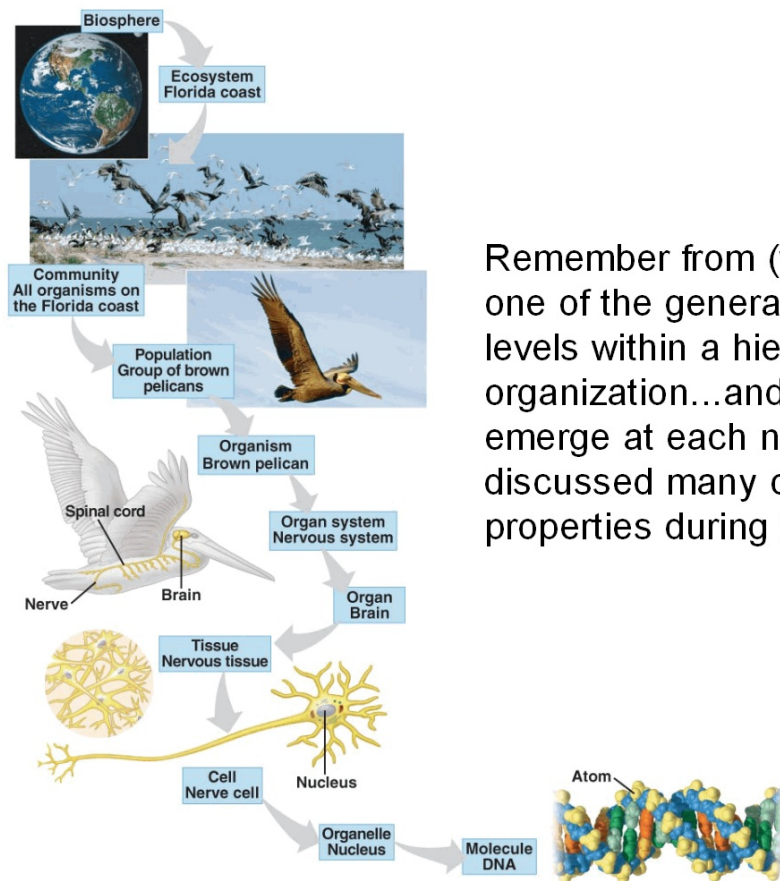
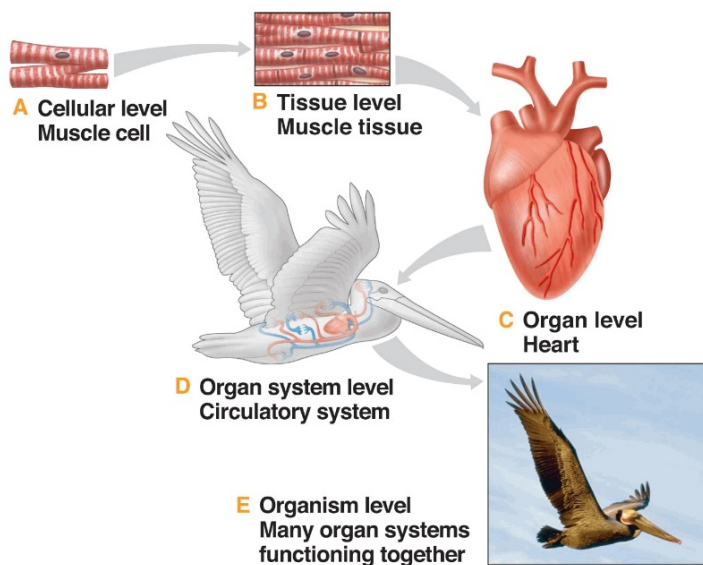


Unifying Concepts of Animal Structure and Function



Remember from (way back) Unit 1 that one of the general themes of Biology is levels within a hierarchy of organization...and that "novel properties" emerge at each new level. We have discussed many of these levels and their properties during the course of the year

In this section (20.1-20.8) we are making another few steps "up the ladder"...from cells to tissues to organs to organ systems



Tissue: integrated system of similar cells with a common function, structure, or both

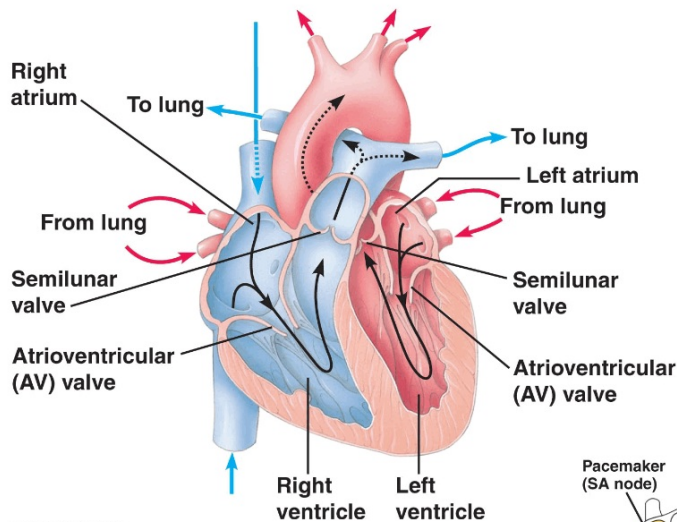
Organ: Two or more tissue types that together perform a specific task

