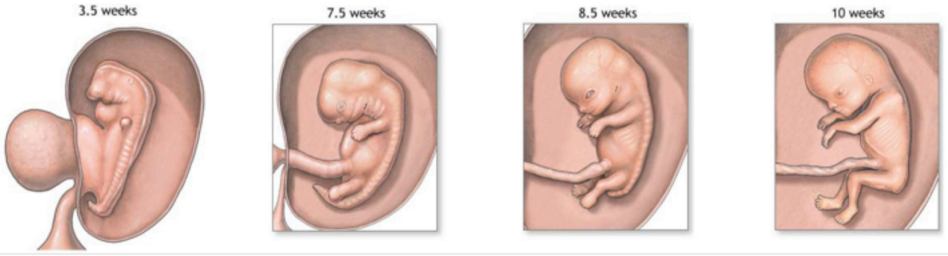
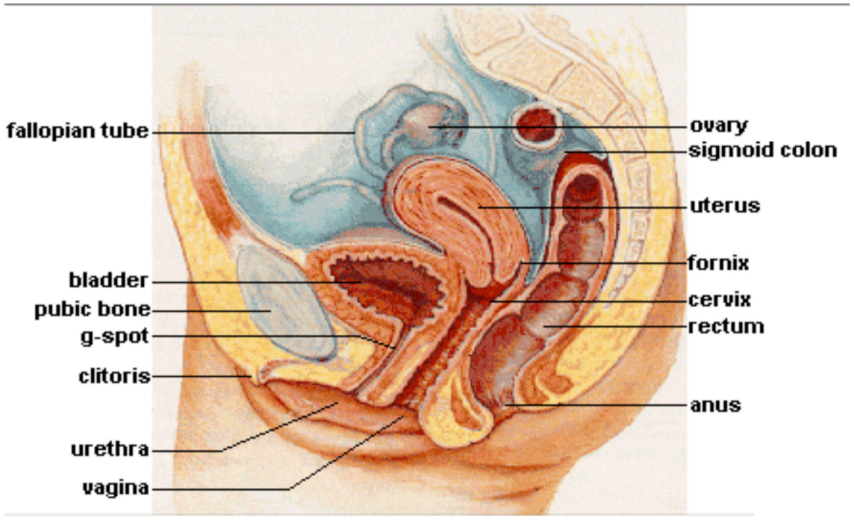
BIOLOGY 30

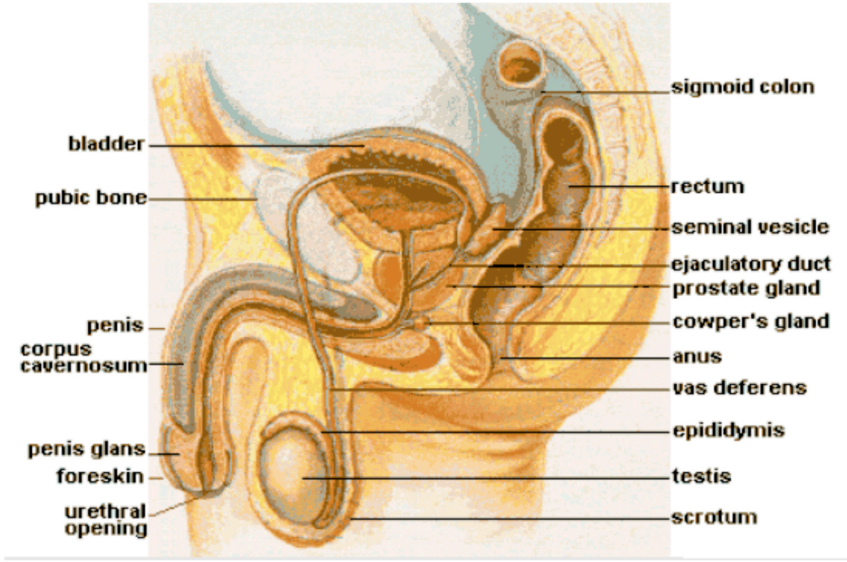
St. John Paul II

High School

Reproduction & Prenatal Development







Reproduction & Prenatal Development Unit Outline

Chapter 16 pg. 506-551

Key Concept A: Structures and Functions of the Male Reproductive System

- A1. Functions of the male reproductive organs
- A2. Structure of the male reproductive organs
- A3. Structure of the human sperm
- A4. Supporting structures for sperm

Key Concept B: Structures and functions of the female reproductive system

- B1. Functions of the female reproductive organs
- B2. External genital organs
- B3. Structure of the female reproductive organs
- B4. Structure of the Human egg (ovum)
- B5. Supporting structures for ova

Key Concept C: Hormonal Regulation of the male reproductive system

- D1. Maturation of the male reproductive system
- D2. Functions of the male reproductive hormones
- D3. Hormone regulation

