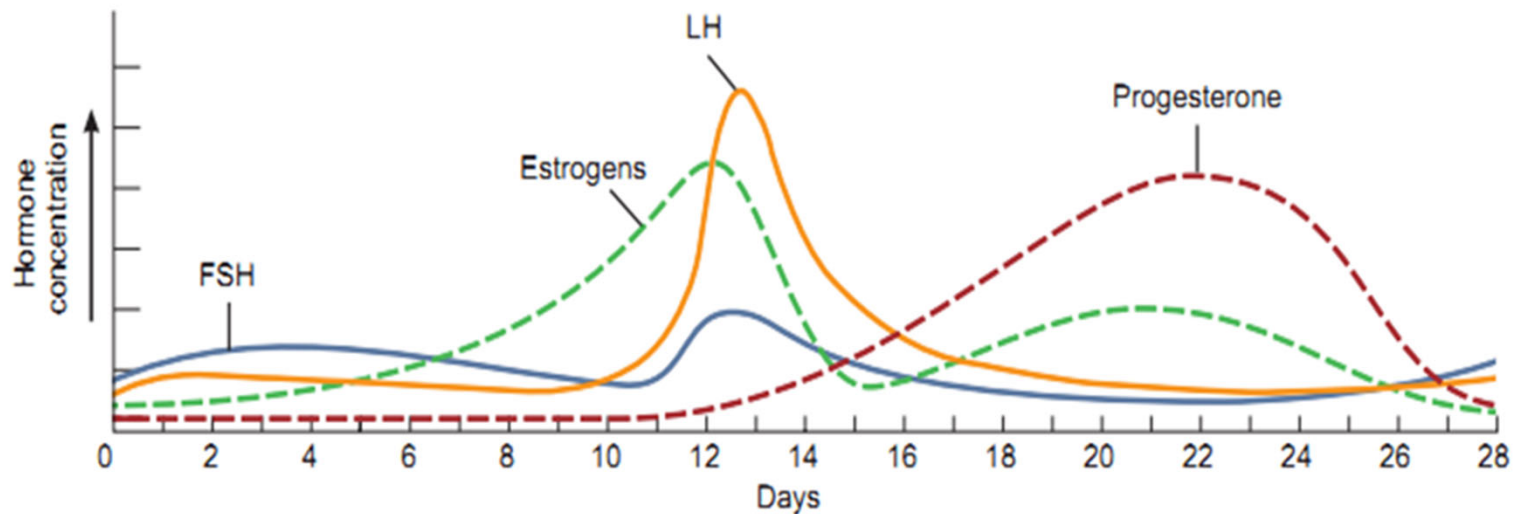


# *Human Reproduction*

## **Menstruation and Pregnancy**



(b) Changes in concentration of anterior pituitary and ovarian hormones

## **OUTCOME QUESTION(S):**

**S1-1-10:**

**How does a fertilized egg turn into a baby and what determines the gender?**

### **Vocabulary & Concepts**

Ovulation

*Menstrual Cycle*

Fertilization

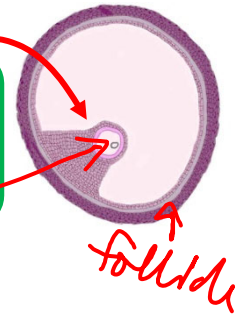
Zygote

Embryo

Fetus

- **Follicle** – *cells surrounding the egg inside ovary*  
(shell)

