CASE #1

Pituitary Gland
Pituitary gland within the sella turcica (bone).

Hypothalamus (part of the brain)

Optic chiasm

Sella turcica
We will study the part of the pituitary gland called the anterior pituitary.
Cells of the anterior pituitary gland produce hormones.

Hormones:
- Growth h. (GH)
- Prolactin
- Other hormones
17 year old twins
22 years old
Graduates college & gets married. Works on a farm doing hard manual labor.

24 years old
GH-secreting tumor
Acromegaly
Munchkin from the Wizard of Oz

What kind of GH problem did he have?
GH cells produce too much GH --> get big

GH cells produce too little GH --> small

What is a tumor?

Abnormal growth of body tissue, may or may not be cancer.
Do our bones change or is bone static and permanent?
If the pituitary gland enlarges it will press against the bone of the sella and the brain above.

What symptoms would you expect?

- Headache
- Enlarged sella
- Double vision
- Acromegaly in the case of a GH-secreting tumor
Therefore, bone is not static & can be modified throughout life.

What comprises bone?

What is in it?
Osteoblasts deposit bone matrix.

Osteocytes are encased within bone matrix.

Osteoclasts digest bone matrix.
Osteoclasts are multinucleate cells that digest bone matrix.
Did the Munchkin lack the cells that produce GH?

Immunostaining is an anatomical technique that can help answer this question.

What is an antibody & how does immunostaining work?
Immunostained section LM

Immunostained section EM

Glass slide

Tissue section

Second antibody with marker molecule

Antibody to GH

GH molecules
The Munchkin did have normal appearing GH cells, but other factors may have accounted for his abnormal stature.
CASE #2

Nephrotic syndrome

A condition in which the individual releases excess protein in their urine
Renal corpuscle

Blood flow in

Blood flow out

Primary filtrate out
Podocytes (pedicels, end feet)
Basal lamina containing heparan sulfate proteoglycan
Capillary lining cells
Inside of the capillary
HSPG

Normal kidney function requires maintenance of this precise anatomy
Normal

Nephrotic syndrome

BCC Microimaging Inc.
CASE #3

Stomach ulcer

What is a stomach ulcer?

An ulcer is a break or disruption in the inner lining of the stomach.

Why does an ulcer hurt?

We feel pain when nerves are stimulated.
Note that the stomach is formed into layers & each layer has a name.
Surfaces of our body are covered by epithelia, both inside and outside. Epithelia are one of 4 basic tissues of our bodies and epithelia cover body surfaces.

A second type of basic tissue lies just beneath the epithelia. That tissue is connective tissue.
CASE #4

Epidermolysis bullosa

A life altering disease in which the skin repeatedly blisters
What is skin & how is it organized anatomically?

Epithelium

This boundary must stay tightly connected or a blister results.
Protein filaments embed into hemidesmosomes, which in turn embed in elements of the basal lamina & connective tissue.

Epithelium

Hemidesmosomes

Basal lamina

Connective tissue

nerves (& cells, blood vessels, etc.)
Protein filaments embed into hemidesmosomes, which in turn embed in elements of the basal lamina & connective tissue.

Laminin is one molecule that is present beneath the hemidesmosome & functions to maintain tight contact between the epithelial cells & the connective tissue beneath.
Protein filaments embed into hemidesmosomes, which in turn embed in elements of the basal lamina & connective tissue.

Abnormal laminin (gene mutation) does not bind the epithelium firmly to the connective tissue, and therefore results in blistering.
Epithelium

Basal lamina

Connective tissue

nerves (& cells, blood vessels, etc.)