Inflammatory Regulator

An inflammatory regulator is any molecule, cell, or signaling pathway that plays a key role in initiating, amplifying, modulating, or resolving the inflammatory response.

 Types of inflammatory regulators include: Cytokines: e.g., TNF-α, IL-1β, IL-6 → Promote or inhibit immune cell activation and recruitment.

Transcription factors: e.g., NF-κB, STAT3 → Control the expression of genes involved in inflammation.

Enzymes: e.g., COX-2, iNOS → Mediate production of inflammatory mediators like prostaglandins or nitric oxide.

Cell surface receptors: e.g., TLRs, TNFR, IL receptors → Detect pathogens or damage signals and activate downstream cascades.

Intracellular signaling proteins: e.g., SMURF2, MAPKs, MyD88 → Act as hubs or checkpoints in inflammatory signaling.

Immune cells: e.g., macrophages, microglia, neutrophils, T cells → Both sources and targets of inflammatory regulators.

 In neurosurgery: Inflammatory regulators are highly relevant in:

Traumatic brain and spinal cord injury

Neurovascular disorders (e.g., stroke, aneurysmal SAH)

Neuro-oncology (e.g., glioma microenvironment)

Degenerative diseases (e.g., spinal disc inflammation)

In short: An inflammatory regulator is any key player that controls the fire of inflammation—either lighting the match, fueling the flames, or helping to put it out.