

FISH EMBRYOLOGY



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introduction



الاسماك من اصلح الحيوانات الفقرية لدراسة المراحل التطورية التي تحصل
لاعضاء واجهزة الفقاريات وذلك لافتقادها الى الصبغات وشفافيتها في
المراحل التطورية المبكرة



Reproductive organ

Ovary ----- ova

testis ----- sperm

Spermatogenesis

Oogenesis



- Type of reproductive
- Bisexual
- Hermaphroditic
- parthenogenetic



- Fertilization
- Impregnation--- cortical reaction
- Micropyle
- Polysperm
- Zygote
- Cleavage

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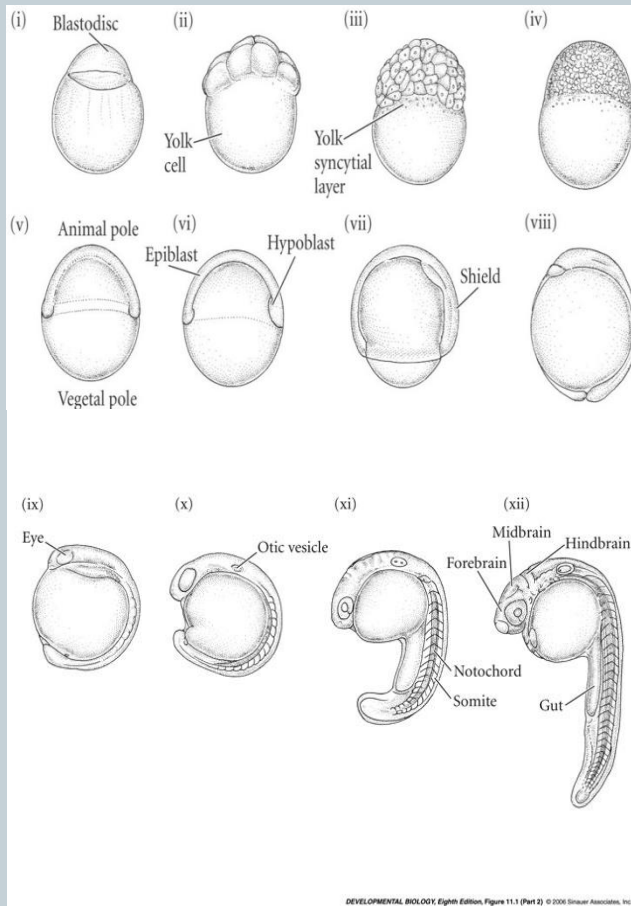
Definition of the embryonic stage



stage that starts from the Fertilization of the egg to the end of the absorption of egg yolk.

Where the development occur within the fetal membrane during the egg stag.

Stages of embryonic development



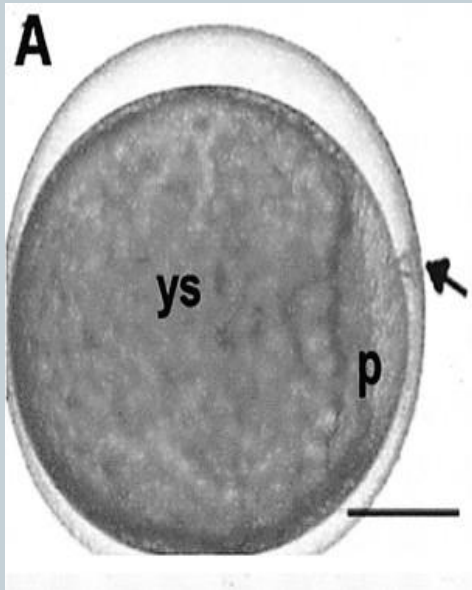
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2. Morula
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Fertilization



- Fertilization is achieved when the nucleus of the egg cell and that of the sperm unite in the cytoplasm of the egg.
- Where is the formation of a fertilized egg and the start of embryogenesis and ends when hatching.

Fertilization



- . Arrow indicates point of sperm entry. Factors, such as beta-catenin mRNA needed for dorsal-ventral axis formation, are loaded into the egg.

