

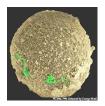
# Fertilization and Cleavage

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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.

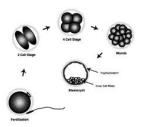


### Fertilization has three functions

- 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?

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#### 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

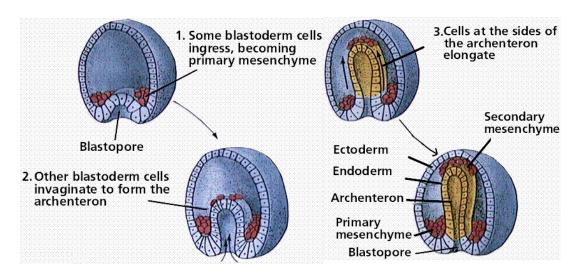
 Forms structures associated with movement and support: body muscles, cartilage, bone, blood, and all other connective tissues. • Reproductive system organs and kidneys form from mesoderm.

### **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:**

- http://en.wikipedia.org/wiki/Talk%3AReproductive\_system
- http://www.becomehealthynow.com/article2/bodyembryo/789/
- $\underline{http://www.cartage.org.lb/en/themes/sciences/lifescience/general biology/physiology/Reproductive System/Fertilization Cleavage/Fertilization Cleavage/Fertil$
- http://www.youtube.com/watch?v=28GTvrNvRRE

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