Key Concept D: Hormonal regulation of the female reproductive system

- E1. Maturation of the female reproductive system
- E2. Functions of the female reproductive hormones
- E3. Hormone Regulation
- E4. Menstrual Cycle
- E5. Ovarian Cycle

Key Concept E: Fertilization & Embryonic Development

- F1. Fertilization
- F2. Implantation
- F3. Differentiation
- F4. Structures that support the embryo
- F5. The placenta
- F6. Sex organ development
- F7. Technologies that reduce reproductive potential

Key Concept F: Fetal Development and Birth

- G1. Hormonal Control of pregnancy
- G2. Fetal Development
- G3. Environmental factors that effect embryonic and fetal development
- G4. Parturition / Birth
- G4. Lactation

Key Concept G: Sexually Transmitted infections

- C1. Summary of STI's
- C2. Preventing Transmission of STI's

REPRODUCTION AND PRENATAL DEVELOPMENT UNIT EXAM

Chapter 15 The Male and Female Reproductive Systems

Vocabulary REVIEW

Gametes:

- Male gametes are called _____
- Female gametes are called _____

sex hormones:

pg. 516-517

primary sex characteristics:

secondary sex characteristics:

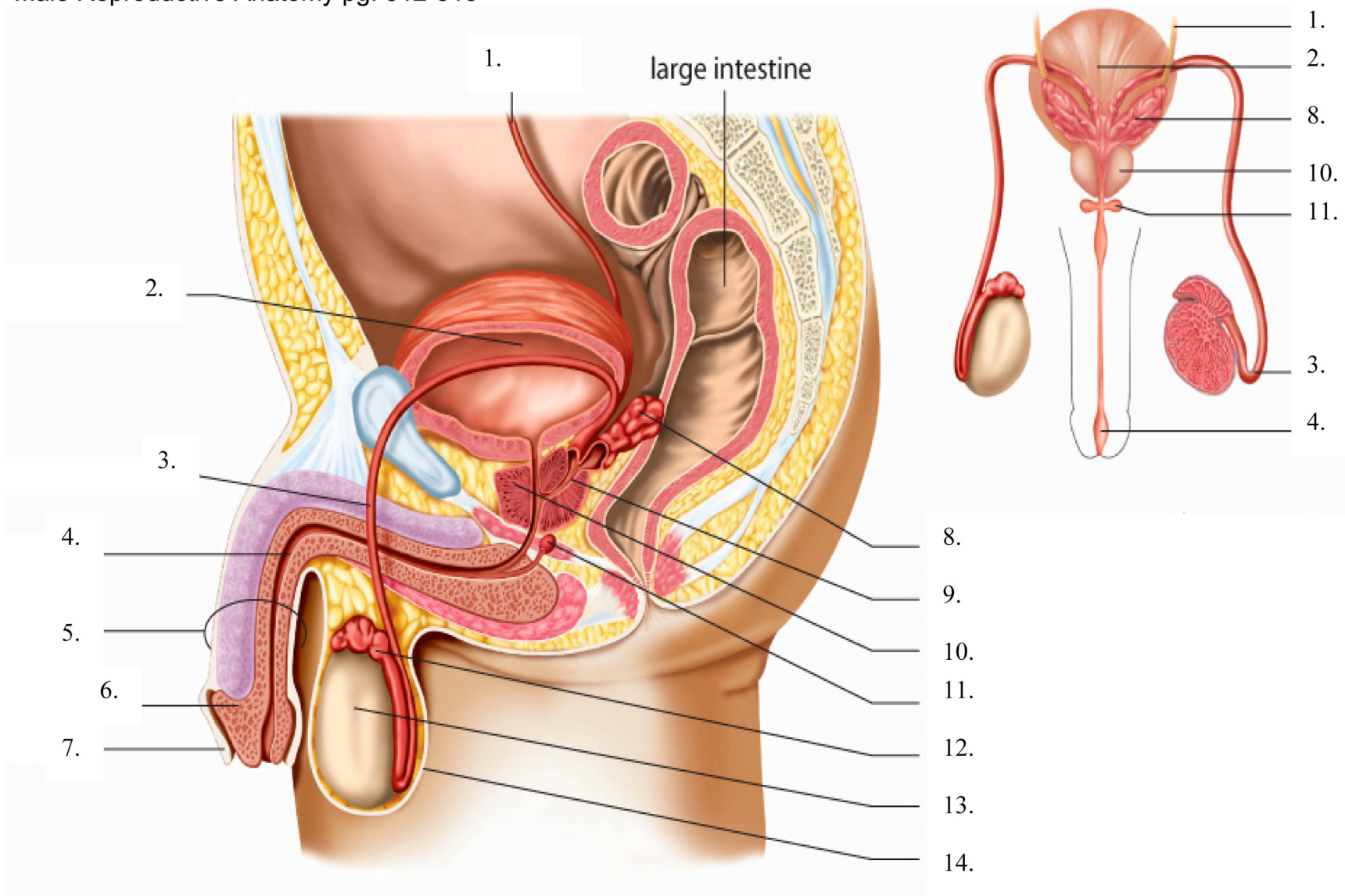
Key Concept: Structures and functions of the male reproductive system pg. 512-519

