

What are cytokines?

Cytokines are small, powerful messenger molecules that cells use to communicate during immune and inflammatory responses. They help coordinate how different cells grow, move, activate, or die, and in doing so influence health and disease throughout the body.

What Cytokines Are

- Cytokines are **small, secreted proteins** (often <30–40 kDa) produced by many cell types, especially immune cells, that regulate immunity and inflammation. (Gulati et al., 2016; Kany et al., 2019)- They act as **intercellular messengers**, integrating functions of many cell types into a coherent immune response. (Gulati et al., 2016; Cui et al., 2023)## Main Types and Families

Common cytokine groups include:

- **Interleukins, interferons, chemokines, tumor necrosis factors, growth factors and adipokines.** (Rahman et al., 2023; Gulati et al., 2016; Storjord et al., 2020)## How They Work
- Cytokines bind to **specific receptors** on target cells and trigger signaling pathways (often JAK/STAT) that change gene expression and cell behavior. (Morris et al., 2018; Samadi et al., 2023)- They can act **autocrine, paracrine, or endocrine**, usually locally but sometimes at a distance. (Duque & Descoteaux, 2014; Lin & Leonard, 2019)## Roles in Health and Disease
- They regulate **immune cell differentiation, inflammation, hematopoiesis, angiogenesis, tumorigenesis, neurobiology, infection responses, atherosclerosis and cancer.** (Gulati et al., 2016)- Cytokines can be **pro- or anti-inflammatory**; imbalance or excessive release contributes to “cytokine storms” and many inflammatory diseases. (Kany et al., 2019)## Summary

Cytokines are small, secreted proteins that function as the immune system’s signaling network, coordinating cell behavior in health and disease. Different families and combinations of cytokines shape inflammation, immunity, and many other biological processes, which is why they are both important disease markers and targets for modern therapies.

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