and Ti molecules), each has a unique shape at the end of their Ti molecule. It is this which greatly restricts what will fit into its 'hand'.

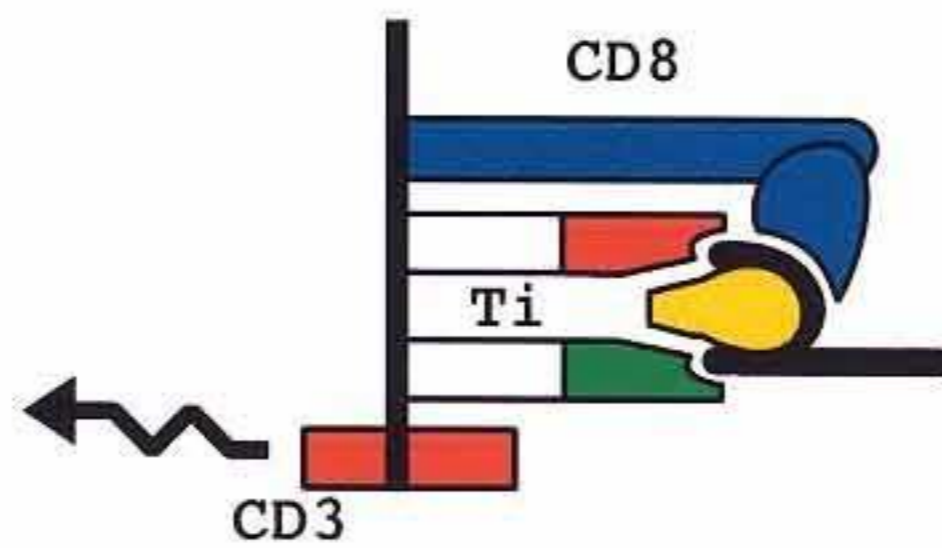


Clones, identical copies of the original T cells, start appearing.

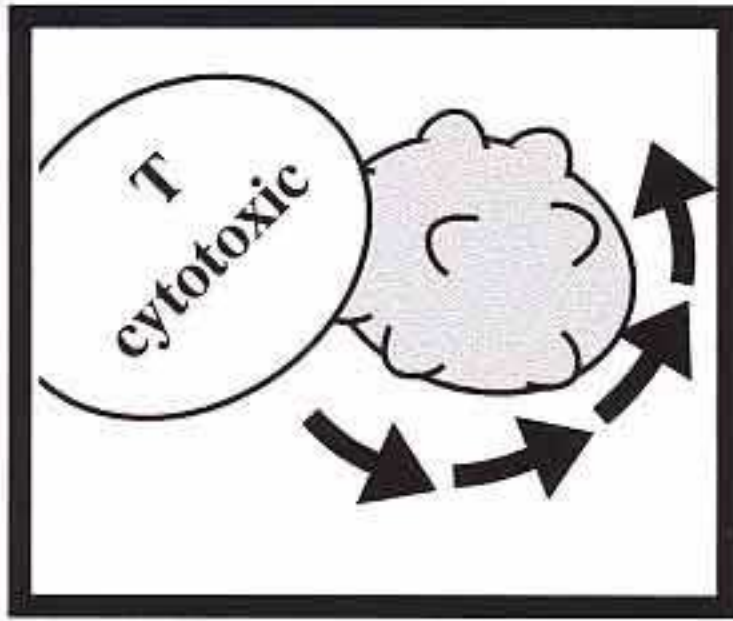


The cytokines from the T helper cell, also triggers the T cytotoxic cells into attacking the virally infected cells.

