Immune response to *Leishmania* parasites

### 1. Macrophages

*Leishmania* are intracellular parasites

Main host cells: macrophages
- phagocytic white blood cells

**Killer**

- Interferon-gamma
  - soluble mediator produced by cells of the immune system
- Nitric Oxide Synthase
- L-arginine
  - amino acid, one of the building units of protein

**Promote growth**

- Interferon-gamma
- Arginase
- Polyamines
  - chemical compounds ('food' for parasites)

L-arginine

- Macrophage
  - enzyme
  - toxic compound
- **Parasite killing**
  - Healing

=> L-arginine

- Macrophage
  - enzyme
  - toxic compound
- **Parasite growth**
  - Nonhealing

### 2. T cells

T cells: white blood cells

**=> T cell activation:**
- they become effector cells

**Cytokine production**

- Interferon-gamma
- Interleukin-4

**=> T cell activation:**
- Macrophages
  - proliferation

- Interferon-gamma

- Interleukin-4

**=> T cell activation:**
- Macrophages
  - proliferation