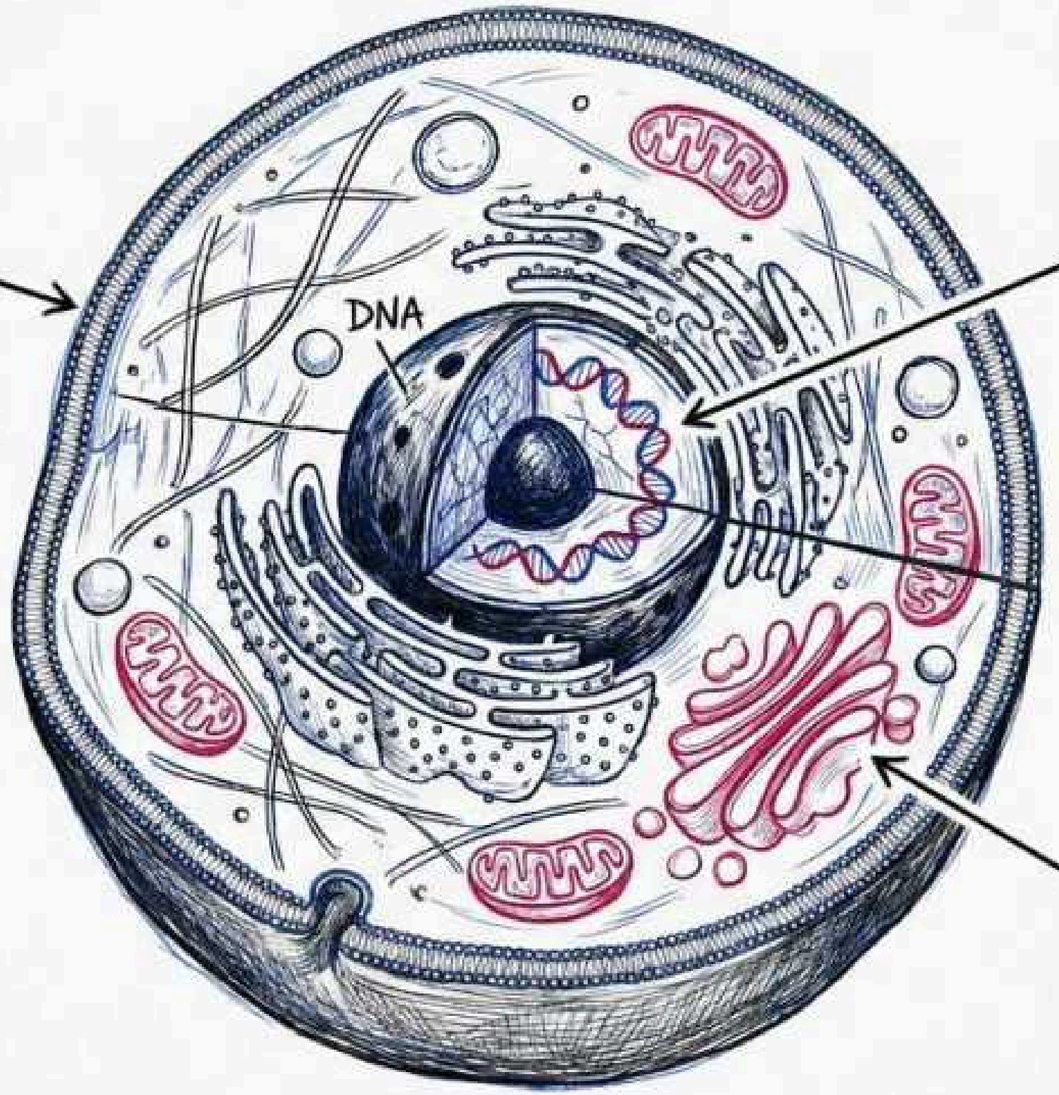
¶ 1.1

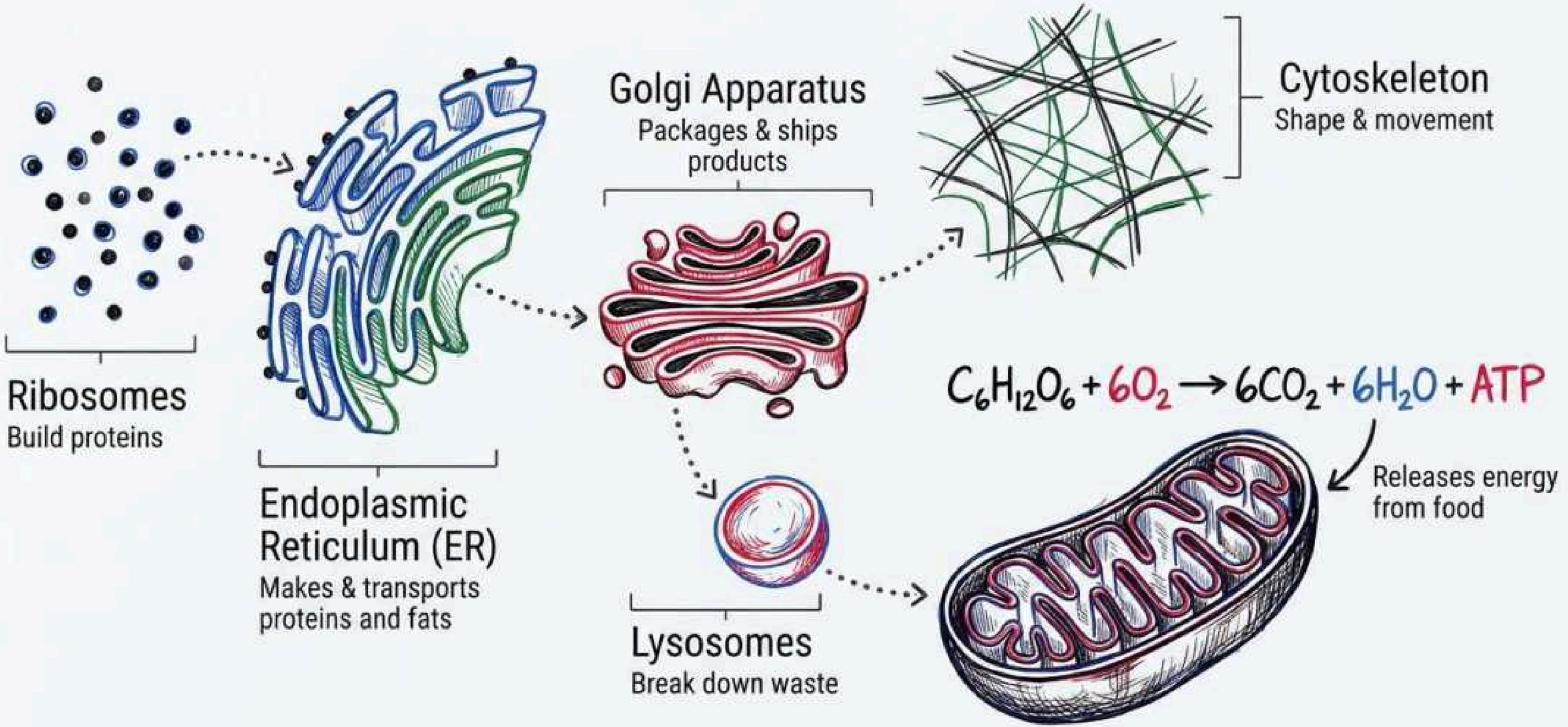
Roughly 30 Trillion Cells
> 200 Distinct Types



The Gatekeeper: Controls what enters and leaves.