1. Functions of the male reproductive organs

Vocabulary

Structure	Description of function
testes	
seminiferous tubules	
epididymis	
vas deferens (ductus deferens)	
Cowper's glands	
prostate gland	
seminal vesicles	
ejaculatory duct	
urethra	
penis	

Male Reproductive Anatomy pg. 512-513



Vocabulary

Vasectomy:

glans penis: enlarged tip of the penis

foreskin: surrounds and protects the glans penis

Circumcision:

3. Structure of the Human Sperm pg. 515

⇨ **Explain** the significance of the:

- acrosome
- nucleus
- mitochondria
- tail (flagellum)

4. Supporting structures for sperm

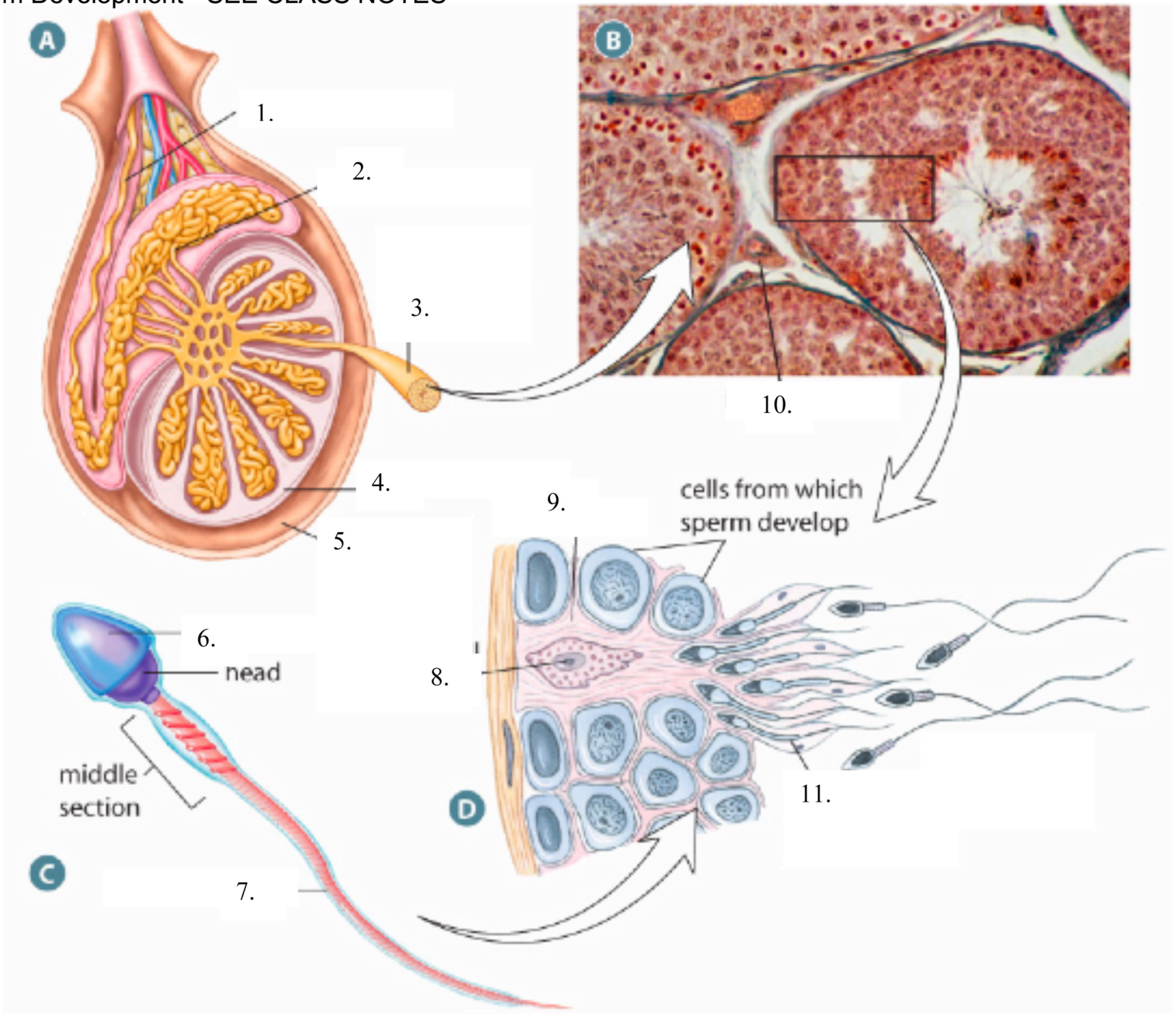
Production of sperm:

