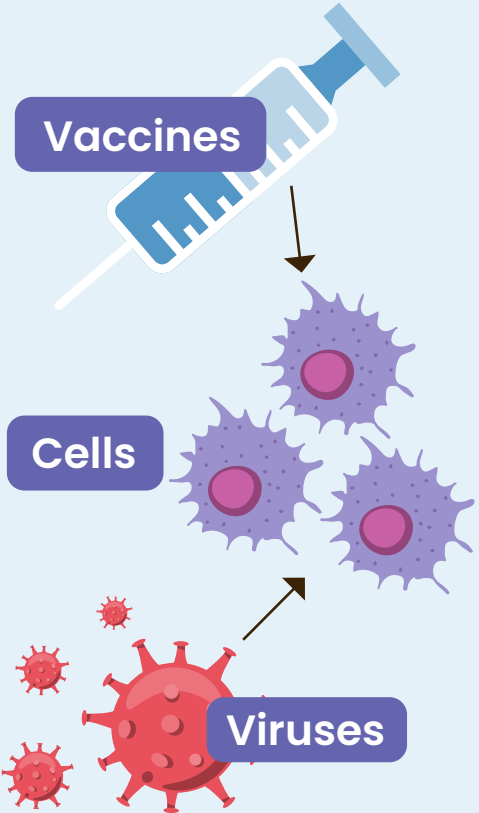


Trained Immunity: Innate Immune Memory

How vaccines can offer non-specific effects, or protection beyond the diseases that they were meant to target

1 **Stimuli that induce trained immunity**

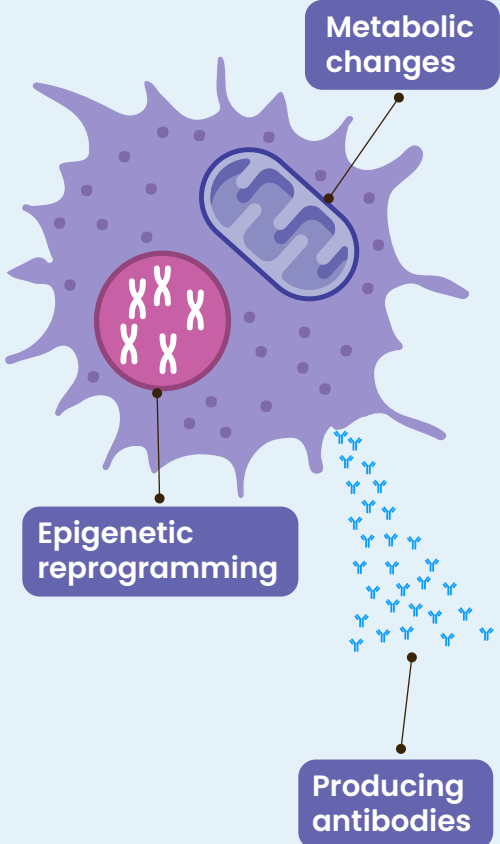
Immune and other cells are affected by vaccines or exposure to viruses.



The diagram illustrates the stimuli that induce trained immunity. On the left, a blue syringe labeled 'Vaccines' and several red, spiky virus particles labeled 'Viruses' are shown. Arrows from both point towards a cluster of purple, spiky immune cells labeled 'Cells'.

2 **Mechanisms**

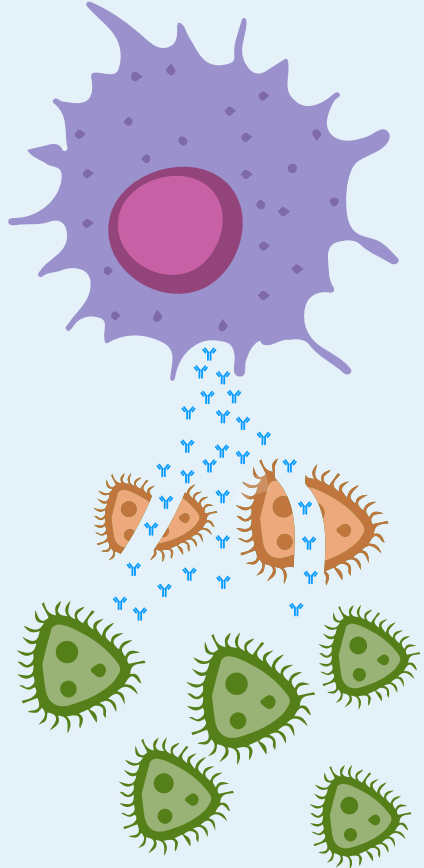
Cells undergo changes and become more responsive.



The diagram shows a purple immune cell undergoing internal changes. A label 'Metabolic changes' points to a mitochondrion inside the cell. Another label 'Epigenetic reprogramming' points to a nucleus containing chromosomes. Below the cell, a label 'Producing antibodies' points to a stream of blue Y-shaped antibody molecules being released from the cell.

3 **Beneficial effects**

The immune cells respond later when challenged, fighting non-target diseases.



The diagram illustrates the beneficial effects of trained immunity. A large purple immune cell at the top releases a stream of blue Y-shaped antibodies. These antibodies are shown binding to and neutralizing several green, spiky non-target pathogens at the bottom.

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