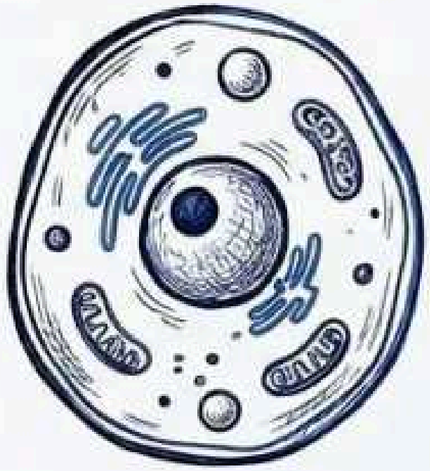
The Vault: Contains DNA (instructions for making proteins).

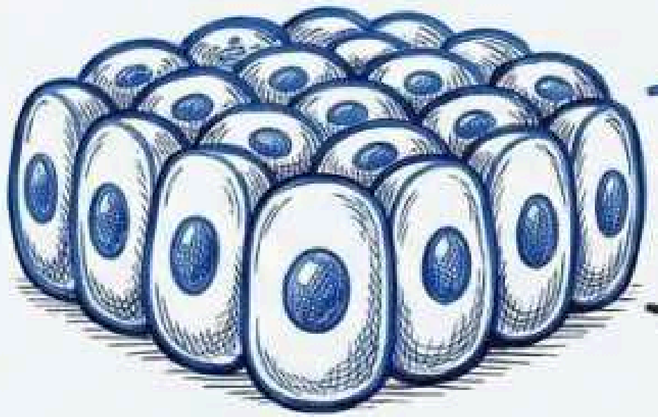
Specialised internal machinery.


Ribosomes
Build proteins
Endoplasmic Reticulum (ER)
Makes & transports proteins and fats
Golgi Apparatus
Packages & ships products
Lysosomes
Break down waste
Cytoskeleton
Shape & movement
$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + ATP$
Releases energy from food

Histology is the study of tissues.

¶ 1.3



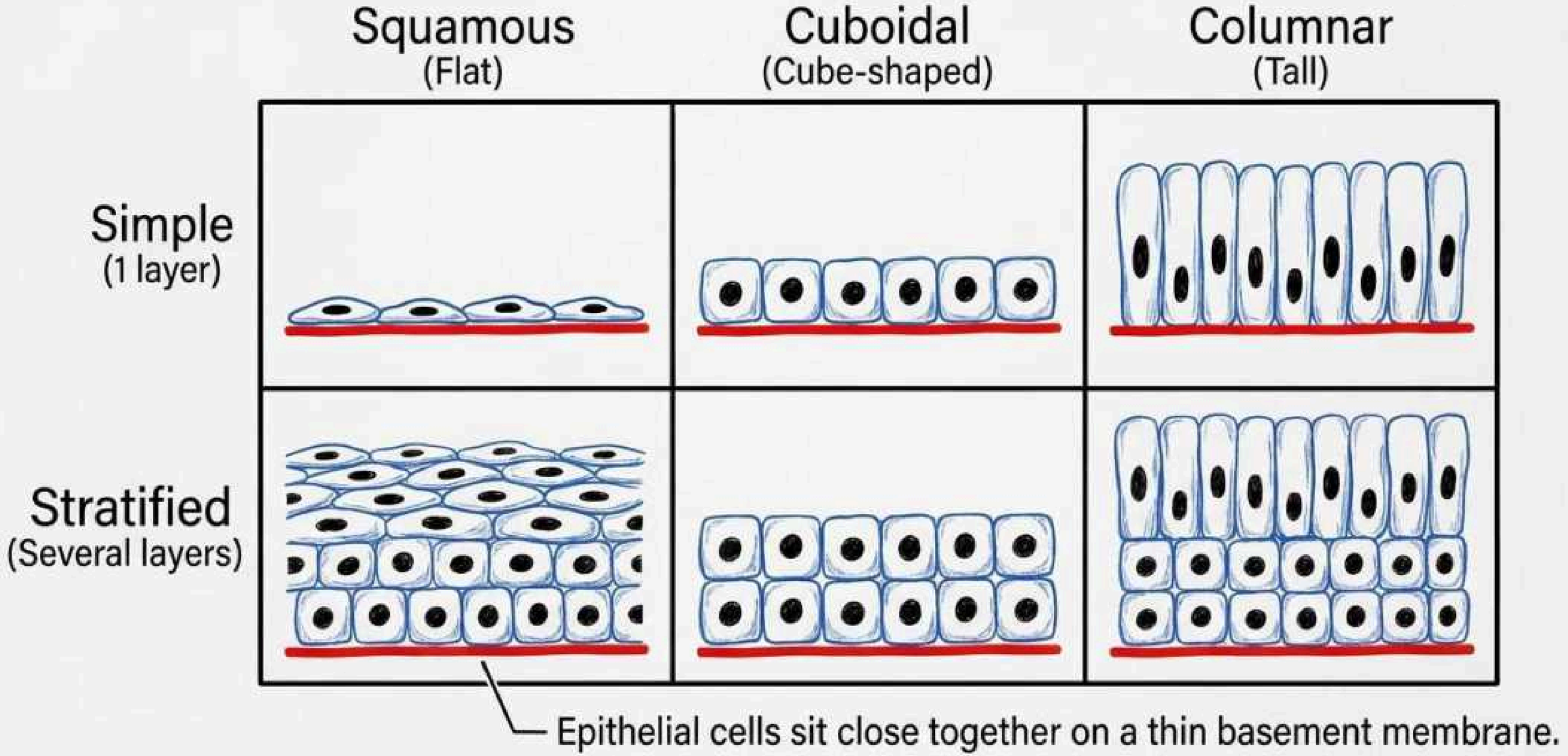


Tissue

- **Epithelial** (Boundary/Lining)
- **Connective** (Support/Binding)
- **Muscle** (Movement/Contraction)
- **Nervous** (Electrical signalling)