Morula

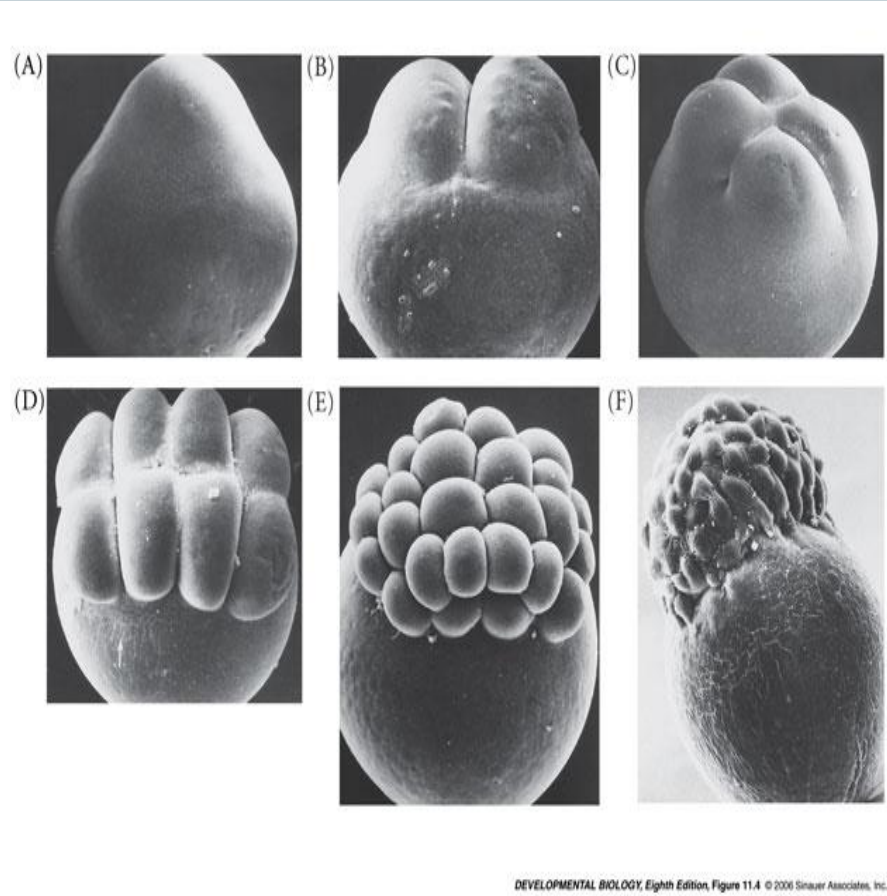


- Further meridional and vertical divisions of the four blastomeric (cells) produce many more blastomeric to form what is called the morula

Cleavage Stage

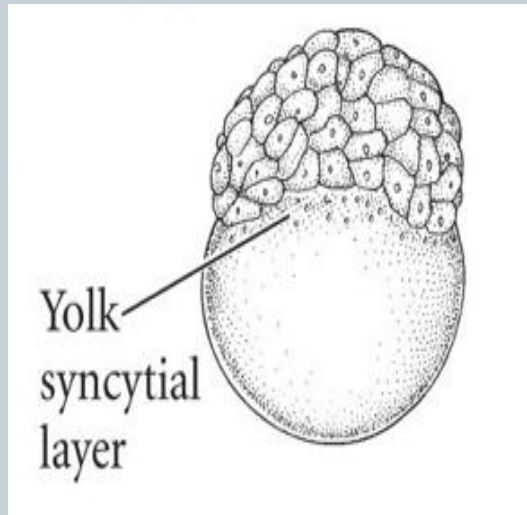


The fertilized egg undergoes synchronous cleavage. This egg is telolecithal, meaning only a small region is free of yolk. This yolk-free region is termed the blastodisc and divides by meroblastic, discoidal cleavage.