The “egg(s)” is also known as an **oocyte(s)** or an **ovum (ova)**



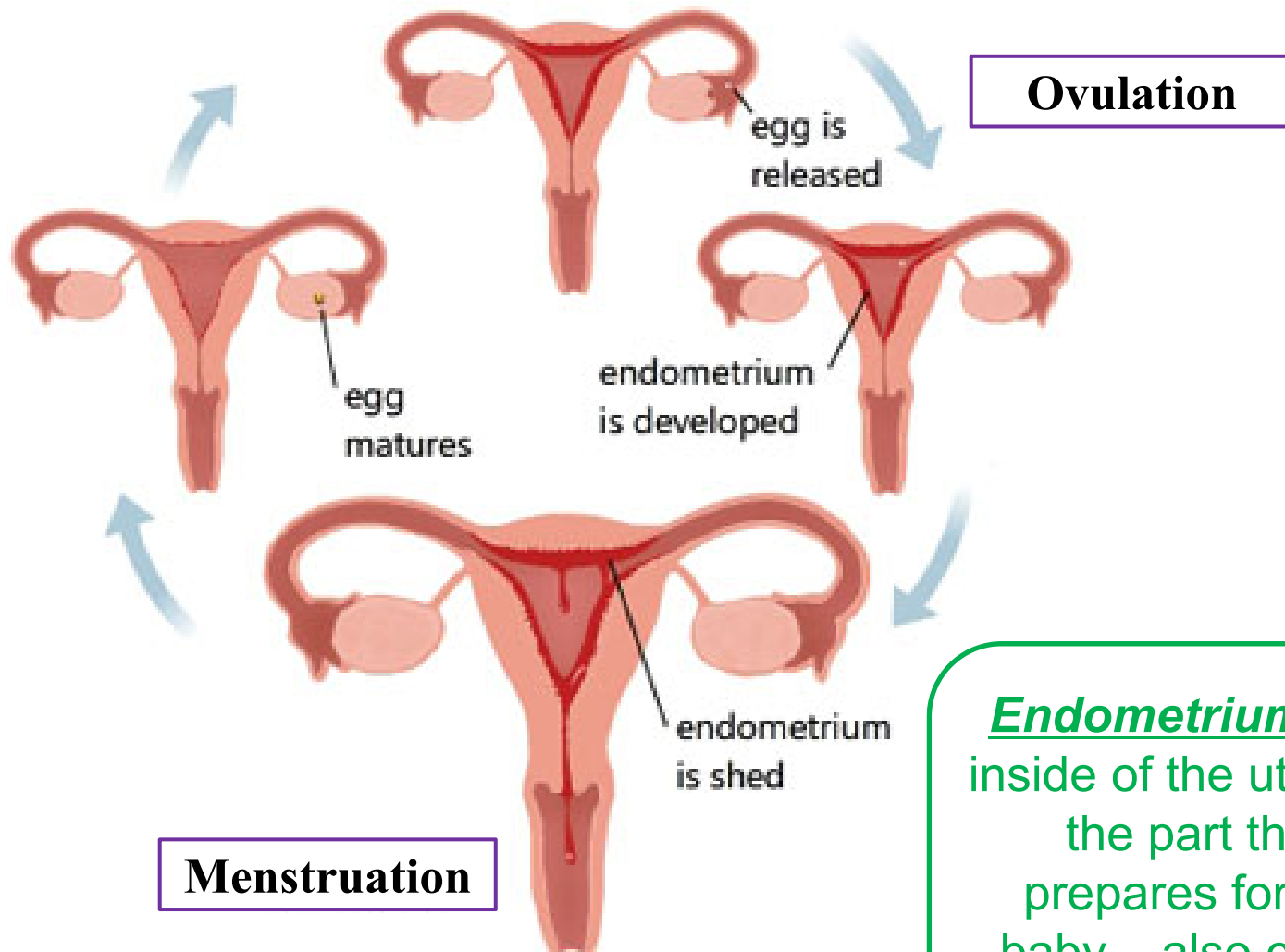
### **Ovulation:**

**Release of ovum** from a follicle in the ovary as a response to a *hormonal brain signal*.

### **Menstrual Cycle:**

**Monthly cycle** of changes that occur in the **ovaries** and **uterus** - *includes ovulation and menstruation*.

- *Ovulation occurs at a **halfway** point in the cycle*

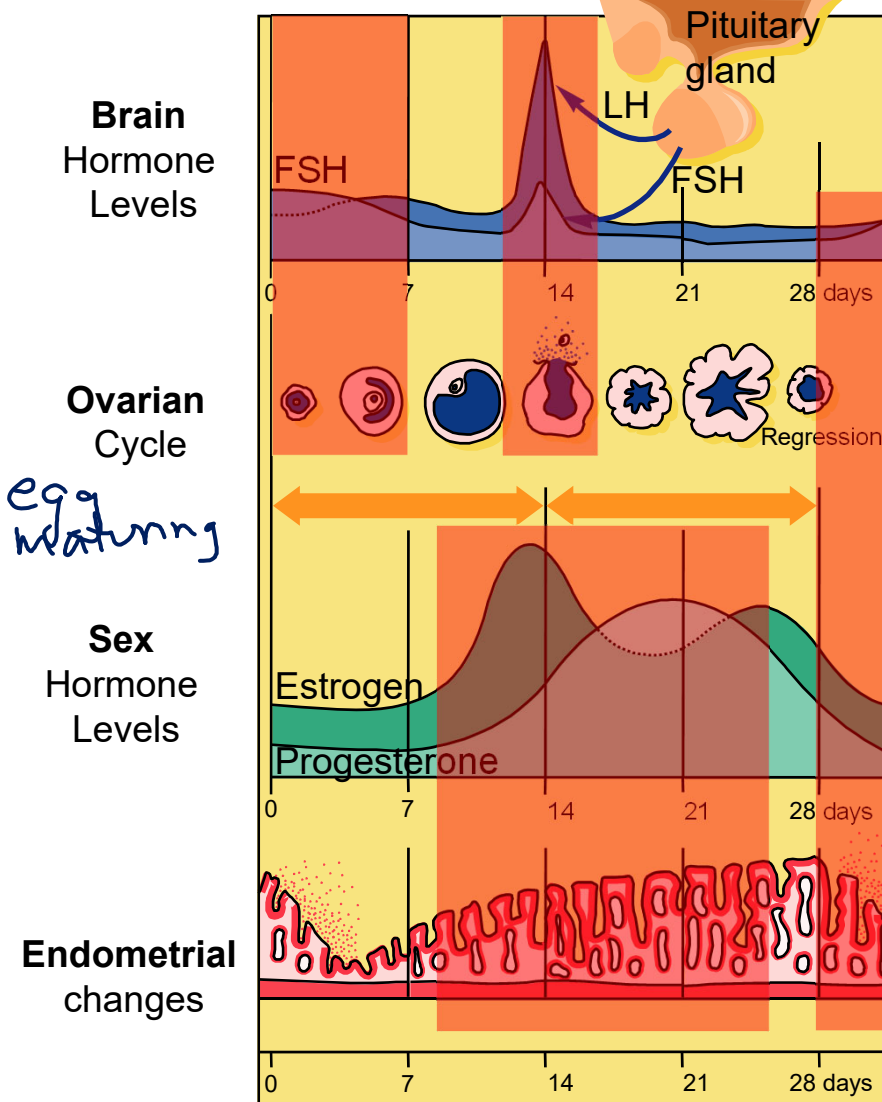


**Ovulation**

**Menstruation**

***Endometrium***: the inside of the uterus – the