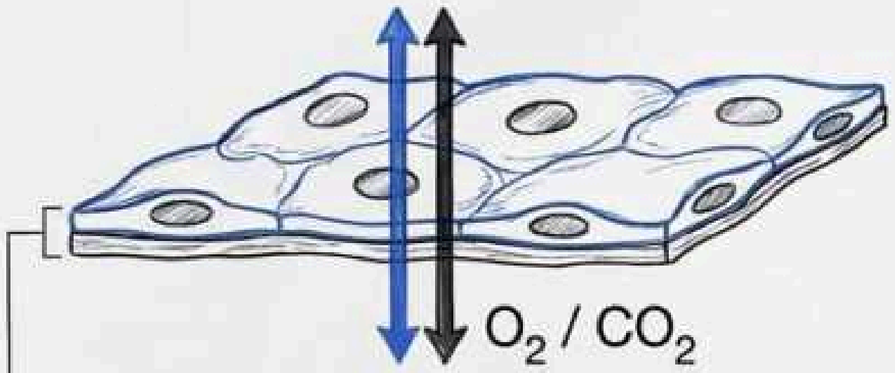
Epithelial tissues cover surfaces and line cavities.

¶ 1.4



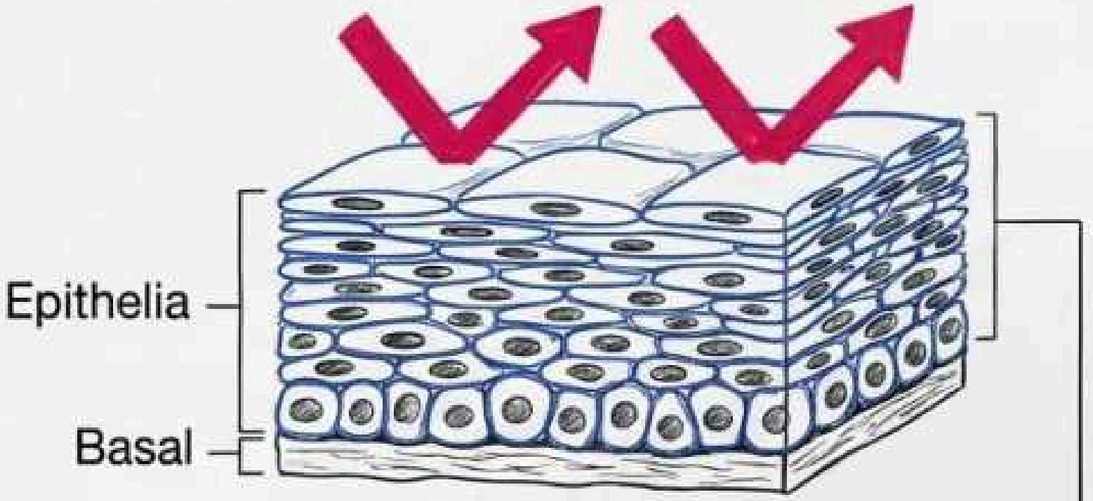
Structure strictly follows function in epithelia.

Simple Squamous



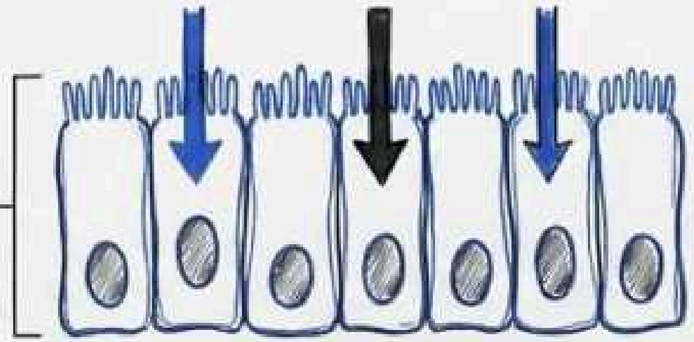
Air sacs of lungs, blood capillaries.
Ideal for diffusion.

Stratified Squamous



Outer skin, mouth, oesophagus.
Thick and tough for protection.

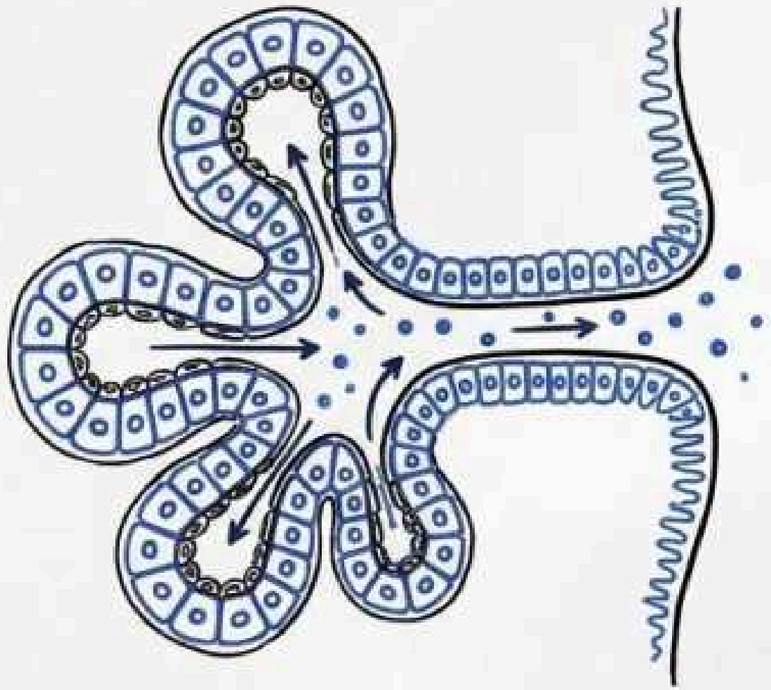
Simple Columnar



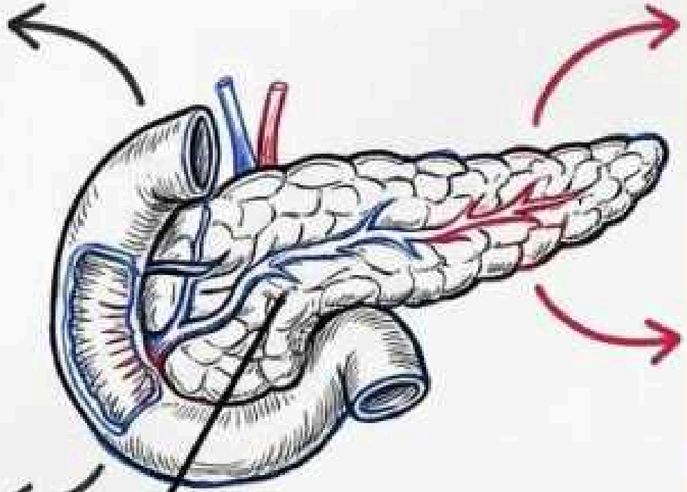
Intestine.
Nutrient absorption.