Organ system: multiple organs that together perform a vital body function

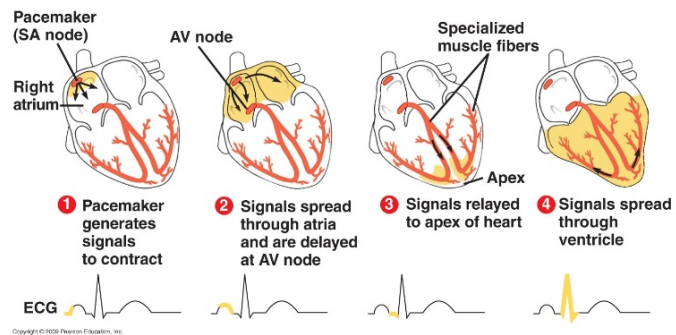
Anatomy is the study of the structures, while physiology is the study of their functions

The study of anatomy and physiology is essentially an examination of "form fitting function"

The form facilitates the function...



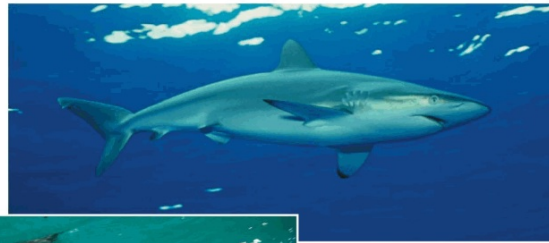
The heart contains three types of tissues: muscle, connective, and nervous...these three tissues result in a structure that is very effective at performing a specific function



Structures within an organism, as well as the organism itself, have been "shaped" by the forces of natural selection

All of these "fast swimmers" have evolved body forms which minimize "drag" and allow them to move quickly through the aquatic environment...

Likewise, specific structures within these organisms have also evolved to perform specific tasks



Shark



Penguin



Seal

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There are FOUR main types of tissues:
Epithelial, Connective, Muscle, and Nervous

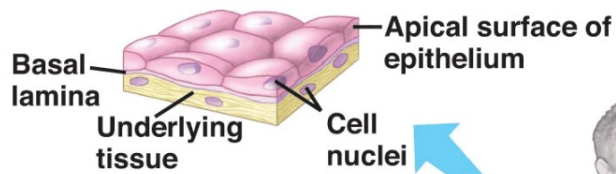
Epithelial: covers the body's external surfaces and lines organs and cavities

Connective: cells that are part of, and produce, the extracellular matrix...provide support and connectivity

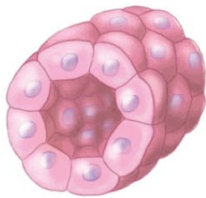
Muscle: consists of long muscle cells capable of contracting...most common animal tissue

Nervous: made of neurons which transmit electrical signals within an animal

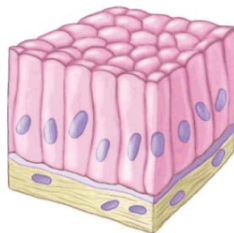
EPITHELIAL TISSUE:



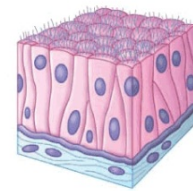
A Simple squamous epithelium (air sacs of the lung)



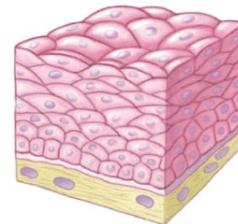
B Simple cuboidal epithelium (kidney)



C Simple columnar epithelium (intestine)

