

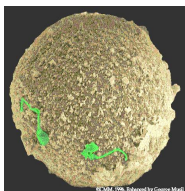
Fertilization and Cleavage

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Functions of Fertilization

What is Fertilization?

The development and liberation of the male and female gametes are steps preparatory to their union through the process of fertilization.

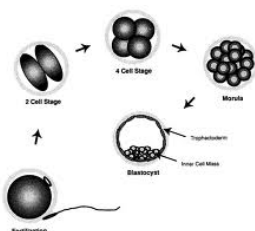


Fertilization has three functions

1. Transmission of genes from both parents to offspring
2. Restoration of the diploid number of chromosomes reduced during meiosis
3. Initiation of development in offspring

Steps in Fertilization

- Contact between sperm and egg
- Entry of sperm into the egg
- Fusion of egg and sperm nuclei
- Activation of development



What is Cleavage?

The zygote directly subdivides into many smaller cells of conventional size, suitable as early building units for the future organism.

Cleavage

- The first step in development of all multi celled organisms.
- Converts a single-celled zygote into a multi celled embryo by mitosis.
- Zygotic cytoplasm is divided among the newly formed cells.

Blastula

- Produced by mitosis of the zygote
- A ball of cells surrounding a fluid-filled cavity
- RNA and information carrying molecules are distributed to various parts of the blastula.

Gastrulation

Gastrulation involves a series of cell migrations to positions where they will form the three primary cell layers.

- [Ectoderm](#) forms the outer layer.
- [Endoderm](#) forms the inner layer.
- [Mesoderm](#) forms the middle layer.

Ectoderm

- Forms tissues associated with outer layers: skin, hair, sweat glands, and epithelium.
- The brain and nervous system also develop from the ectoderm.

Mesoderm

- Forms structures associated with movement and support: body muscles, cartilage, bone, blood, and all other connective tissues.

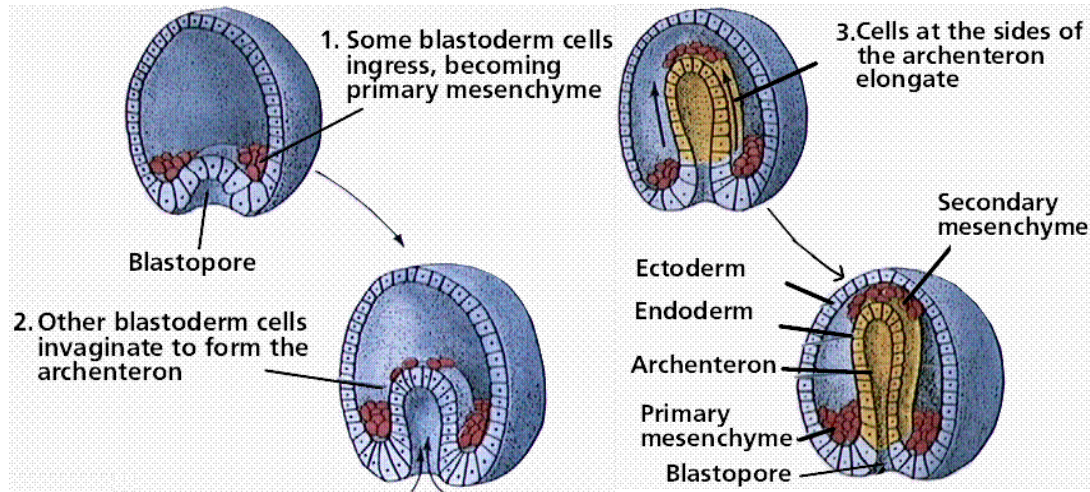
- Reproductive system organs and kidneys form from mesoderm.

Endoderm

- Forms tissues and organs associated with the digestive and respiratory systems.
- Many endocrine structures, such as the thyroid and parathyroid glands, are formed by the endoderm.
- The liver, pancreas, and gall bladder arise from endoderm.

Invagination

Immediately after gastrulation, the body axis of the embryo begins to appear.



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Reference Links:

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- <http://www.becomehealthynow.com/article2/bodyembryo/789/>
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- <http://www.youtube.com/watch?v=28GTvrNvRRE>

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