part that prepares for the baby – also called ***endometrial lining***

## Menstrual Cycle

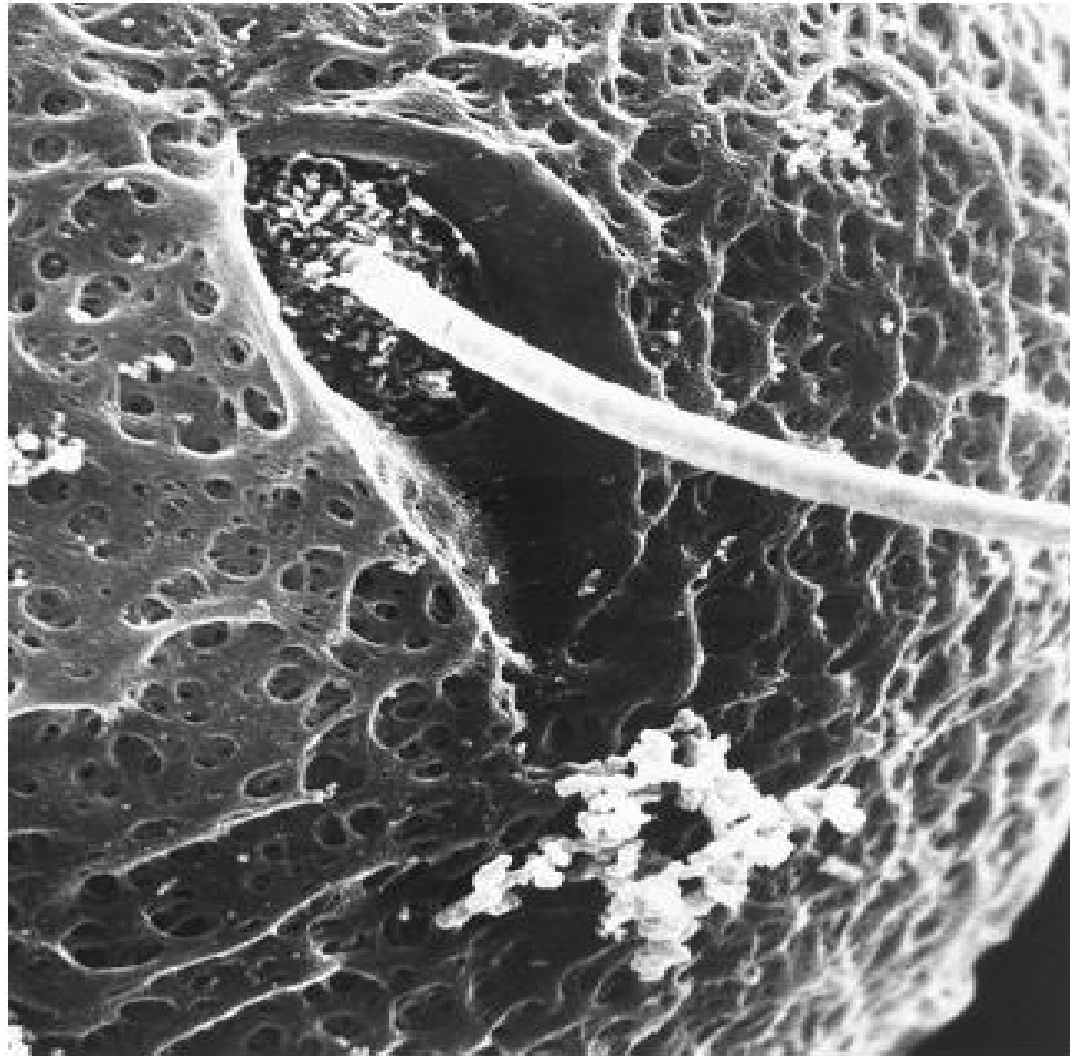


Menstrual Cycle consists for  
**4 repeating steps:**

1. *Brain* prepares *one follicle* to grow and release hormones.
2. *Brain* triggers ovulation.
3. Estrogen and progesterone maintain endometrial lining.
4. **No fertilization:** *follicle dies, hormones drop* → menstruation (period)

**REPEAT**

# Fetal Development



## *Begins with Fertilization*

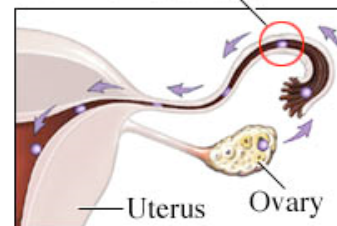
