


How Does Life Begin?




Chapter 2
Biological Beginnings

Class Objectives:

We will examine the biological process of human development.

- The stages of prenatal development



The passing on of genetic characteristics

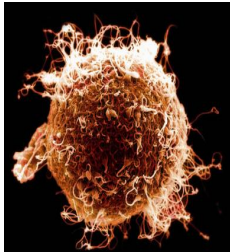
Genetic Foundations of Development
(please make sure to read p. 60-66)

TRUE OR FALSE...
The study of development begins at birth.

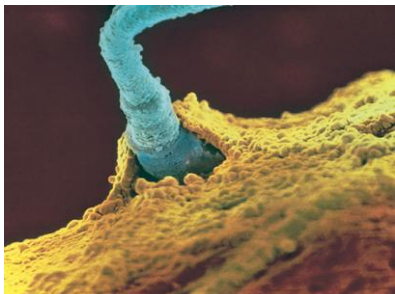


The real “Amazing Race”

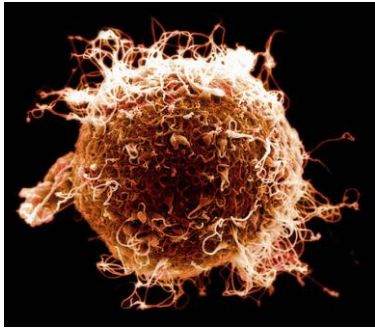
- Every human begins very simply with the meeting of one sperm and one ovum (egg).



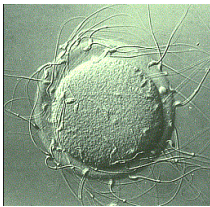
The sperm “fight” to be the only one that can successfully fertilize the egg.



Conception occurred ...now what?



The first form of life



- At conception the genetic material from each parent is fused.

- _____

From Zygote to human??

- The Zygote will become transformed through a process of three stages:

- _____ The first two weeks after conception

- Embryonic period- The 3rd to the 8th week after conception

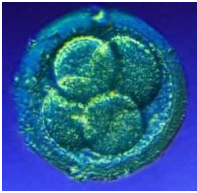
- Fetal period- _____ after conception to birth

Periods of Prenatal Development

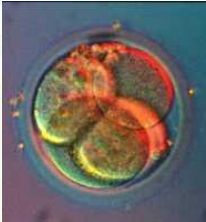
- **Conception to 2 weeks (zygote)**
 - Starts with conception and lasts until the zygote is implanted in the uterine wall
- **3rd to 8th week (embryo)**
 - Starts with implantation
 - Development takes place through process of cell division, cell migration, cell differentiation, and cell death
 - Development is influenced by hormones
- **9th week to birth (fetus)**
 - Continued development of physical structures and rapid growth of the body
 - Increasing levels of behavior, sensory experience, and learning

True or false?

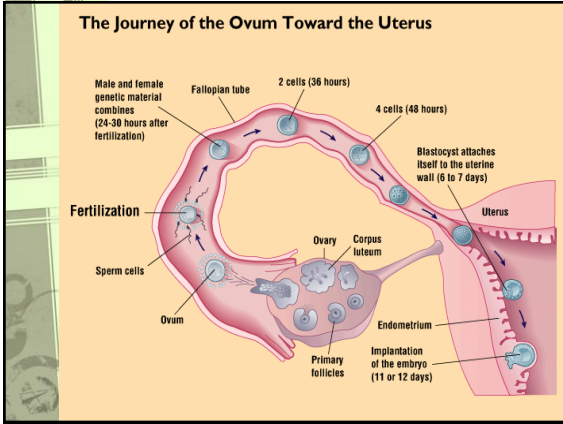
50% of fertilized eggs are lost before a woman finds out she's pregnant.



The Germinal Period



- The original zygote divides into:
 - Two cells, Four cells, Eight cells...etc
- At this stage cells separate completely forming the beginning of monozygotic twins and multiples





Time for Implantation

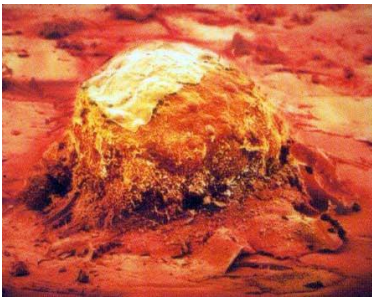
- At about a week after conception the multiplying cells separate into two masses
- A small cluster of cells near the center of the blastocyst (*germ disc*) develop into the baby
- Outer cells, which will later become the _____

Early Prenatal Development

- Gastrulation (end of germinal phase)
 - The process by which cells start to differentiate after the zygote implants in to the uterine lining

- _____
- _____
- _____
- _____

The Blastocyst implants itself into the uterine wall



Inner cell mass differentiates

- Top layer: nervous system, nails, teeth, inner ear, lens of the eyes, and the outer surface of the skin
- Middle layer: muscles, bones, circulatory system, the inner layers of the skin, and other internal organs
- Bottom layer: digestive system, lungs, urinary tracts, and glands
- Neural tube
 - A U-shaped groove formed from the top layer of differentiated cells.

