Extracellular Space

The **extracellular space** refers to the **area outside of cells**, filled with **extracellular fluid (ECF)** and various molecules. It is a key component of all tissues and plays critical roles in communication, transport, and structural support.

Key Characteristics

- **Contents:**
  - Water and electrolytes (e.g., Na^+, Cl^-, Ca^{2+})
  - Proteins (e.g., albumin, cytokines, enzymes)
  - Lipids and metabolites
  - **Extracellular matrix (ECM)** components:
    - Collagen, fibronectin, laminin
  - Extracellular vesicles (e.g., exosomes, microvesicles)
- **Functions:**
  - Facilitates **cell-to-cell communication**
  - Enables **transport** of nutrients, oxygen, and waste
  - Provides **mechanical and biochemical support**
  - Maintains **tissue homeostasis**
  - Participates in **signal transduction** (e.g., hormones, neurotransmitters)

Examples

- **Brain:** tightly regulated extracellular space crucial for synaptic transmission
- **Connective tissue:** ECM-rich, provides mechanical support and elasticity
- **Tumor microenvironment:** altered extracellular space affects invasion, angiogenesis, and therapy resistance

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`Note:` The composition and regulation of the extracellular space are central to many physiological and pathological processes, including inflammation, cancer, neurodegeneration, and tissue repair.