Occurs when egg and sperm meet in the oviduct

- Nuclei join to produce a single **diploid** cell called a zygote
- Zygote implants into the endometrium and *releases new hormones to maintain the lining*

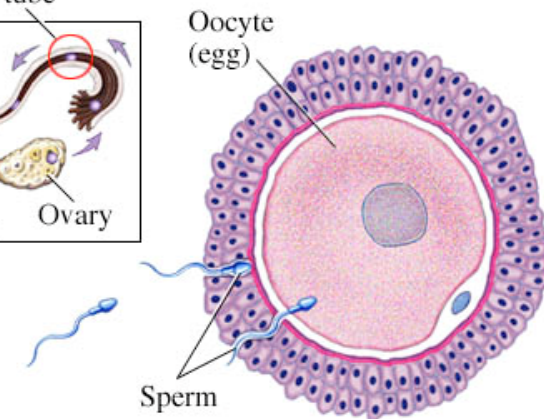
46 chromosomes

Remember: the sex is determined by the male - X or Y sex chromosome in the sperm

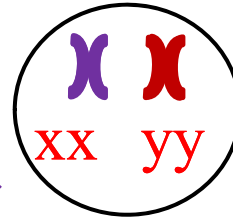
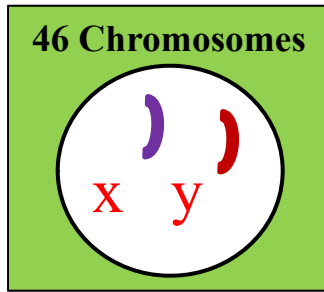
Fertilization occurs within fallopian tube



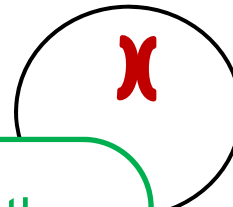
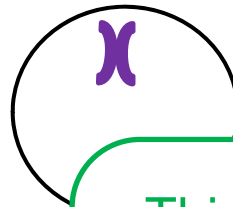
Enlarged view