- pituitary secretes FSH to stimulate _____

Vocabulary pg. 514

Supporting structure for sperm	**Description of the function**
Sertoli cells	
interstitial cells	
epidiymis	
seminiferous tubules	

Sperm Development - SEE CLASS NOTES



Key Concept: Structures and functions of the female reproductive system pg. 520 - 521

1. Functions of the female reproductive organs

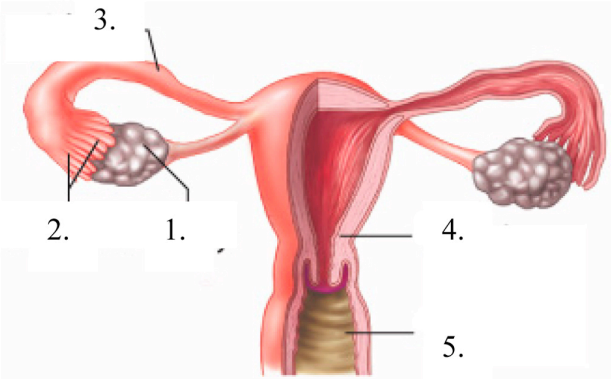
Vocabulary

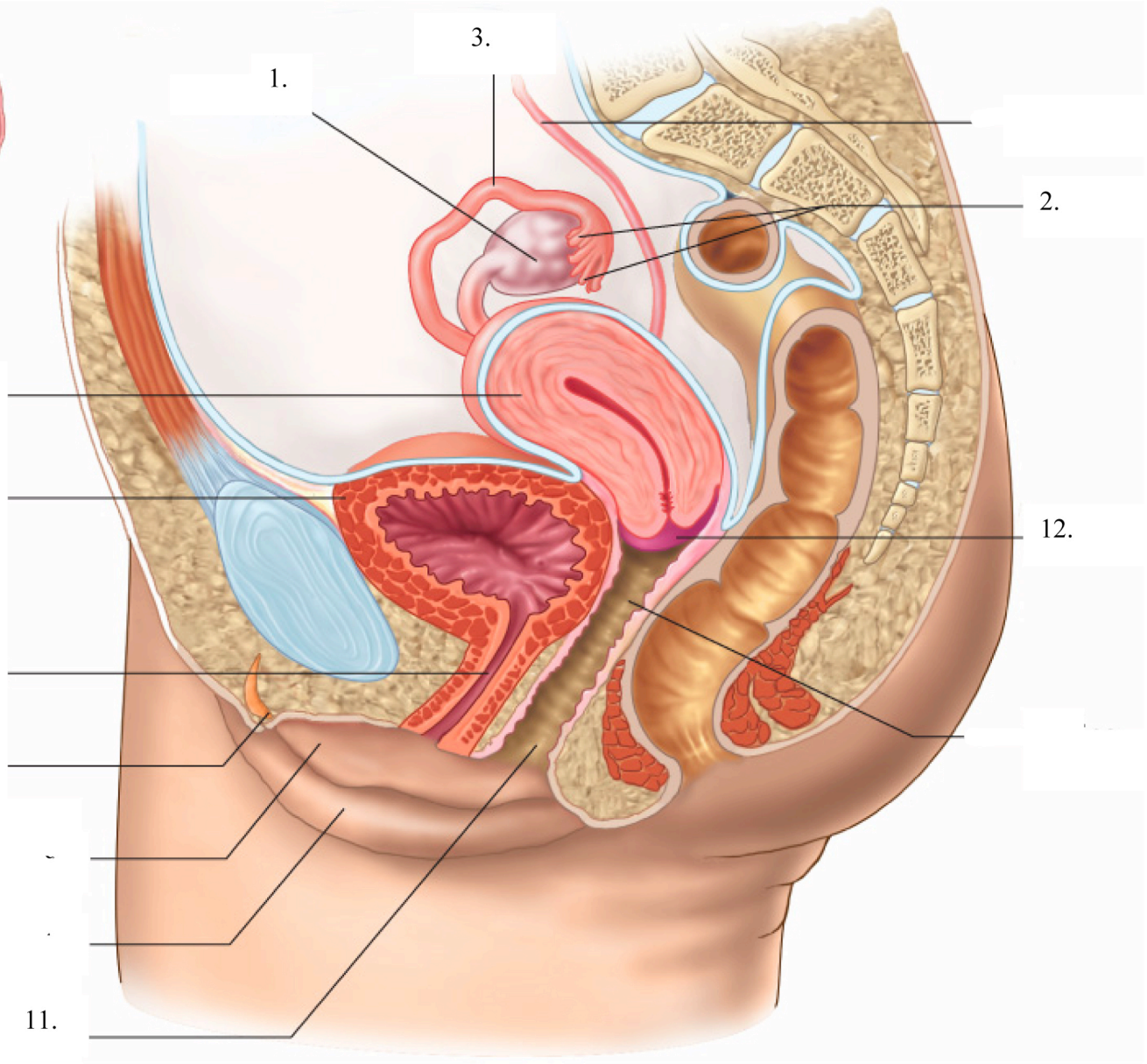
Functi	Description of function
ovaries	
fimbriae	
Fallopian tubes (oviducts)	
uterus (womb)	
endometirum	
cervix	
vagina	