Glands are constructed entirely from epithelium.

Exocrine



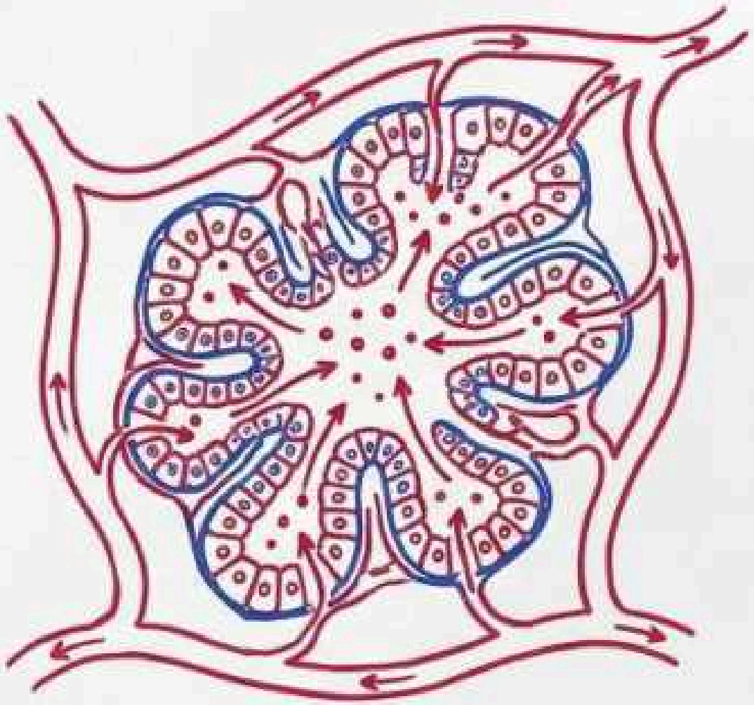
Sweat, Salivary, Pancreatic digestive glands.



Pancreas

Dual Function:
Operates as both exocrine and endocrine.

Endocrine



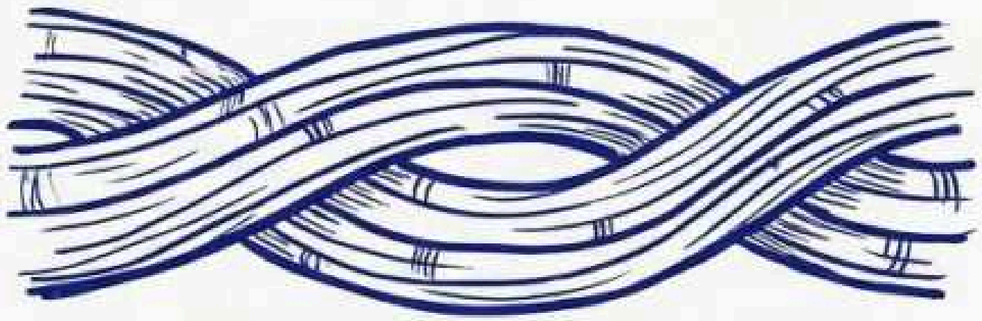
Thyroid, Adrenal glands.

¶ 1.7

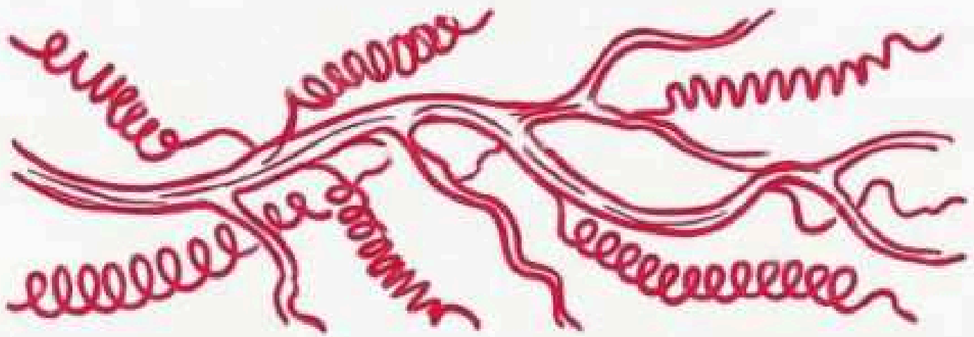
Connective tissue is the most abundant and varied type.

Connective Tissue = Scattered Cells + Extracellular Matrix

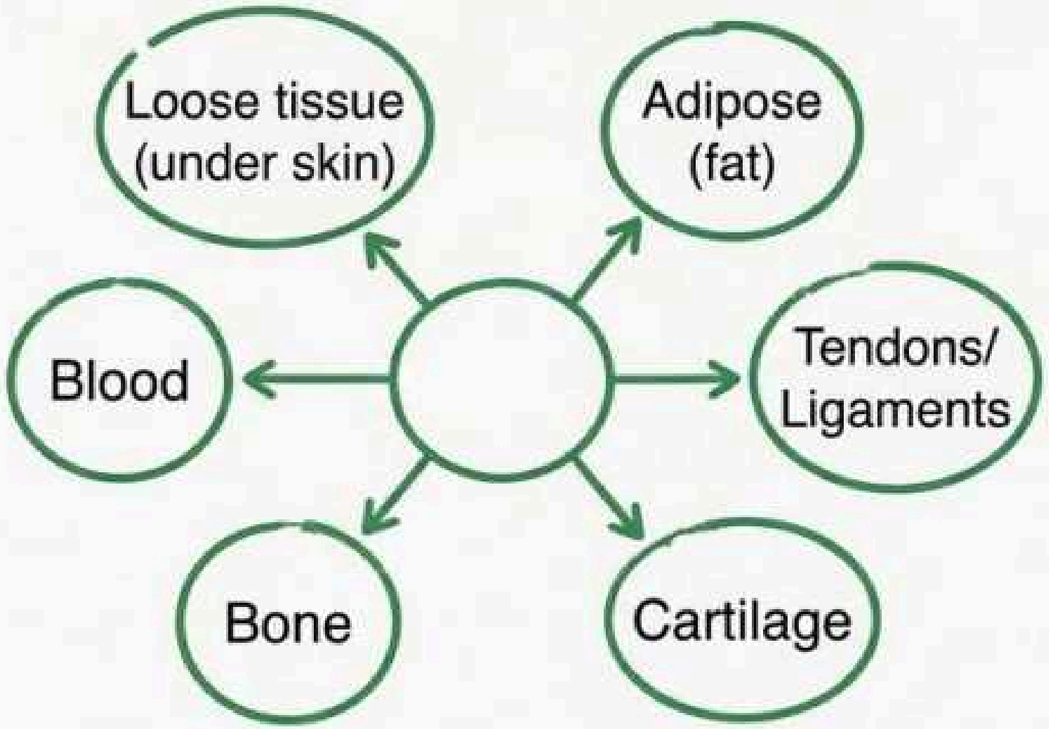
(Fibres + Ground Substance)



Collagen Fibres (Give strength)



Elastic Fibres (Allow stretch)



Structural mechanics of dense connective tissue.