# MEIOSIS- MALES

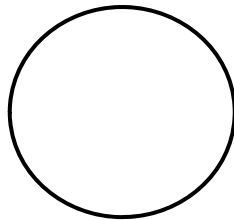


DIPLOID 2n

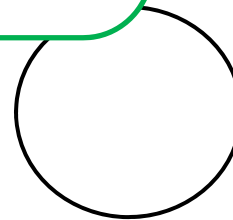
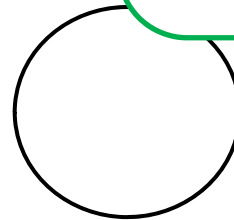


HAPLOID 1n

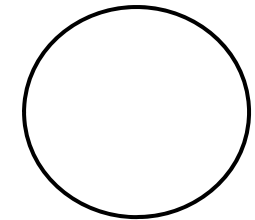
This represents the 44 "regular" chromosomes and the 2 sex chromosomes



Female sperm

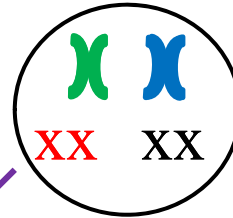
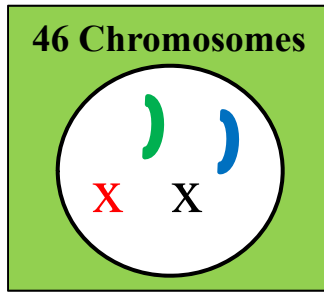


Male sperm

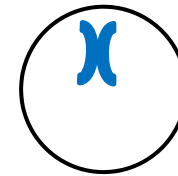
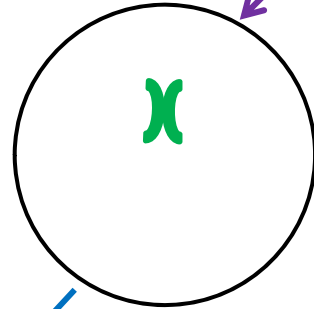




