Immunization
How does it work?

1. Introduction of the antigen through vaccination or infection
2. Phagocytosis of the antigen by a macrophage which becomes an antigen-presenting cell (APC).
   2a. The pathogen activates memory B lymphocytes.
   2b. The pathogen activates memory T lymphocytes.
   2c. The pathogen infects a cell.
3. The antigen presented on the APC’s surface is recognized by helper T lymphocytes (Th, Td, Tc).
   4a. The Th cells activate B cells.
   4b. The Th cells activate killer T cells.
4a. Activated B cells proliferate and differentiate, some to form plasma cells and others memory cells.
5a. Activated Td cells proliferate and differentiate, some to form killer cells and others memory cells.
   3a. The target cell presents antigens at its surface.
6a. Production of antibodies which bind to free antigens as well as to infected cells—which promotes their phagocytosis.
6b. Activated Th lymphocytes bind to the target cell.
7a. The infected cell flagged by antibodies is phagocytosed and then destroyed.
8a. The infected cell is lysed.

... and induce protection against real infection

When a pathogen bearing the same antigens enters the body, it is quickly recognized by the memory cells. The memory T and B lymphocytes then directly transform into killer and plasma cells respectively.

The immune system’s response is immediate and intense. Plasma cells quickly produce large quantities of powerful antibodies. The infectious agent is then brought under control before any symptom of the disease can manifest.