The paired female gonads are called:

The female gametes are called:

Female Reproductive Anatomy pg. 528-529





4. Structure of the Human Egg (Ovum)

- 20 times larger than the head of the sperm cell
- contains a large quantity of cytoplasm
- encased in a thick membrane that must be penetrated by the sperm's acrosome

5. Supporting structures for ova

Production of eggs:

- pituitary releases FSH to promote_____
- involves the ovarian cycle

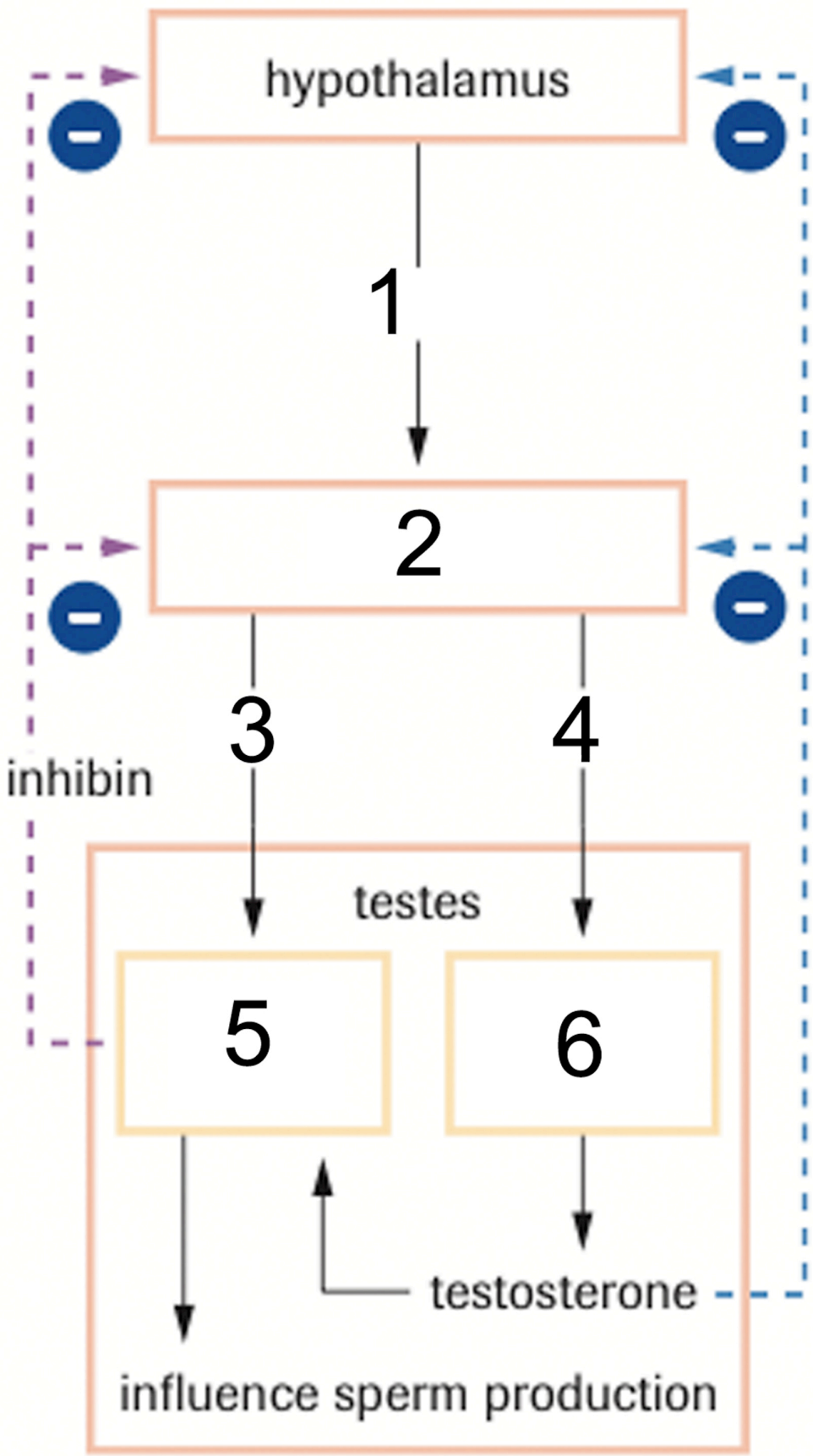
Vocabulary pg. 522

Supporting structures for ova	**Description of function**
follicles	
copus luteum	

