

# Development



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# What is development?



Development is growth of an organism's body to maturity. This is the first process that takes place after reproduction, and is arguably the most important stage. This system is independent from all other body system because it creates the other body systems. Without this, there would be no immune system, endocrine system, or even an organism for that matter. Because the development system creates the organism, it creates the perfect environment for homeostasis to occur.

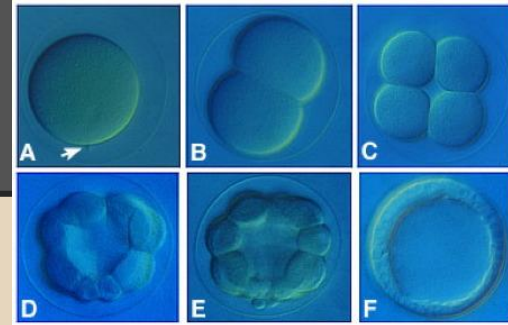


# Evolution

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Since life on earth was originally single cell organisms, development was, at the time, almost non-existent. As evolution progressed, the development system has become more specialized to assist in the development of a diverse array of animals and their organ systems.

# Overview - The Major Stages



1. Fertilization - Gametes turning to zygotes.
  - Gametes from a male and female fuse together to form a zygote.
  - Zygote: A diploid cell which contains chromosomes from each parent cell.
1. Cleavage - The splitting of a zygote into many different cells, forming a blastula.
  - Blastula: A hollow ball of cells.
  - Size does not change, only the number of cells.
    - One large cell to many small cells
1. Patterning - Cells created during cleavage begin to organize themselves into layers.
  - Also called gastrulation, the three layers are: ectoderm, mesoderm, and endoderm.
    - Genes of the zygote are beginning to be expressed
1. Differentiation
  - The cells in the gastrula(s) begin to specialize and gain shape (morphogenesis) and function
  - Tissues → Organs → Organ Systems
1. Growth - The final process once all of the major organ systems are formed.
  - The organism increases in size and complexity.

# Morphogenesis and Differentiation

Morphogenesis - The process in which an organism begins to develop its shape

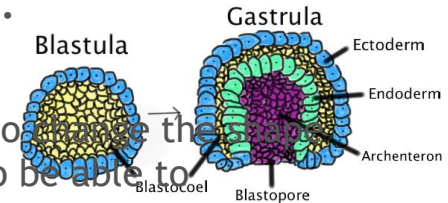
- This process begins during the cleavage phase, when zygotes turn to blastulas. This process alters the shape ever so slightly, but not the size.

Differentiation - The specialization of cells for different functions

- This process begins during the gastrulation phase, when the three different layers of the gastrula take on their own purpose.

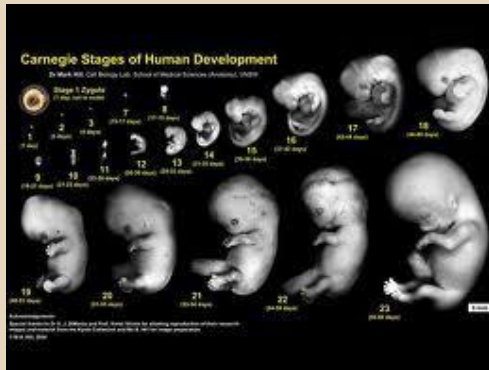
## How do these relate?

- The structure of a cell affect the cell's function. Without morphogenesis to shape the of an organism, the organism's cells would not be given the opportunity to be able to specialize.



# Structures

- Uterus- the organ in the lower body of a woman where offspring are conceived and in which they gestate before birth
- The fetus develops in the uterus, relying on the given umbilical cord and placenta to get through the development process. Without the safety of a uterus, the fetus would surely die.
- The uterus is where the development process starts, where the fetus develops organs of its own, as well as key body parts.



# Examples of Diseases/Disorders Dealing with Development-Birth Defects

Diseases/Disorders developed in the womb during development-

- Cerebral Palsy- a congenital disorder of movement, muscle tone, or posture
- Down Syndrome- fetus develops extra chromosome 21, causes various physical/mental defects
- Clubfoot- one of several types of deformities of the foot or ankle that affects fetal growth
- There are many more disorders or diseases that are initiated in the development process, such as hereditary diseases, growth disorders, etc.



# Works Cited

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# video

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<https://www.youtube.com/watch?v=dQw4w9WgXcQ>