Purines

Adenosine	Formed from the breakdown of ATP. Acts via adenosine receptors **(A1, A2A, A2B, A3)**. Functions: *Vasodilation* (especially coronary arteries) *Sedative and sleep-promoting effects in the brain. Inhibits neurotransmitter release. Anti-inflammatory and immunosuppressive effects*
ADP (Adenosine Diphosphate)	Plays a critical role in platelet aggregation. Released during tissue injury → binds **P2Y12** receptors on platelets → promotes clot formation.

Purines (cont)

ATP (Adenosine Triphosphate)	Beyond being the "energy currency," extracellular ATP: Acts via **P2 receptors (P2X and P2Y)**. Mediates pain, inflammation, and immune responses. Can trigger cell death pathways or survival signalling.

Cannabinoids (Endocannabinoids)

Anandamide and 2-AG are naturally occurring ligands. Bind to CB1 (central nervous system) and CB2 (immune cells) receptors.

Roles:	Modulate pain, appetite, mood, memory. Regulate immune responses. Provide neuroprotection

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Histamine

Histamine	Stored in mast cells, basophils, and enterochromaffin-like cells in the stomach. Released in response to allergens, injury, or inflammation.**Receptors: H1, H2, H3, H4**
H1	Inflammation, allergy (vasodilation, bronchoconstriction, itching)
H2	Gastric acid secretion in the stomach
H3	Neurotransmission in the brain (auto--inhibition)
H4	Chemotaxis in immune cells

Serotonin (5-HT)

Location:	Derived from tryptophan, found in the CNS, GI tract, and platelets.

Serotonin (5-HT) (cont)

Roles	Mood regulation (CNS). GI motility. Platelet aggregation and vasoconstriction. Sleep, appetite, thermoregulation.
Receptors	Multiple **(5-HT1 to 5-HT7)**, all involved in diverse functions like anxiety, pain, nausea, and cardiovascular tone.

Eicosanoids

These are derived from arachidonic acid and include:	Prostaglandins, Thromboxanes, Leukotrienes
Key Enzymes	COX (Cyclooxygenase) → Prostaglandins & Thromboxanes. LOX (Lipoxygenase) → Leukotrienes.
Roles	Inflammation and immunity.Fever, pain.Bronchoconstriction (asthma).Platelet function **(e.g., TXA2 promotes clotting, PGI2 inhibits).**Gastric protection and renal blood flow regulation.

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Bradykinin

A nonapeptide released during tissue injury or inflammation. Very potent vasodilator and pain mediator.Increases vascular permeability and causes edema. Also causes bronchoconstriction and stimulates prostaglandin and nitric oxide release.

Neuropeptides

These are small protein-like molecules used by neurons to communicate.

Substance P	Pain transmission, vasodilation
Neuropeptide Y (NPY)	Appetite stimulation, vasoconstriction
Calcitonin gene-related peptide (CGRP)	Potent vasodilator, involved in migraines
Endorphins/Enkephalins	Pain inhibition (natural opioids)

Interferons

A type of cytokine (usually classified separately but functionally similar to autacoids).

Produced in response to viral infections and other immune triggers

Type I (IFN-α, IFN-β)	Antiviral
Type II (IFN-γ)	Activates macrophages and promotes antigen presentation

Nitric Oxide (NO)

A gaseous signaling molecule, synthesized by nitric oxide synthases (NOS).

NO diffuses across cell membranes and activates guanylyl cyclase, increasing cGMP.

Functions:	Vasodilation (endothelium-derived relaxing factor). Neurotransmission (e.g., in memory and learning). Antimicrobial and antitumor effects (in macrophages).

Cytokines

Small proteins involved in cell signaling, especially in the immune system. Produced by various cells (T-cells, macrophages, endothelial cells).

Interleukins (IL-1, IL-6)	Inflammation, fever
TNF-α (Tumor Necrosis Factor)	Inflammation, apoptosis
IL-10	Anti-inflammatory

Cytokines can act locally (autocrine/paracrine) or systemically.

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