Key Concept: Hormonal regulation of the male reproductive system pg. 517

Functions of the male reproductive hormones

Hormone	Production site	Target organ(s)	Description of function
GnRH			
FSH			
LH			
testosterone			1. 2. 3. along with FSH, testosterone stimulates gamete production
iinhibin			


hypothalamus
1
2
3
4
inhibin
testes
5
6
testosterone
influence sperm production

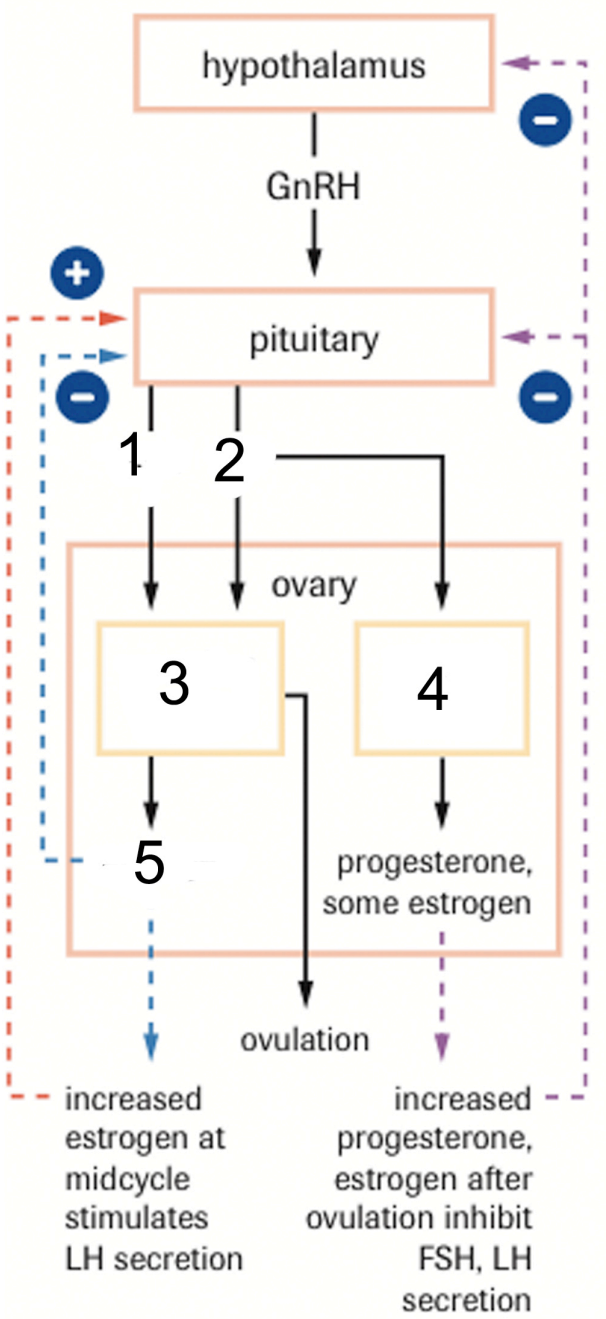
Key Concept: Hormonal regulation of the female reproductive system pg. 524-526