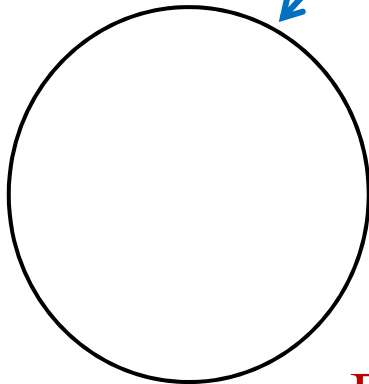
# MEIOSIS- FEMALES



DIPLOID 2n

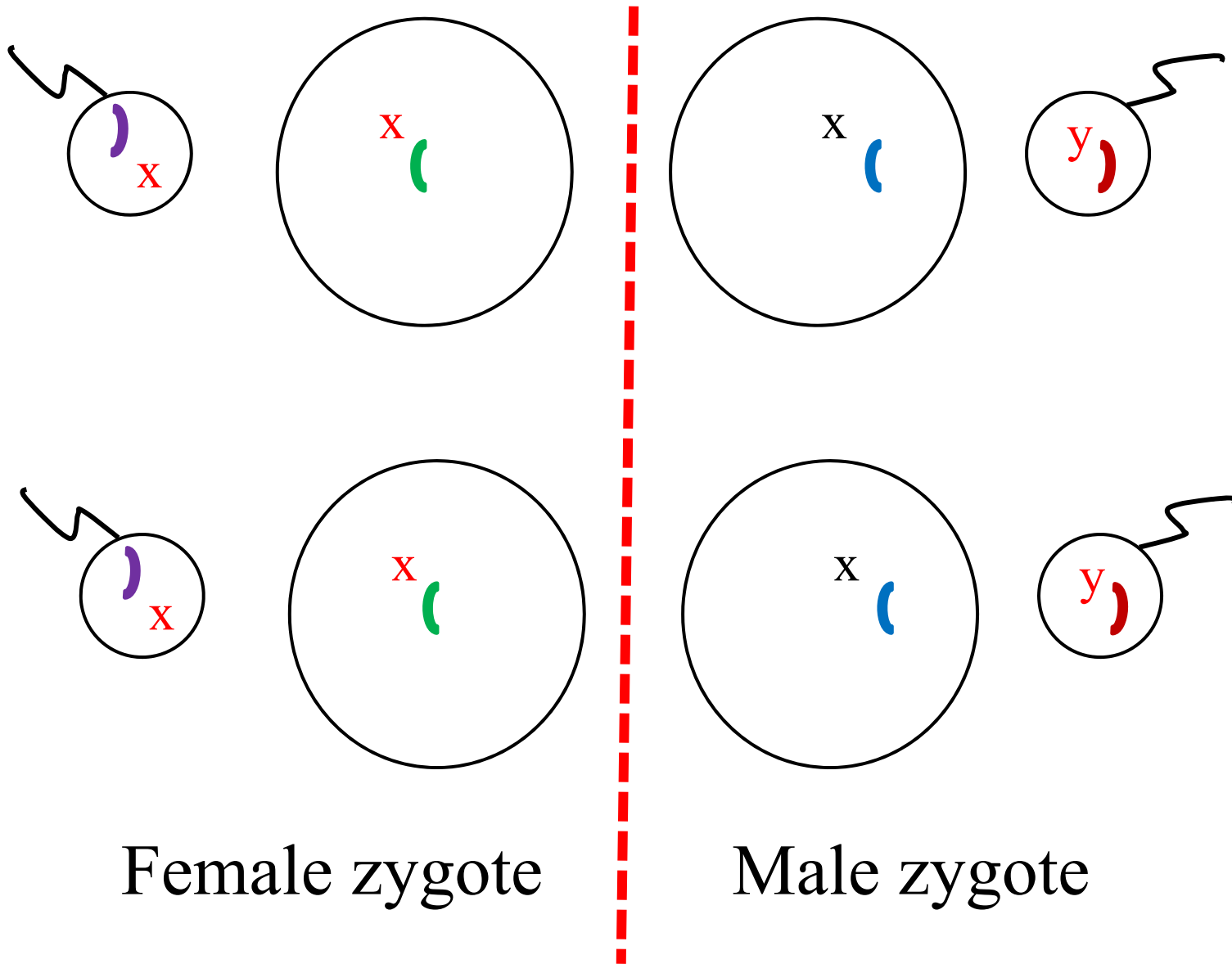


HAPLOID 1n



Female egg

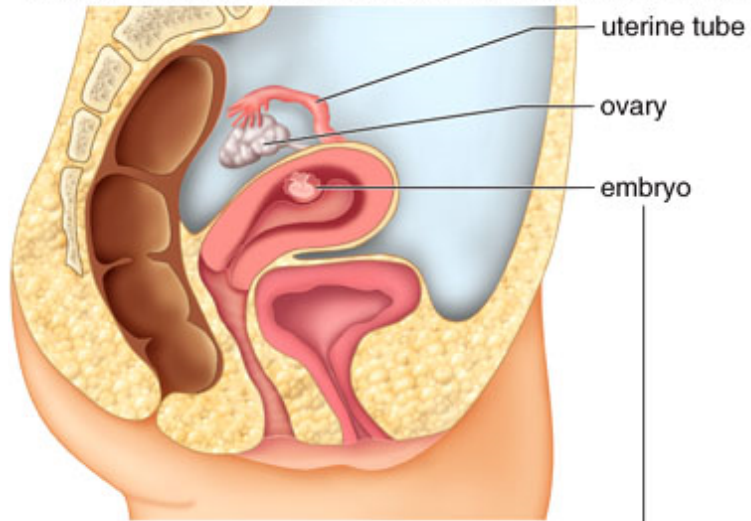
Remember the female creates one "super" egg to ensure success – the others are destroyed