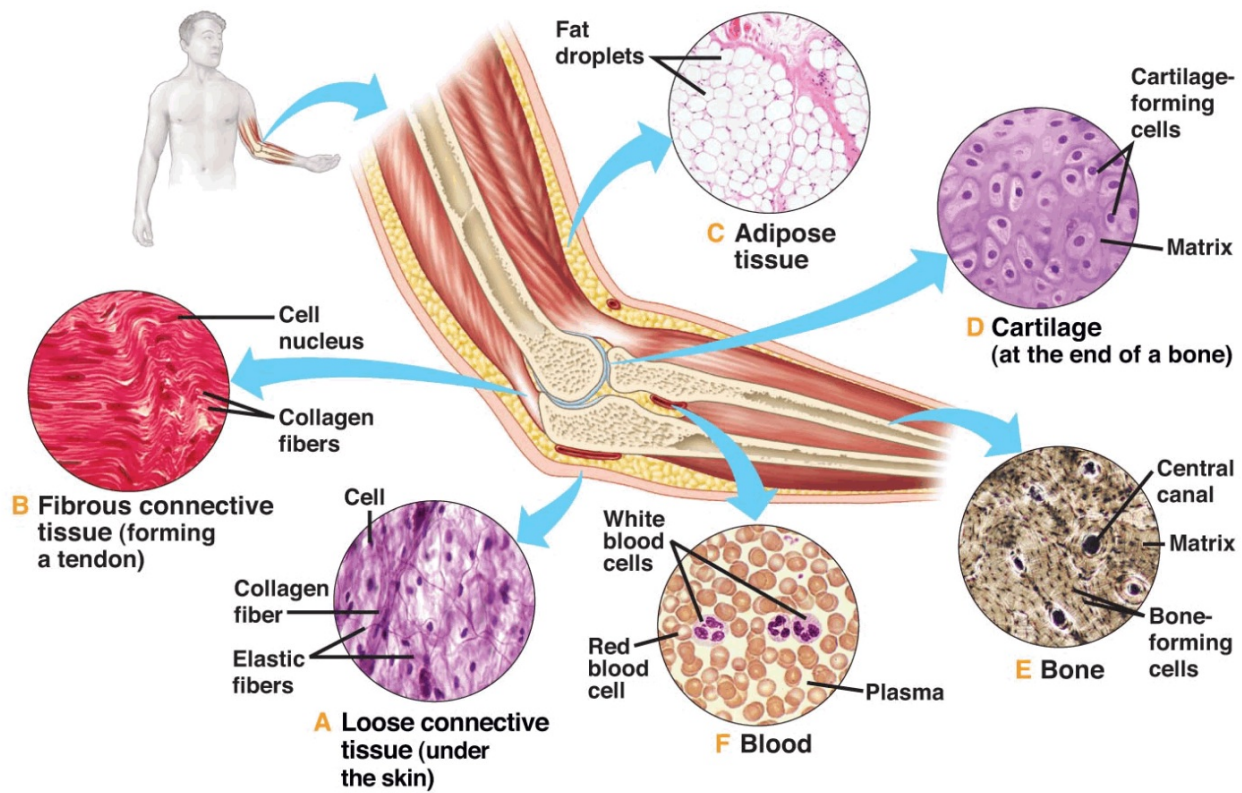


D Pseudostratified ciliated columnar epithelium (respiratory tract)