Blastula Stage

Mid-Blastula Transition



Blastula stages begin at the eighth division. The pulsing characteristic of synchronous division stops and asynchronous division begins. At this point transcription of the zygotic genome begins. Between the ninth and tenth division, the Yolk Syncytial Layer (YSL) is formed by the fusion of cells with yolk.

Blastula Stage continued

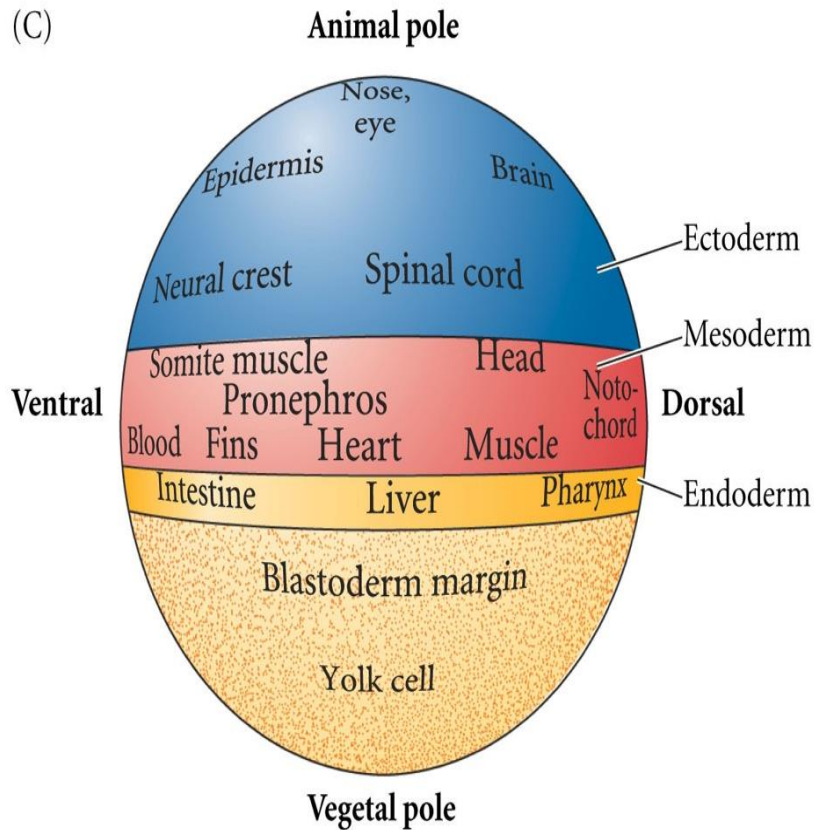
The blastomeres begin to mix randomly and mixing continues through late gastrulation. Dorsal YSL begins to express the nodal signal Squint when nuclear beta-catenin accumulates.



Blastula Stage Fate map



(C)



The mixing of the cells finally allows for fate mapping during late-blastula.

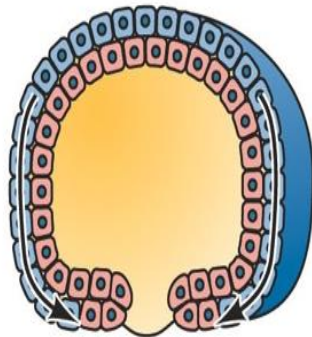
Blastula Stage

Late Blastula



All embryonic cells undergo epiboly driven by the expansion of the YSL. The outermost layer of blastomeres (the enveloping layer) surrounds the yolk cell.

Epiboly



Gastrulation (Embryonic Shield Formation)



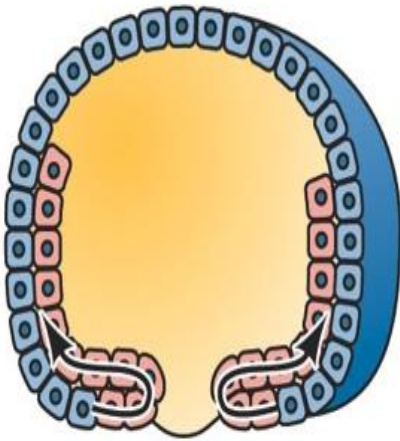
Cells undergo dorsal convergence to form the embryonic shield. This structure organizes gastrulation. The embryonic shield secretes nodal which sets up the dorsal-ventral gradient, in which high nodal produces dorsal structures and low nodal produces ventral structures.

