

Purines		Purines (cont)		Cannabinoids (Endocannabinoids)		Serotonin (5-HT) (cont)	
Adenosine	Formed from the breakdown of ATP. Acts via adenosine receptors (A1, A2A, A2B, A3). Functions: <i>Vasodilation</i> (especially coronary arteries) <i>Sedative and sleep-promoting effects in the brain. Inhibits neurotransmitter release. Anti-inflammatory and immunosuppressive effects</i>	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.	Anandamide and 2-AG are naturally occurring ligands. Bind to CB1 (central nervous system) and CB2 (immune cells) receptors.		Roles	Mood regulation (CNS). GI motility. Platelet aggregation and vasoconstriction. Sleep, appetite, thermoregulation.
ADP (Adenosine Diphosphate)	Plays a critical role in platelet aggregation. Released during tissue injury → binds P2Y12 receptors on platelets → promotes clot formation.	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		Cannabinoids (Endocannabinoids) Anandamide and 2-AG are naturally occurring ligands. Bind to CB1 (central nervous system) and CB2 (immune cells) receptors.		Receptors	Multiple (5-HT1 to 5-HT7), all involved in diverse functions like anxiety, pain, nausea, and cardiovascular tone.
		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		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		Eicosanoids These are derived from arachidonic acid and include: Key Enzymes COX (Cyclooxygenase) → Prostaglandins & Thromboxanes. LOX (Lipoxygenase) → Leukotrienes.	
				H1	Inflammation, allergy (vasodilation, bronchoconstriction, itching)	Roles	Inflammation and immunity.Fever, pain.Bronchoconstriction (asthma).Platelet function (e.g., TXA2 promotes clotting, PGI2 inhibits).Gastric protection and renal blood flow regulation.
				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.			

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.