Histology

Histology	the study of tissue	
Tissue	a group structurally and functionally related cells and their external environment that together perform common functions	
	tissues share 2 basic components: all tissues consist of discrete population of cells that are related in structure and function	
	all tissues have a surrounding material called extracellular matrix (ECM)	
Types of Tissues	are defined by the kind and number of cells, the amount and composition of ECM and their specific functions	
	Epithelial tissues	•tightly packed sheets
		•no visible ECM
		•cover and line all body surfaces and cavities
		•forms secretory glands
	Connective Tissues	•connect all the other tissues in the body to one another

Histology (cont)

	•ECM is a prominent feature for most connective tissues types with cells scattered throughout
	•bind, support, protect, and allow for transportation of substances
	•fill internal spaces
	•provide structural support and energy
Muscle Tissue	•contracts to produce movement and force
	•skeletal muscle, cardiac muscle, and smooth muscle
	little ECM between cells
Nervous Tissue	consist of cells capable of generating, sending, receiving messages, and cells that support this activity all within a unique ECM
	conduct electrical impulses
	carries information

Cell Junctions

Cell Junctions	another way cells bind to one another where neighboring cell's plasma membranes are linked by integral proteins	
3 Major Types of Cell Junctions	tight junctions (occluding junctions)	hold cells closely together such that the space between is impermeable to the movement of macromolecules
	desmosomes	allow for materials in the ECF to pass through the space between cells
	gap junctions	small pores formed by protein channels between adjacent cells that allow small substances to flow freely between each cells cytoplasm

The Extracellular Matrix (ECM)

Extracellular matrix (ECM)	composed of substances in a liquid, thick gel, or solid that surround the cells of a tissues	
	2 Components	Ground Substance
		Protein Fibers

The Extracellular Matrix (ECM) (cont)

ECM Functions	provides the tissue with strength to resist tensile (stretching) and compressive forces
	directs cells to their proper positions within a tissue and holds those cells in place
	regulates the development, mitotic activity, and survival of cells in a tissue
Ground Substance	Makes up most of ECM and consists of extracellular fluid (ECF) and their components: water, nutrients, and ions
	also found: three families of macromolecules, glycosaminoglycans (GAGs), proteoglycans, and cell-adhesion molecules (CAMs)

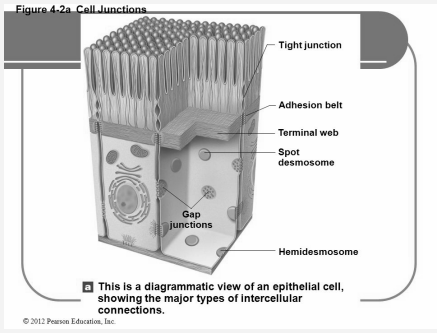
The Extracellular Matrix (ECM) (cont)

Protein Fibers	long molecules composed of multiple fibrous subunits with a ropelike structure with enormous tensile strength
	embedded within the ground substance j
	3 Types of Protein Fibers
	Collagen Fibers composed of multiple repeating subunits that form a white fibrous protein that is resistant to tension (pulling and stretching forces) and pressure
	Elastic Fibers composed of the protein elastin surrounded by glycoproteins
	f has the property of extensibility that allows the fiber to stretch up to one and a half times its resting length without breaking
	give elasticity

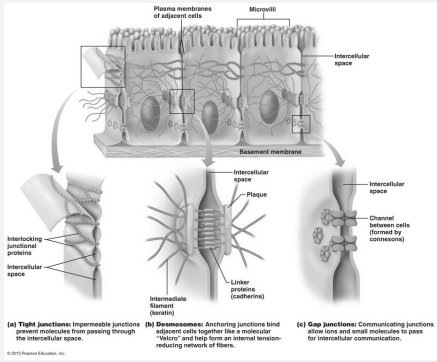
The Extracellular Matrix (ECM) (cont)

Reticular Fibers	a thin short collagen fiber, form a meshwork that support the cells and ground substance of many tissues
	form web-like structure in organs like the spleen that help trap foreign cells

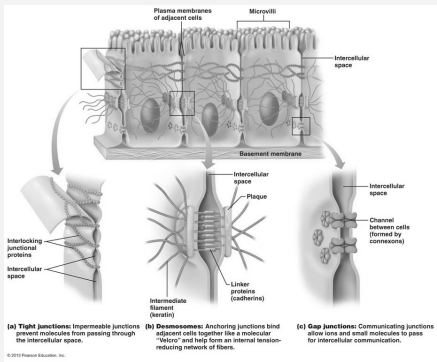
Cell Junctions



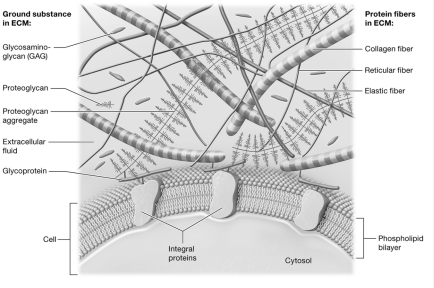
Cell Junctions



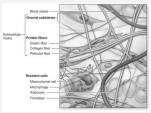
Cell Junctions



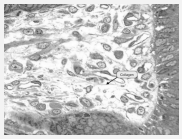
The Extracellular Matrix (ECM)



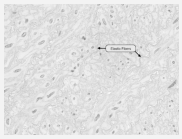
Ground Substance and Protein Fibers



Collagen



Elastic Fibers



Reticular Fibers