¶ 1.8



Ligaments
Stability, strong in one direction.

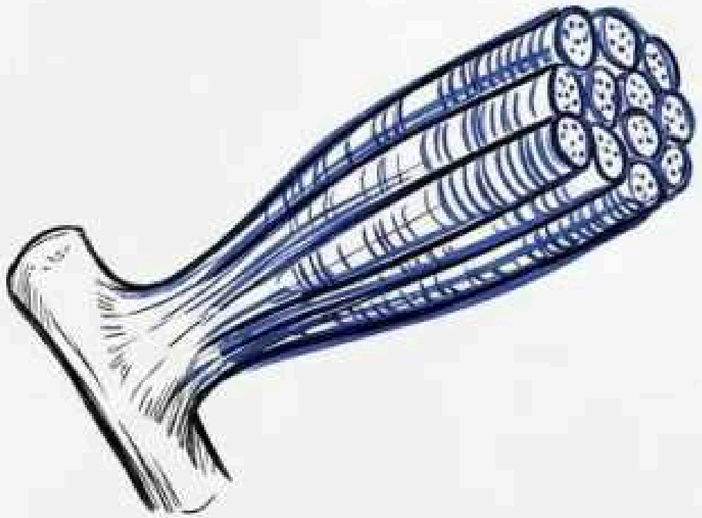
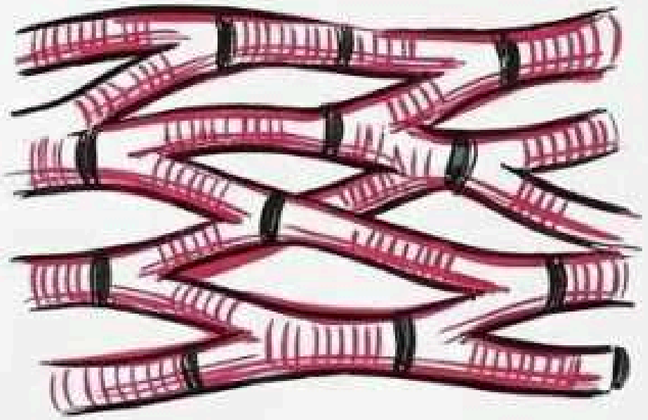
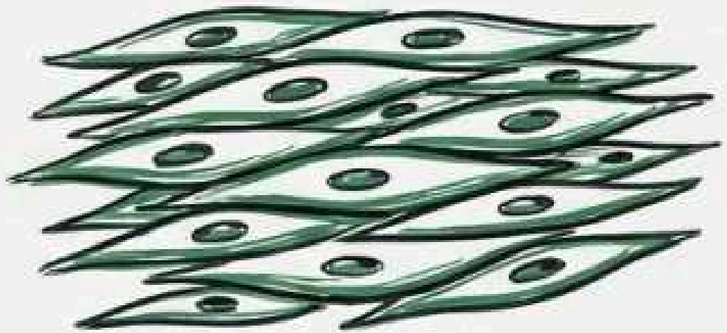
Cartilage
Firm but flexible (nose, ears).
Heals slowly due to lack of blood.

Tendons
Force transmission, parallel collagen fibres

Blood
Fluid connective tissue with plasma as its matrix.

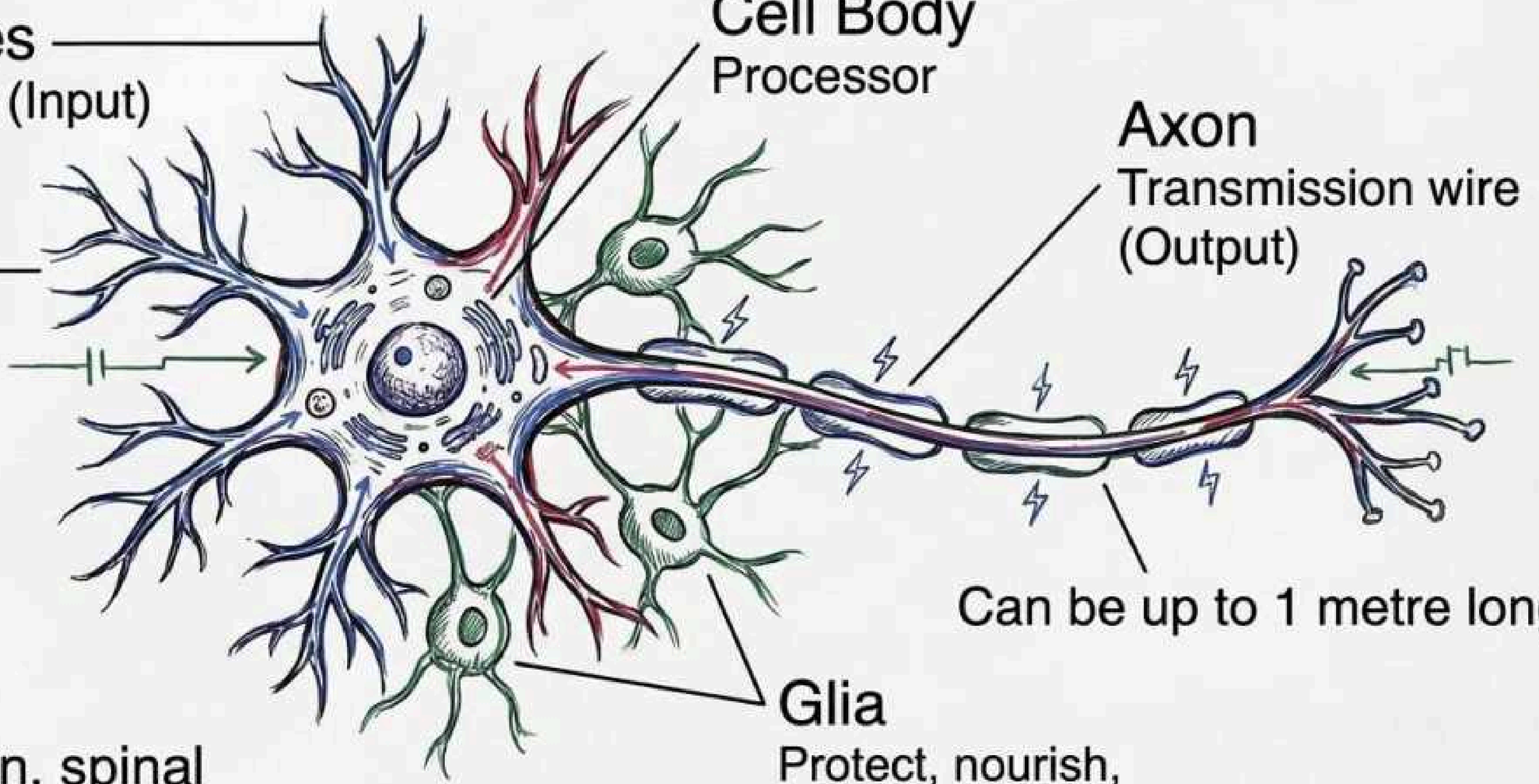
Muscle tissue contracts to produce movement.

