IMMUNE SYSTEM

INNATE IMMUNITY
- Other non-specific factors
  - Epithelial barriers
  - Digestive features
  - Anti-microbial proteins
  - Natural killer cells
  - Other innate cells (ILCs, MAIT cells)
  - Inflammatory response
- Complement system
- Phagocytosis
  - Neutrophils
  - Eosinophils
  - Monocytes, Macrophages, Dendritic cells

CELL-MEDIATED IMMUNITY
- T lymphocytes
  - CD8+ cytotoxic T cells
  - CD4+ Th1 cells
  - CD4+ regulatory T cells
  - CD4+ Th2 cells
  - CD4+ Th17 cells
  - Antigen-presentation

ACQUIRED IMMUNITY
- Humoral immunity
  - B lymphocytes
  - Plasma cells
    - Stimulate humoral immunity and eosinophils
    - IL-4, IL-5, IL-10, IL-13
- Cell-mediated immunity
  - CD8+ cytotoxic T cells
  - CD4+ Th1 cells
  - CD4+ regulatory T cells
  - CD4+ Th2 cells
  - Antigen-presentation

IMMUNO-LOBULINS
- IFN-γ
- TNF-α
- TNF-β
- IL-2
- IL-10
- TGF-β
- IL-4
- IL-5
- IL-6
- IL-17
- IL-21

TH
- Activation
- Stimulate cell-mediated immunity, humoral immunity, and phagocytosis
- IL-17
- IL-21
- IL-22
- IL-6
- TNF-α

OTHER FACTORS
- Complement system
- Phagocytosis
- Cell-mediated immunity
- Humoral immunity
- T lymphocytes
- B lymphocytes
- Plasma cells
- Immuno-lobulins
- Antigen-presentation
- CD8+ cytotoxic T cells
- CD4+ Th1 cells
- CD4+ regulatory T cells
- CD4+ Th2 cells
- CD4+ Th17 cells
- Th
- Activation
- Stimulate cell-mediated immunity, humoral immunity, and phagocytosis
- IL-4, IL-5, IL-10, IL-13
- IL-17
- IL-21
- IL-22
- IL-6
- TNF-α
Good nutrient supply

↓

Good nutrient status
(& stores)

↓

Good immune function

↓

Good defence against pathogens

Poor nutrient supply

↓

Poor nutrient status
(& stores)

↓

Poor immune function

↓

Poor defence against pathogens
(More infections; More severe infections; Greater illness; Death)
Nutritional inadequacy

Weakened immunity

Inflammation and Oxidative stress

Infection

Loss of lean mass

Gut dysbiosis

Weakened immunity

Poor outcome

Illness

Functional decline

Poor outcome

Illness

Functional decline

Nutritional inadequacy

Loss of lean mass

Inflammation and Oxidative stress

Infection

Gut dysbiosis