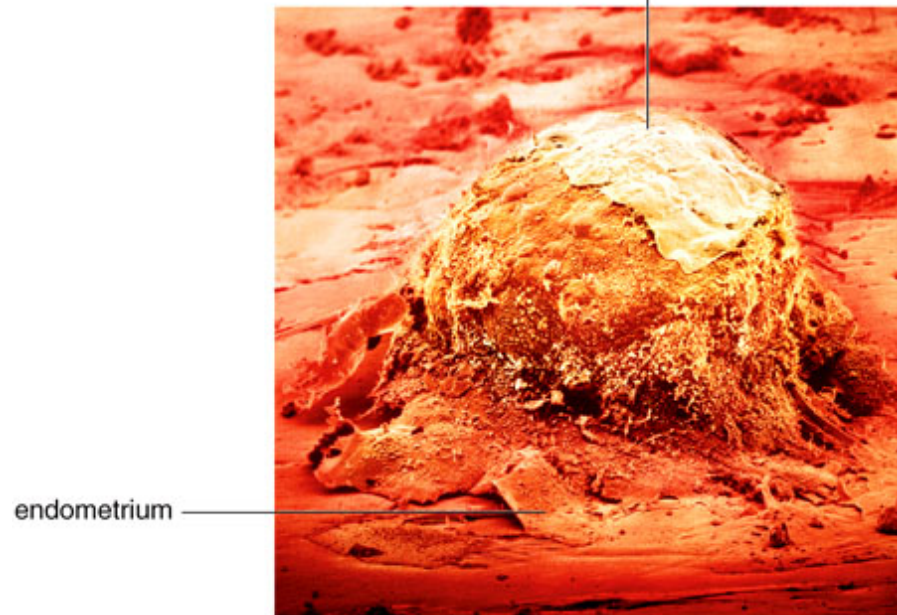
Female zygote

Male zygote

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



**There are 2 stages of  
“baby” development:**



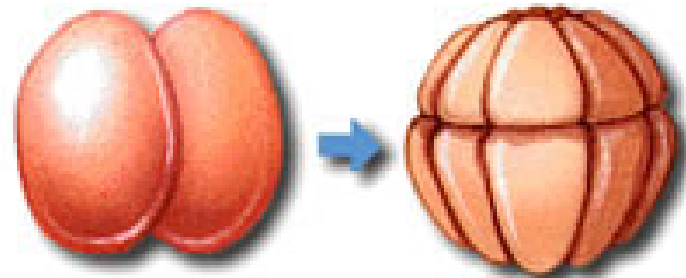
## 1. Embryo Stage (*the first 8 weeks*)

*Zygote implants* in *endometrial* lining and begins to grow (divide) by mitosis.

Once implanted the zygote is called an embryo

Congrats! You are now officially pregnant

**Cleavage:** the process of **mitotic** divisions that changes the **zygote** into a *multicellular embryo*.

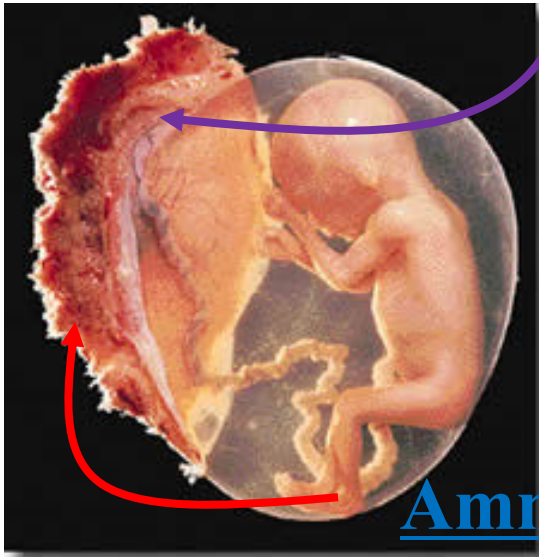


## 2. Fetus Stage *(after 8 weeks until birth)*

Placenta - exchanges waste and nutrients through umbilical cord.

Developing embryo forms bone cells around the ninth week of pregnancy.

Once bone forms, embryo called a fetus (until born)



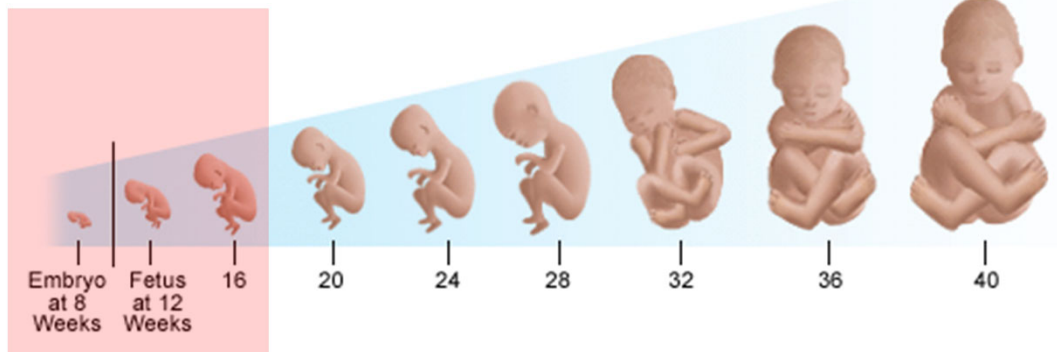
Amnion - protective sac filled with fluid.