¶ 1.9

Skeletal	Cardiac	Smooth
		
Voluntary control	Involuntary control	Involuntary control
Attached to bones	Heart wall	Walls of hollow organs (intestines, blood vessels)

Nervous tissue carries and processes electrical signals.

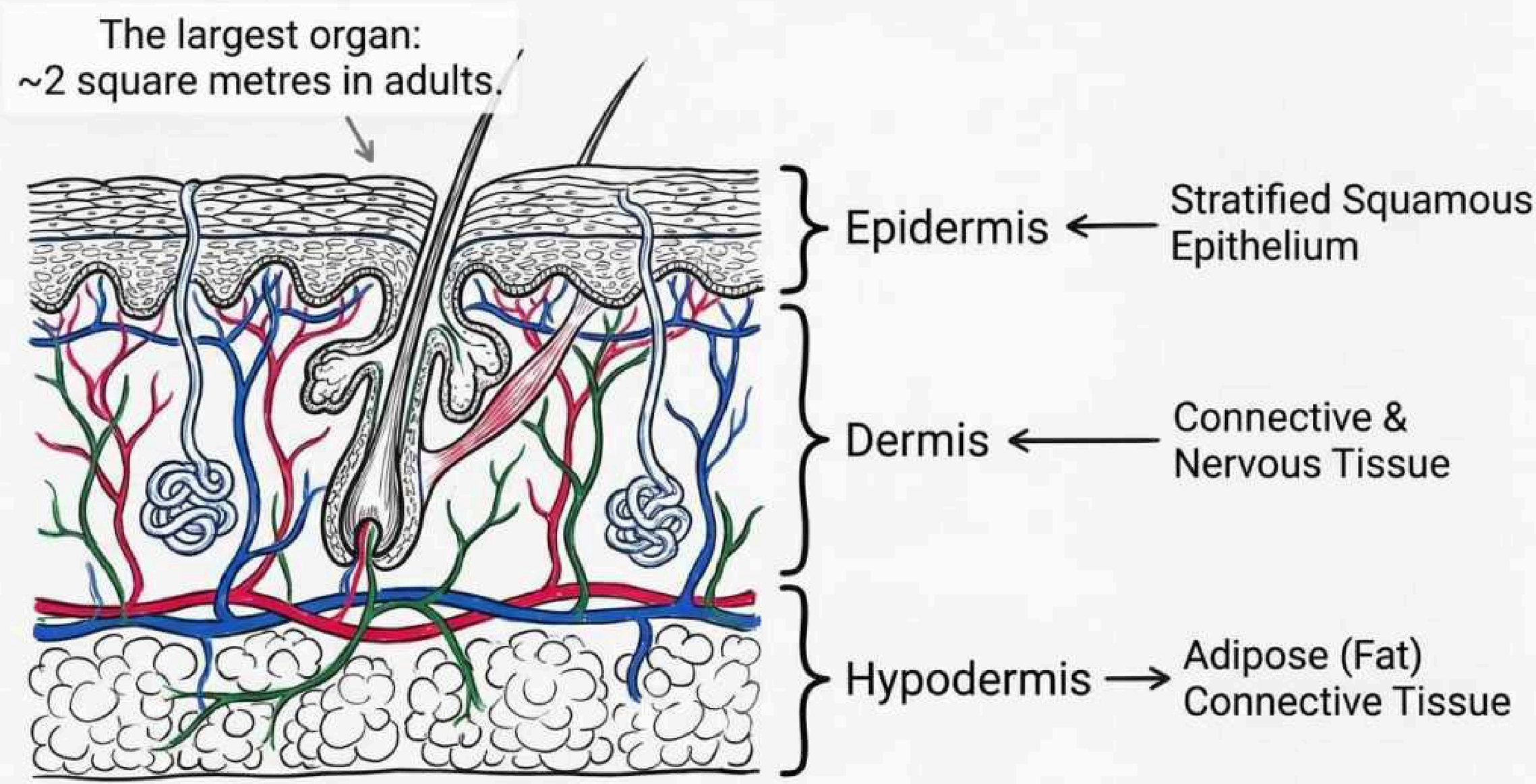
¶1.10



Forms brain, spinal cord, and nerves.

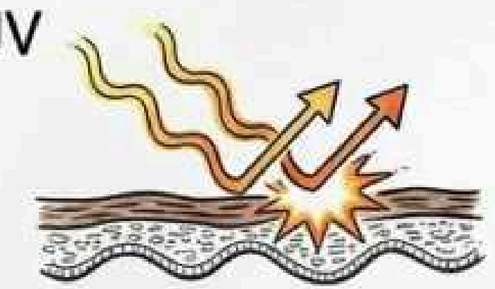
Organs are structures built from combinations of tissues.

¶ 1.11



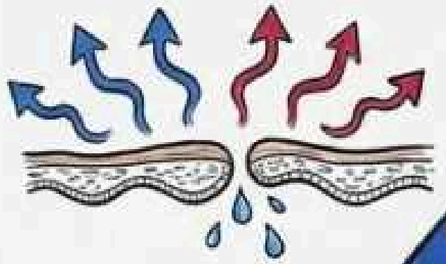
The active functional roles of the integumentary system.