Gastrulation

Mesendoderm Formation



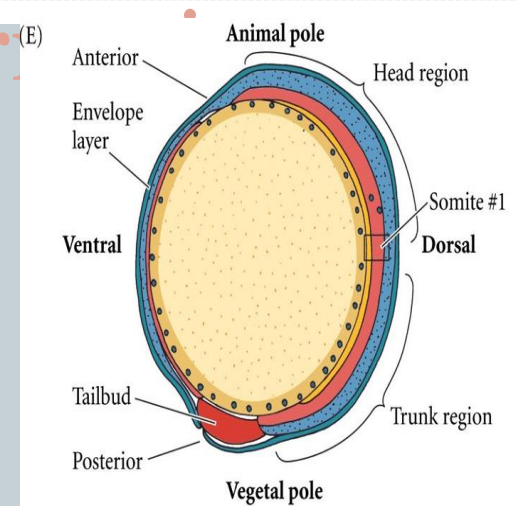
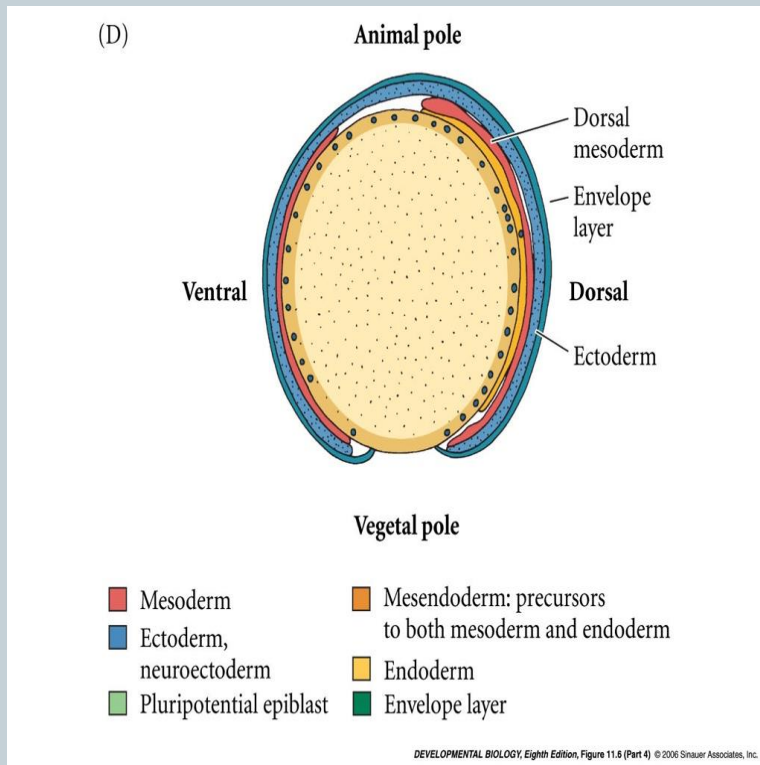
Involution



Cells of the embryonic margin begin to involute, giving rise to the mesendoderm. These specified cells involute to form the inner cell layer (hypoblast).

Gastrulation

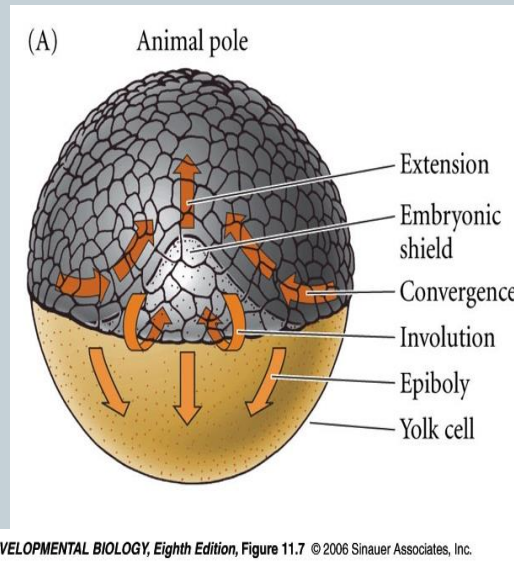
Anterior-Posterior Axis For



The anterior-posterior axis is formed by involution. The first cells to involute make anterior structures and the last cells to involute make posterior structures.

