Developmental Biology Lecture 15 (Week 9, Thursday) 10/24/2014

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Slide 1: Germ layers are the beginning layers. Germ and germination usually refer to the beginning of development.

The difference between morphogenesis and gastrulation: morphogenesis is the generation of form. Gastrulation is the first step in generating form.

Slide 2: Gastrulation is the inward movement of cells.

(incomplete) Gastrulation begins with an epithelial to mesenchymal transition.

The diagram shows epithelial cells, which are typically cuboidal in shape. Here, cell-cell adhesions called Adherins Junctions are involved (Cadherins and actin from the cytoskeleton -> this will be on the next exam!!)

Remember, desmosomes attach to intermediate filaments.

Slide 3:

Shape Change:

- Cuboidal to round

Loss of Adhesion:

- Endocytosis of cadherins from surface

Cancer cells are typically epithelial and can undergo this transition to begin migration throughout body.

Slide 4: The right most picture shows the mouth forming as the second opening so it is a deuterostome. The scale bar on the bottom left image represents 50 micro meters.

(missing) Inward deformation of a sheet of cells.

The basal lamina is part of the extracellular matrix and gives structure and support to the epithelial cells.

Slide 5: The bump forming in the bottom image is forming due to actin-myosin localized contractions, aka invagination.

(incomplete) Apical faces of cells contract in region of invagination.

Slide 6:
(incomplete) This process is called **convergent extension**: cells in a region moving together in one direction to extend the length of the region in the perpendicular direction.

Clicker Question!

Convergent extension is mainly about
A) Cell shape change
B) Cell movement
C) Change in the rate of cell division
D) Change in the plane of cell division
E) Cell death

Answer is **B**!

Slide 7:
(incomplete) Mesoderm invaginates to form a ventral furrow, then a tube that quickly breaks apart.

Slide 8: Autonomous means that it doesn't require a signal from other cells to happen.

Slide 9:
(incomplete) Doral gradient.

Dorsal has a high concentration at the bottom of the image and a low concentration at the top. This means Dpp has a high concentration at the top because dorsal inhibits Dpp (so it can't have a high concentration where dorsal has a high concentration). Dorsal is high at the bottom of the image because of the activity of toll receptor, which inhibits cactus.

Slide 10:

(missing) Involves regulated changes in the junction holding the cells together.

Slide 13: Cell shape changes initiate involution. Cells migrating on the roof of the blastoseal. Archenteron gets larger until blastoseal naturally disappears.

Slide 16: In radial intercalation you increase the surface area; in medio-lateral there is no increase of surface area.

(incomplete) Occurs during epiboly resulting in an increase in surface area.

Clicker Question!

What is the 1st evidence of involution during xenopus development?
A) Shape changes in the bottle cells.
B) A sheet of cells migrates inwards.
C) Cadherins are expressed in the mesoderm.
D) All of the above occur at the same time.

Answer is **A**!