¶ 1.12

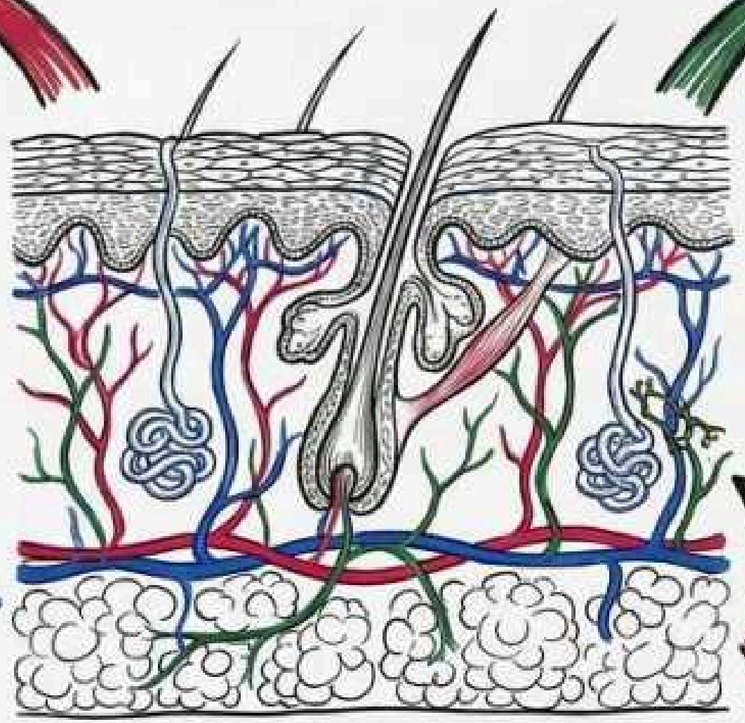


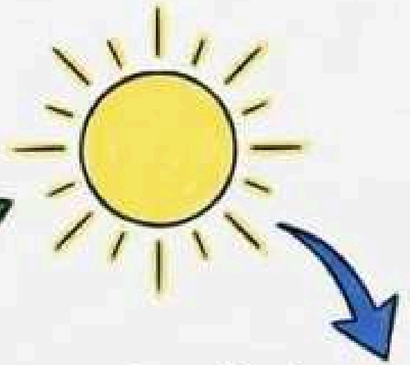
Melanin production protects against UV radiation and gives skin colour.

Physical barrier against injury/infection/drying out.



Thermoregulation: Sweating and changing blood flow.



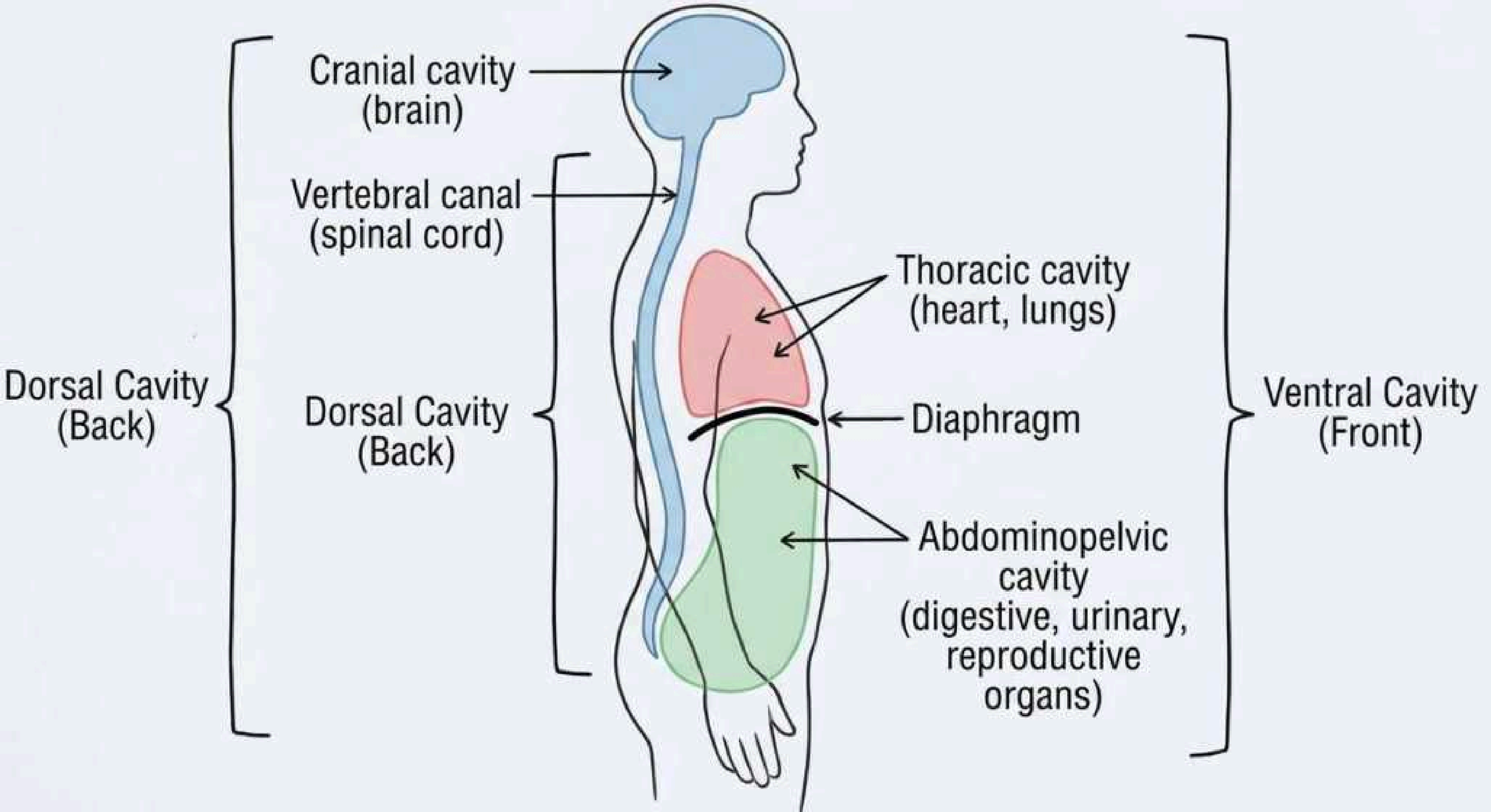


Sunlight → Vitamin D production.

Senses touch, heat, and pain.