Hello Embryo!

● During the Embryonic stage, it is still not recognizable as a human.

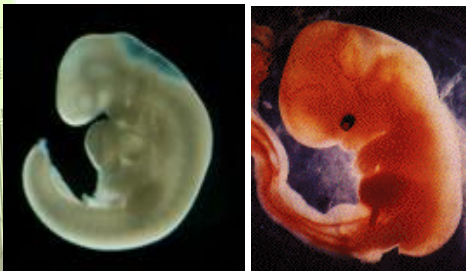
● The neural tube forms (at 22 days), which becomes



4 Week Embryo



From 4 to 6 weeks...
Look at the difference!



6-9 week Embryo



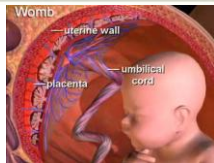
TRUE OR FALSE?

Approximately 20% of all embryos are aborted spontaneously

The *placenta* also forms during this early period

- The placenta is a mass of tissue attached to the uterine wall that _____

- Total surface area of the tissue is 10 square yards!
- Connects its circulatory system with the mother
- The embryo and placenta are connected by the umbilical cord



The Support System

- Umbilical Cord

- A tube that contains the blood vessels that travel from the placenta to the developing organism and back again

- Amniotic Sac

- _____
- _____

- Maintains a relatively even temperature
- Cushions against large movements
- Allows muscles of fetus to get exercise without the effects of gravity

The Fetus Week 9-Birth

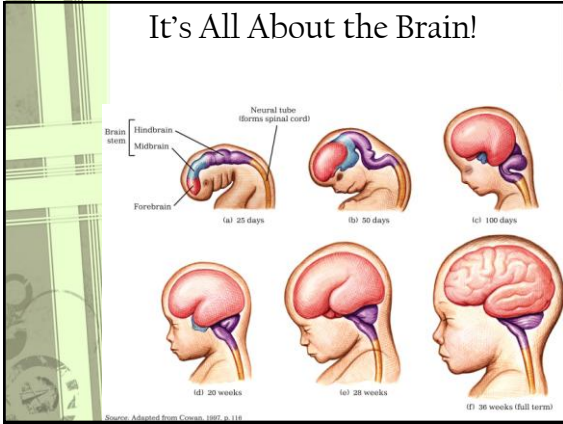


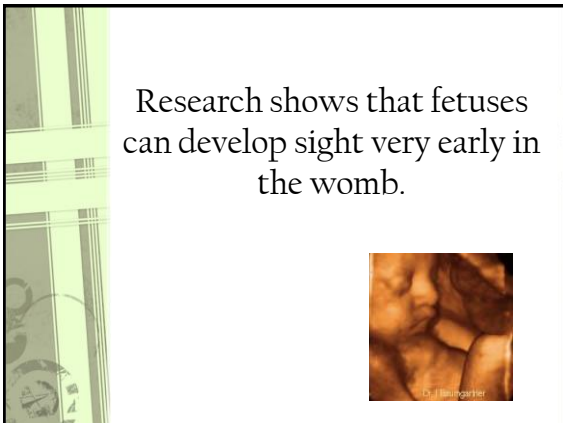
- The Brain grows dramatically (6 times in size) and becomes responsive during this time.

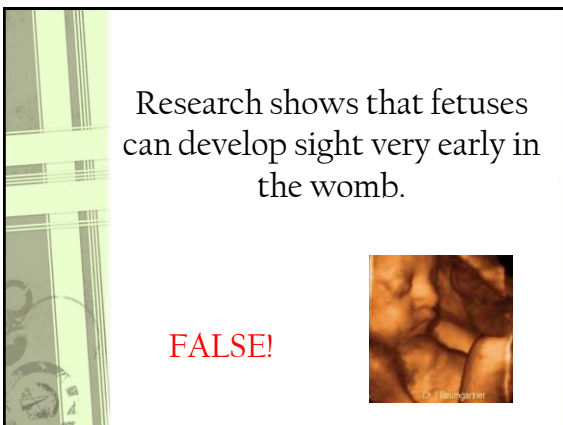
- _____
- _____
- _____

- There is only a 50% survival rate at 26 weeks

The Brain MUST be able to sustain the body for survival







It was previously thought that emotions were only expressed after birth



36-38 Weeks
The baby is now full-term



Next Class...

Teratogens and the birthing process
-Factors that influence prenatal development