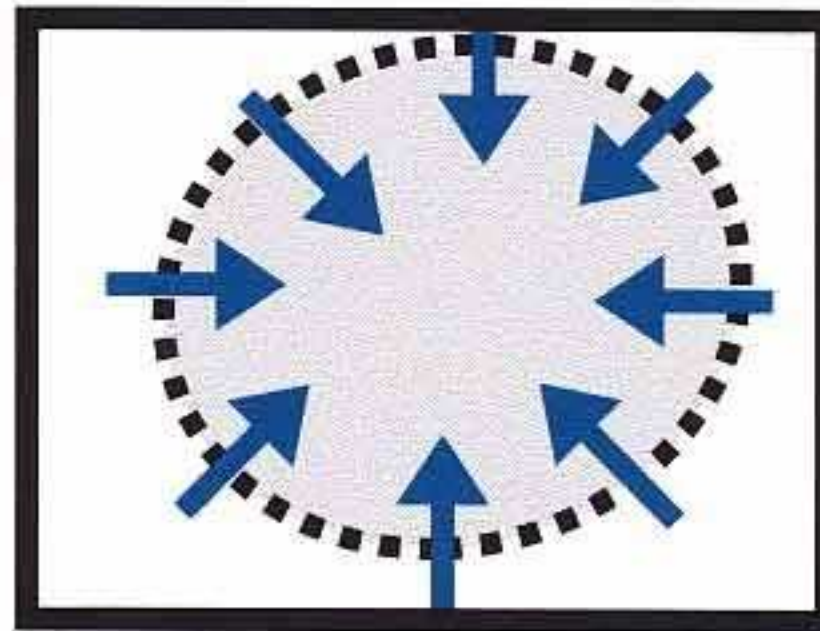
FOR THAT PERFECT FIT



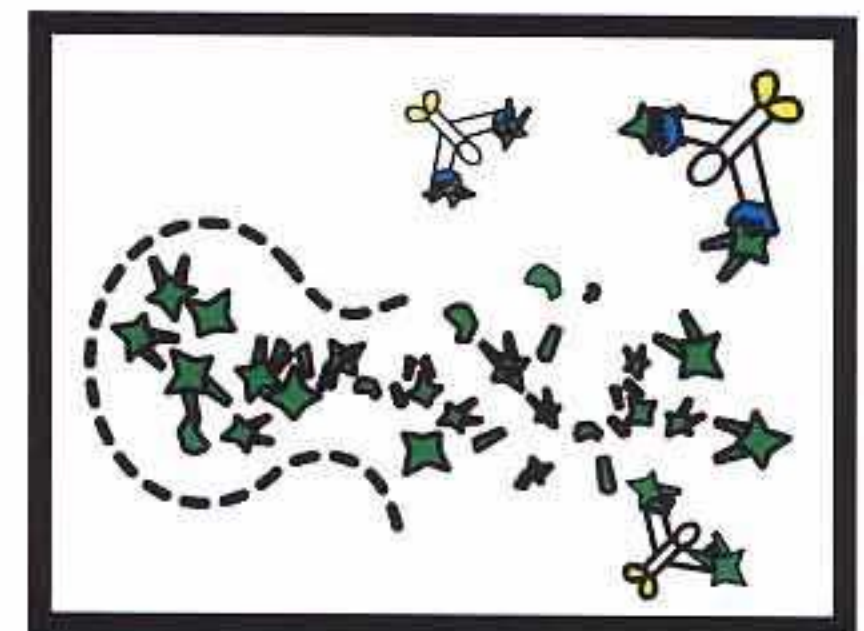
1. CD8 attaches to the side of the 'defence' protein.
2. Ti fits over the top of the 'defence' protein + viral protein.
3. CD3 can now signal to the nucleus that the 'hand' fits.



Moving around its victim, perforin is discharged on-to its surface.



The perforin punctures the membrane, allowing water to flow into the infected cell.



The cell swells and bursts, releasing the 'hidden' viruses for antibodies to eliminate.

The T cytotoxic cell also releases toxins into the target cell, which will disrupt its nucleus.



Side view



Top view

A perforin complex is round, with a hole through the centre. It is very similar to a membrane attack complex (see page 270).