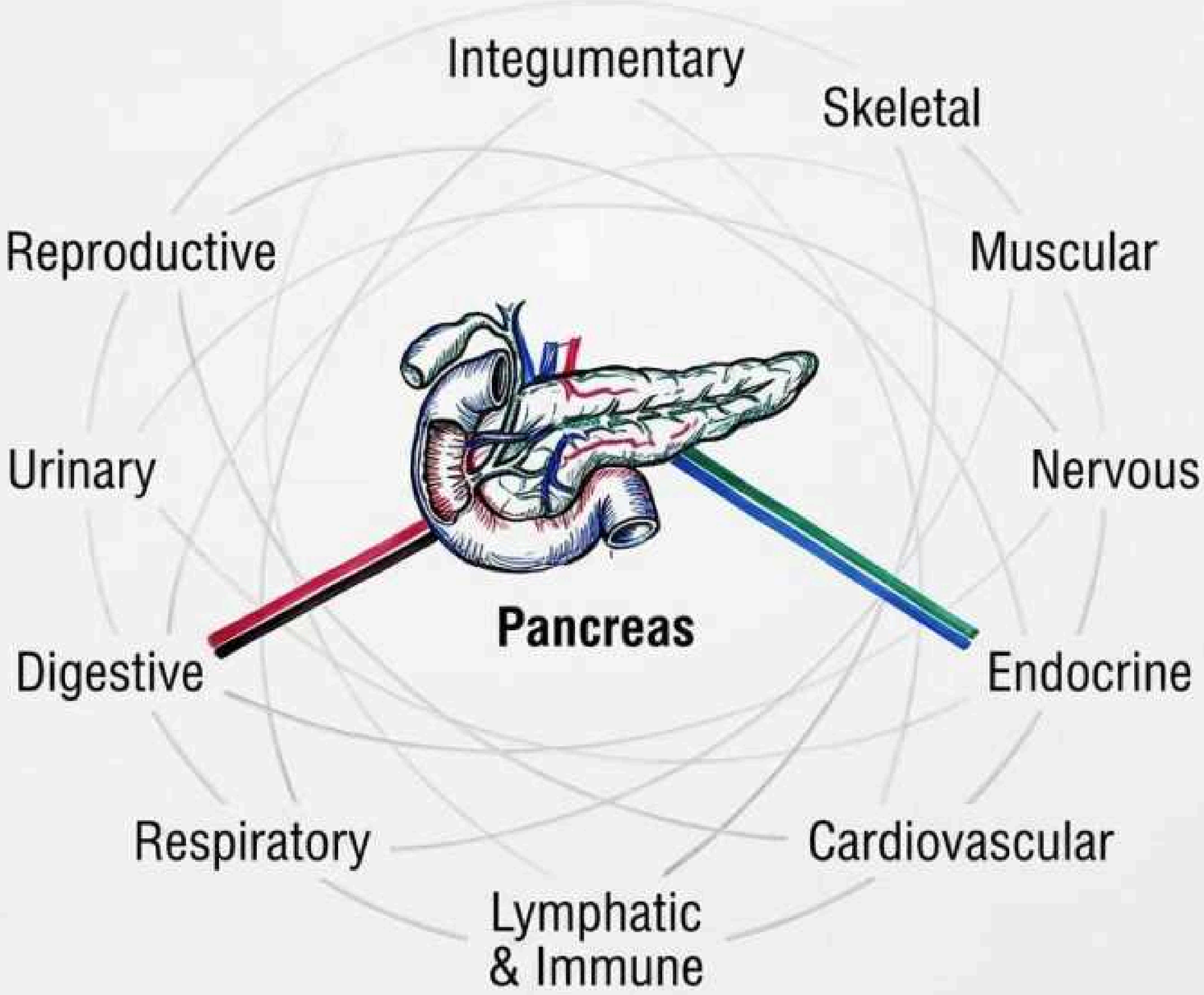
Organs are physically contained within specific body cavities.

¶ 1.13



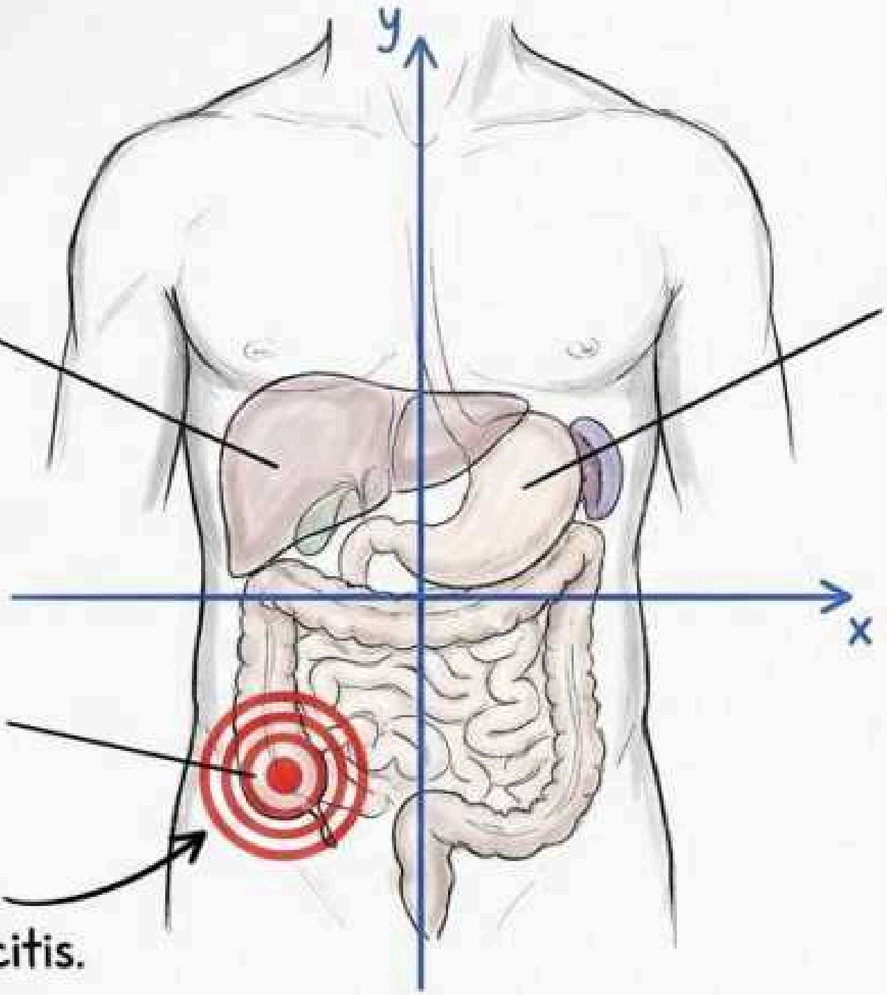
Organs collaborate across eleven interconnected systems.

¶ 1.14



Clinical mapping of the abdomen and biological hierarchy.

¶ 1.15 - 1.16



Right Upper Quadrant (RUQ)
Liver, Gallbladder

Left Upper Quadrant (LUQ)
Stomach, Spleen

Right Lower Quadrant (RLQ)
Appendix

Pain here may suggest appendicitis.

Organelles → Cells → Tissues → Organs → Organ Systems

Next: The Skeleton.