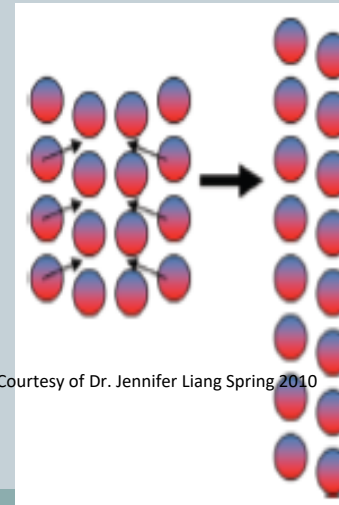
Gastrulation

Convergent Extension



Mesendoderm and ectoderm converge to the dorsal side and extend along the anterior-posterior axis.

Convergent extension, epiboly and involution occur at the same time.

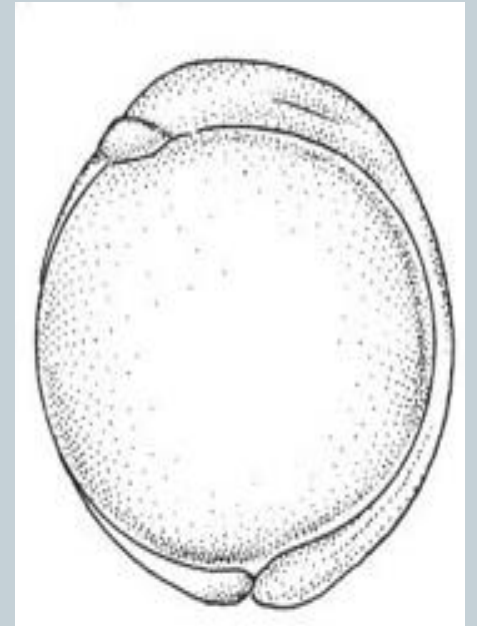


Courtesy of Dr. Jennifer Liang Spring 2010

Embryonic body (Formation of embryonic axis optic vesicles)



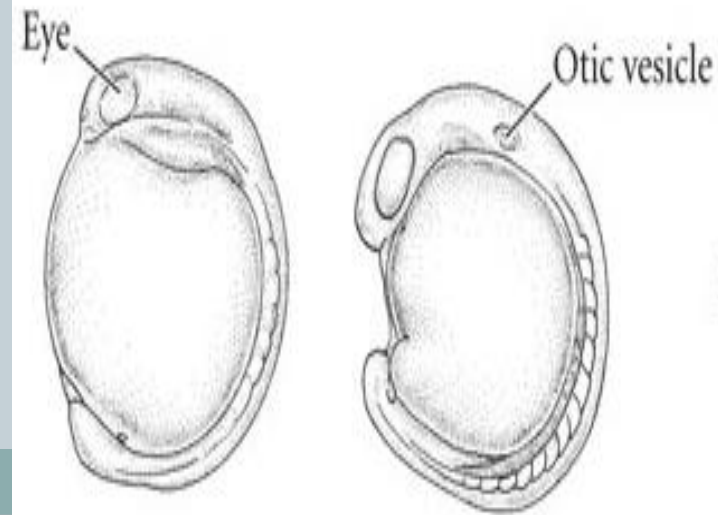
Grow embryonic shield in length and width
axis consists embryonic optic vesicle.



Embryonic body



- During the next development stages .the lenses of eyes and vesicles promissory will start appearing.





**THANK YOU FOR
ATTENTION**