Cytokine classification

Cytokines can be classified into several different categories based on their functions and structural characteristics. Here are some common classifications of cytokines:

Based on Function

Proinflammatory Cytokines: These cytokines promote inflammation and immune responses. Examples include Interleukin-1 (IL-1), Interleukin-6 (IL-6), and Tumor Necrosis Factor-alpha (TNF-α). Anti-Inflammatory Cytokines: These cytokines dampen inflammatory responses and help regulate immune reactions. Examples include Interleukin-10 (IL-10) and Transforming Growth Factor-beta (TGF-β). Chemokines: Chemokines are involved in guiding immune cells to sites of infection or tissue damage. They play a role in cell migration and recruitment. Examples include CCL2 (MCP-1), CXCL8 (IL-8), and CCL5 (RANTES). Interferons: Interferons are involved in antiviral responses and immune regulation. Examples include Interferon-alpha (IFN-α) and Interferon-gamma (IFN-γ). Interleukins: Interleukins are a diverse group of cytokines that regulate various immune functions. They are numbered (e.g., IL-2, IL-4, IL-12) based on the order of their discovery.

Based on Cellular Source

Monokines: Cytokines produced primarily by monocytes and macrophages. Lymphokines: Cytokines produced primarily by lymphocytes, such as T cells and B cells.

Based on Structural Characteristics

Type I Cytokine Receptors: These cytokines bind to receptors that have a common γ (gamma) chain. Examples include IL-2, IL-4, and IL-7. Type II Cytokine Receptors: These cytokines bind to receptors that do not have a common γ chain. Examples include IFN-γ and IL-10. Chemokine Receptors: Chemokines bind to specific G protein-coupled receptors (GPCRs) on target cells.

Based on Biological Effects

Hematopoietic Cytokines: Cytokines that regulate the development and function of blood cells, such as erythropoietin (EPO) and granulocyte colony-stimulating factor (G-CSF). Th1 Cytokines and Th2 Cytokines: These classifications are based on the types of T-helper (Th) cell responses they promote. Th1 cytokines (e.g., IFN-γ) are associated with cell-mediated immune responses, while Th2 cytokines (e.g., IL-4) are associated with antibody-mediated immune responses. It's important to note that cytokines often have pleiotropic effects, meaning they can have multiple functions and can act in a

complex network of interactions within the immune system. Additionally, the classification of cytokines continues to evolve as our understanding of these molecules deepens through ongoing research.

Cytokines include chemokines, interferons, interleukins, lymphokines, tumor necrosis factor but generally not hormones or growth factors. Cytokines are produced by broad range of cells, including immune cells like macrophages, B lymphocytes, T lymphocytes and mast cells, as well as endothelial cells, fibroblasts, and various stromal cells; a given cytokine may be produced by more than one type of cell.

Simplified representation of major signal transduction pathways in mammals.
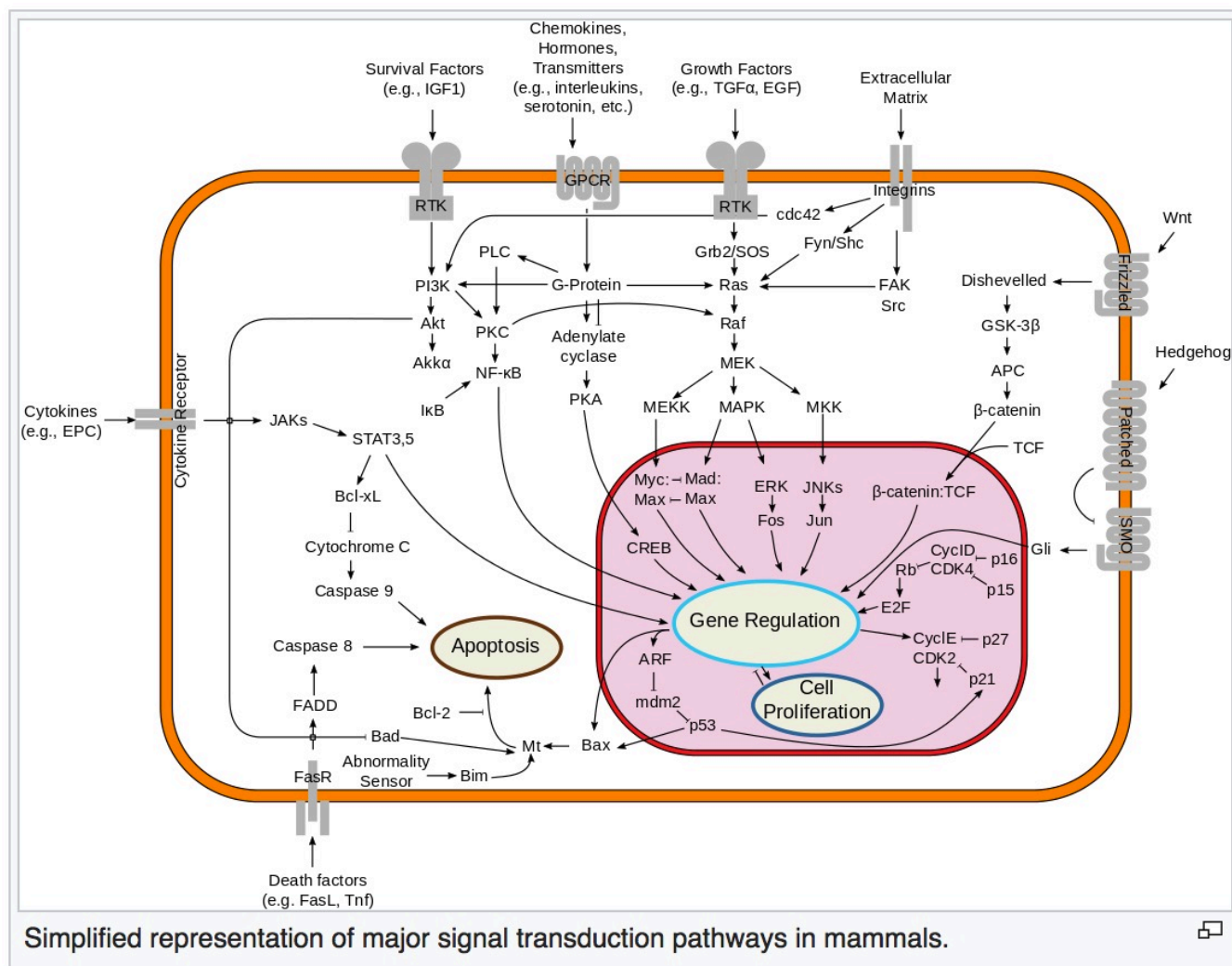
Several factors account for the tumorigenicity of human gliomas, including cytokines and their receptors.

see Interleukins

Inflammatory cytokines, such as interleukin 6 and tumor necrosis factor-α, are gaining attention as important etiologic factors associated with discogenic pain.

Inflammasomes are multiprotein complexes that trigger the activation of caspase 1 and subsequently the maturation of proinflammatory cytokines interleukin-1β and interleukin-18. These cytokines play a critical role in mediating inflammation and innate immunity response. Among various inflammasome

complexes, the NLRP3 inflammasome is the best characterized, which has been demonstrated as a crucial role in various diseases.

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