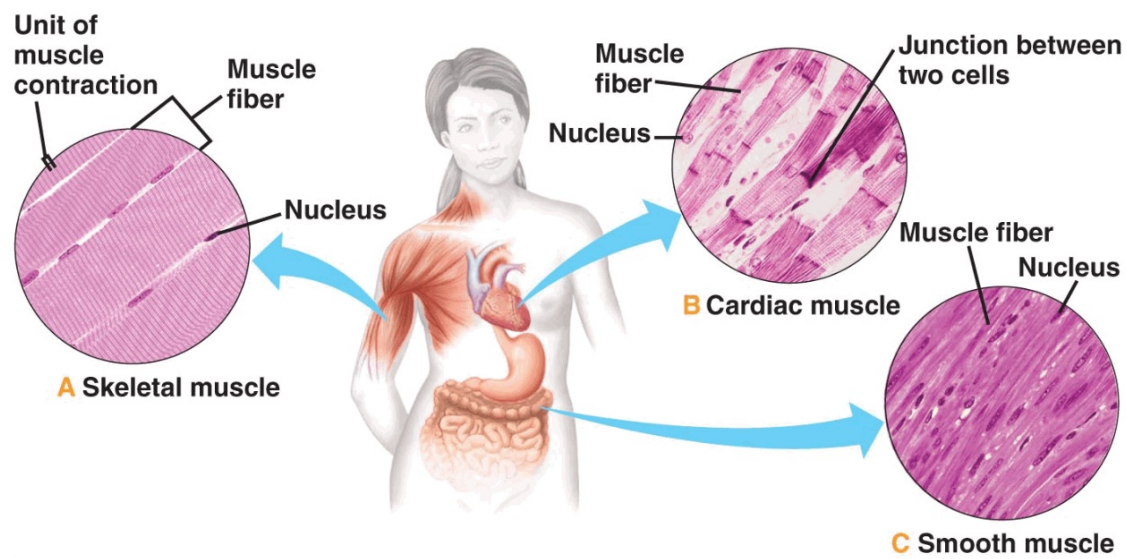


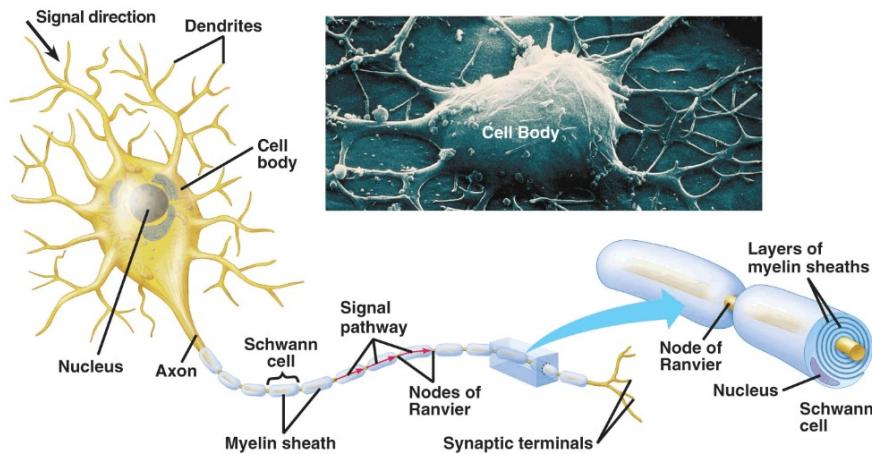
E Stratified squamous epithelium (esophagus)

CONNECTIVE TISSUE:



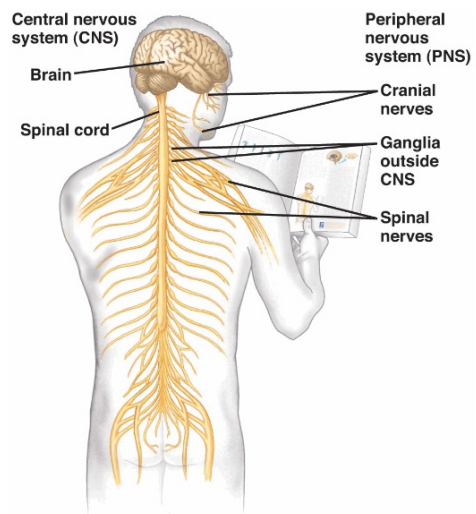
MUSCLE TISSUE:





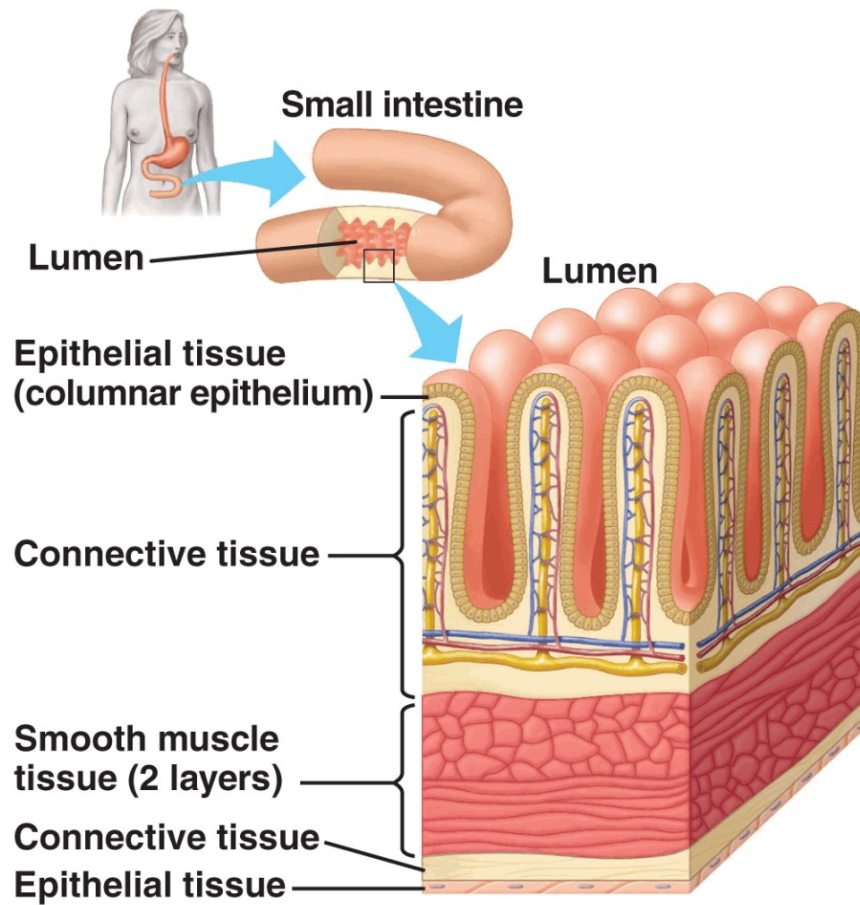
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NERVOUS TISSUE:



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Organs are made of Tissues:



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