Pregnancy can **also** be *divided* in 3 trimesters:

**1<sup>st</sup> trimester** (*conception to 3<sup>rd</sup> month*)

- **development** of **all body systems** and organs
- embryo is **particularly sensitive** to **alcohol/drugs**
- *sex can be determined*

Fetal Growth From 8 to 40 Weeks



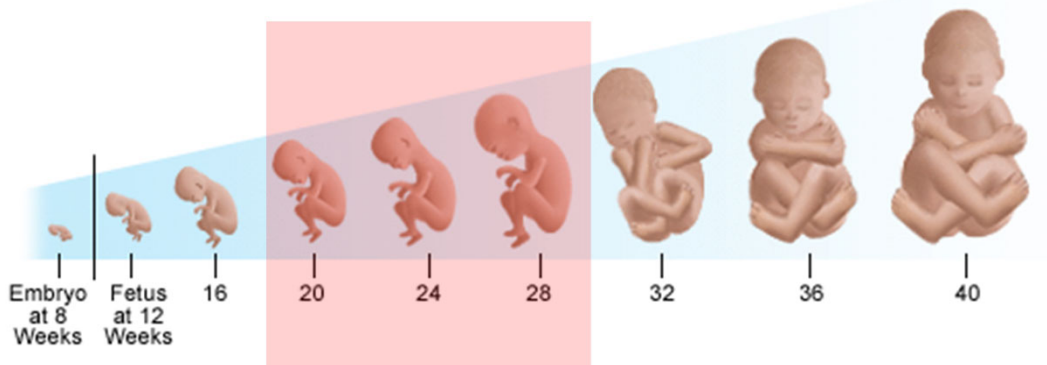
**1<sup>st</sup> trimester**

## 2<sup>nd</sup> trimester – 4<sup>th</sup> to 6<sup>th</sup> months

- period of rapid and **continuous growth**
- *Only brain and lungs still developing*
- fetus movements can be **felt**



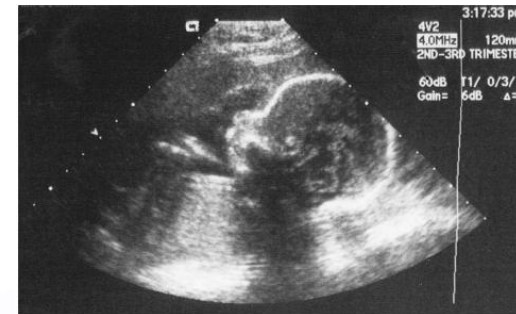
Fetal Growth From 8 to 40 Weeks



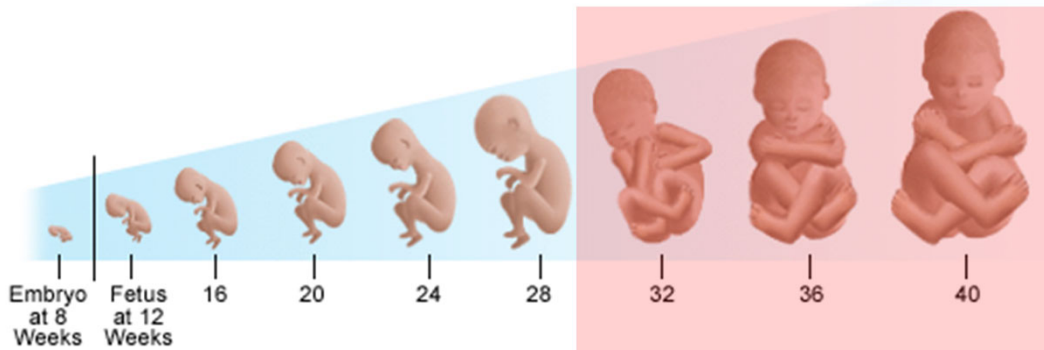
**2<sup>nd</sup> trimester**

## **3<sup>rd</sup> trimester** (*7<sup>th</sup> to 9<sup>th</sup> month/birth*)

- fetus kicks, stretches and *moves freely*
- Eyes sense light, fingerprints have formed
- Ends with labour



**Fetal Growth From 8 to 40 Weeks**



**3<sup>rd</sup> trimester**