

a body that tells self from non-self, ten named pathogens, and the years between childhood and adulthood

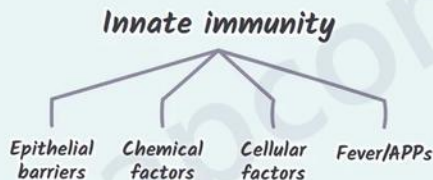
Health and immunity *

- WHO: health is complete physical, mental and social well-being, not merely the absence of disease
- **immunity**: the body's resistance to pathogens and their products
- the concept began with Edward Jenner's cowpox vaccine against smallpox
- immunity's defining trick is telling **self** (own cells) from **non-self** (antigens)
- antigens trigger the response; antibodies are the protective chemicals made against them
- **innate (inborn)** immunity: present from birth, non-specific
- **acquired (adaptive)** immunity: built up during life, specific

Innate immunity, in detail

- skin's salty sweat and sebaceous fatty acids block microbes at the surface
- nasal hair, mucus and the cough reflex trap and expel invaders
- saliva and gastric acid destroy many microbes before they establish
- tears carry **lysozyme** (discovered by Fleming), an enzyme that kills bacteria
- complement system: 30+ inactive serum proteins that activate on microbial contact
- interferons: released by virus-infected cells, warn neighbouring cells to resist
- microphages and macrophages (discovered by Metchnikoff) engulf invaders by phagocytosis
- Natural Killer (NK) cells target virus-infected and tumour cells non-specifically
- fever speeds anti-pathogen processes and boosts interferon activity
- acute phase proteins (e.g. CRP) rise on injury to limit tissue damage

Innate immunity, four lines of defence



physical barriers stop entry first; chemical and cellular defences catch what gets through; fever and acute phase proteins are the whole-body backup

Acquired immunity, four hallmarks

- **specificity**: a dedicated antibody or T-cell for one antigen
- **diversity**: recognizes a vast range of distinct pathogens
- **self/non-self discrimination**: distinguishes body cells from foreign ones
- **memory**: a first encounter is slower; a second encounter with the same antigen is faster and stronger