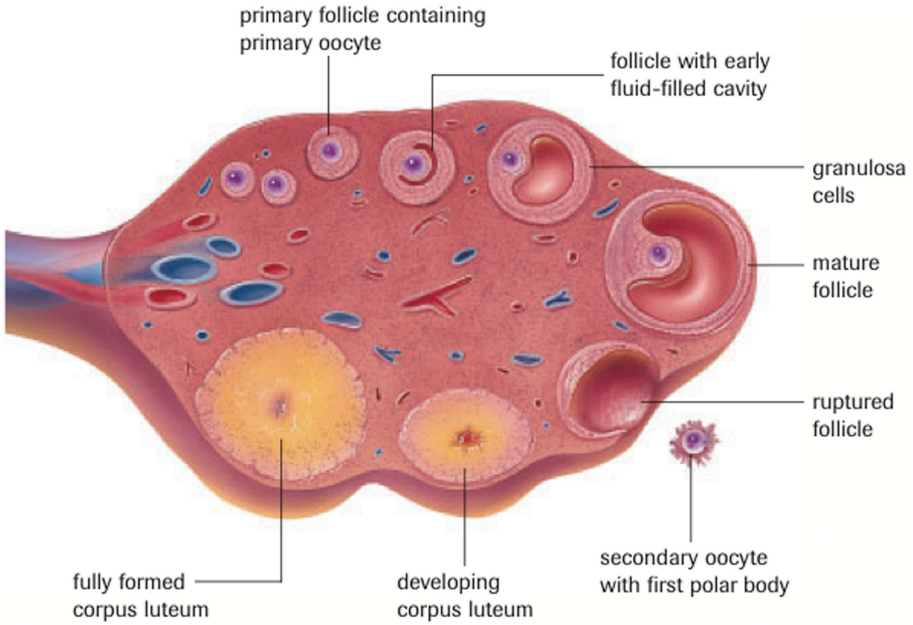
2. Functions of the female reproductive hormones pg. 525-526

Vocabulary

Hormone	Production site	Target organ(s)	Description of function
GnRH			
FSH			1. 2. 3. stimulates estrogen production
LH			1. 2.
estrogen			1. 2. initiates the formation of a new layer of endometrium
progesterone			1. further prepares the endometrium for arrival of the fertilized egg 2. in conjunction with estrogen, inhibits FSH and LH 3. inhibits uterine contrations

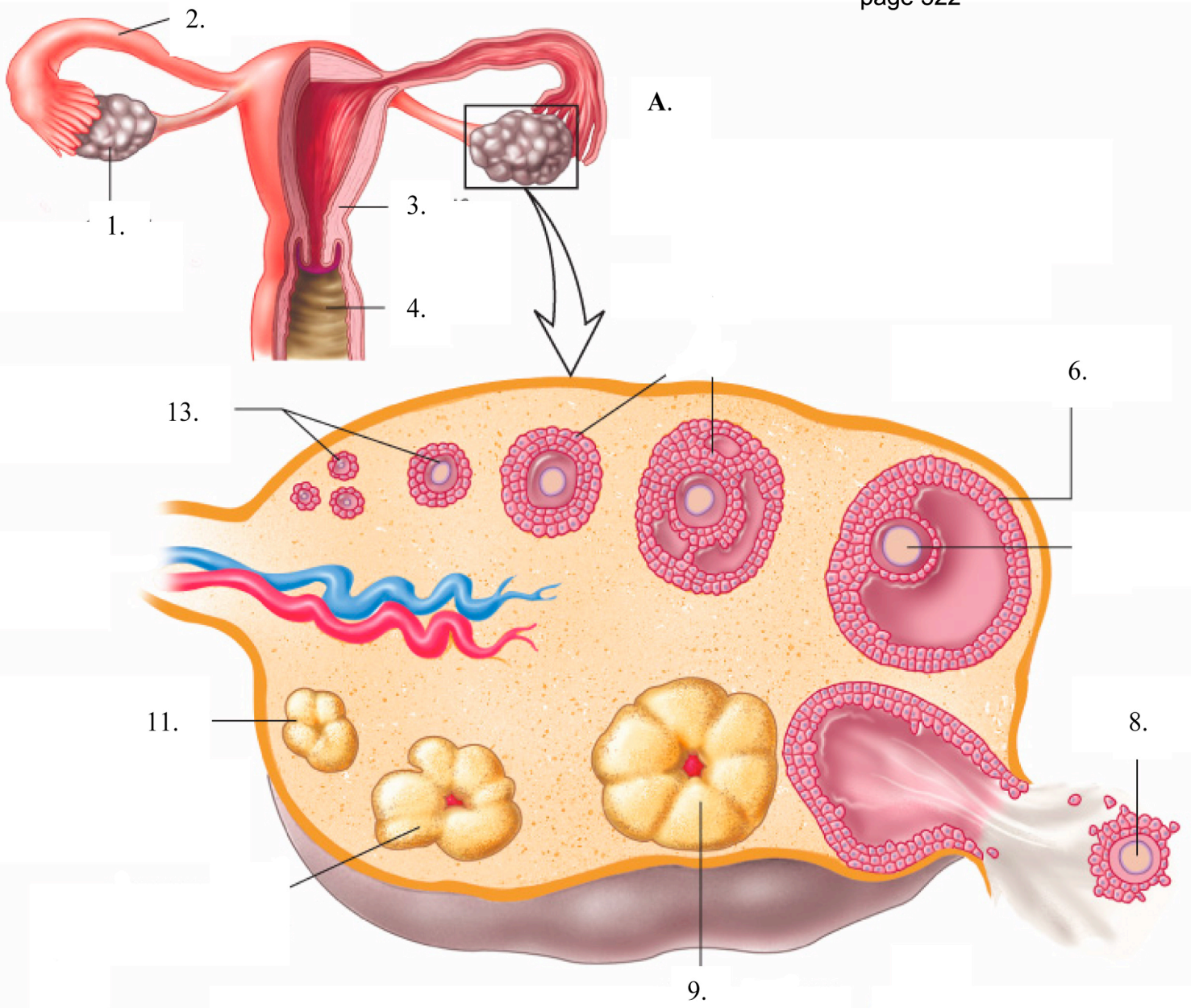
3. Hormone Regulation pg. 525 and 522





The Ovarian Cycle

page 522



Hormones and the Menstrual Cycle

Due date:_____

PROBLEM: What is the relationship between hormones and changes in the ovary?

PROCEDURE:

1. Using either a computer or a piece of graph paper, plot the concentrations of FSH and LH in the blood during the menstrual cycle. Use the data from the table. If you are completing your graph by hand, you may want to separate the gonadotropic hormones from estrogen and progesterone. Use a different colour for each of the four hormones.

2. The following 5 pictures depict the follicle and/or corpus luteum during day 4, 8, 14, 18, and 22 in random order. Re-arrange them and sketch them on, above, or below your graph from step #1. Make sure your sketches correspond with the correct days.

3. Label ovulation, follicular phase and luteal phase on your graph

4. Use your graphs and data table to answer the questions that follow.

Concentration of FSH, LH, estrogen and progesterone (in arbitrary units) in the blood during the menstrual cycle.

Day	FSH	LH	Estrogen	Progesterone
0/28	8	12	5	3
2	14	14	4	2
4	16	15	3	2
6	17	15	3	2
8	17	15	4	2
10	18	15	5	2
12	20	28	14	2
14	18	45	13	3
16	8	20	9	4
18	7	19	8	6
20	6	18	10	11
22	5.5	16	11	12
24	6	14	12	13
26	7	14	8	8
28/0	8	12	5	3

QUESTIONS:

1. What is the effect of follicle development on estrogen levels during the late stages of the follicular phase?

2. What hormone directly stimulates ovulation? Support your answer with data. (Note: no marks to identify the hormone unless you have referred to the data to support your answer)

3. Identify the organ causes a change in progesterone levels.

4. Identify the endocrine cells that produces mainly estrogen.

5. Identify the organ that estrogen targets during the menstrual cycle.

6. What effect does the high levels of estrogen and progesterone, during the luteal phase, have on the levels of FSH and LH?

Key Concept: Fertilization and embryonic development page 530

1. Fertilization: day 1

▪

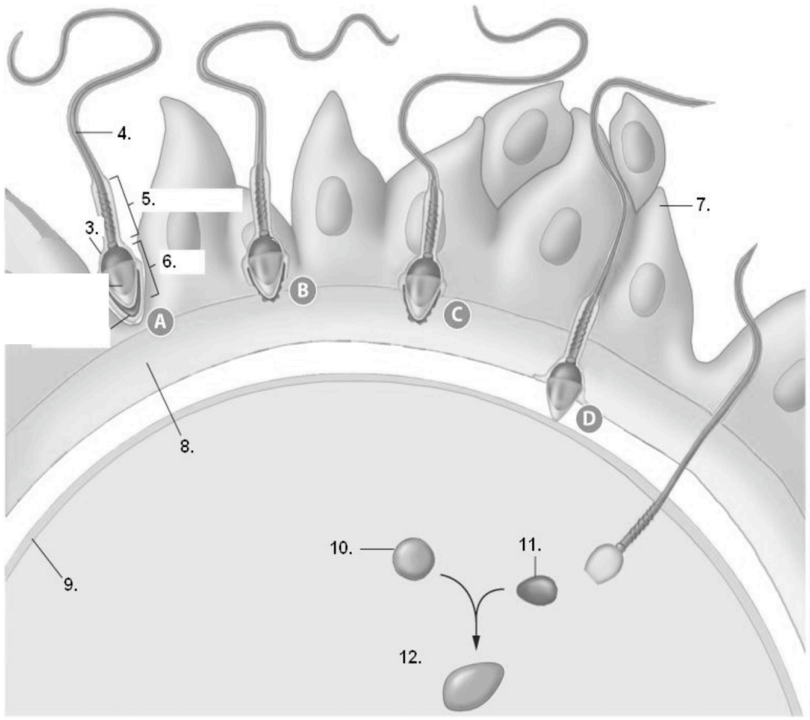
Vocabulary

Fertilization:

Zygote:

⇨ Why must the egg be fertilized within 12 to 24 hours of its release?

⇨ Why do so few sperm arrive in the oviduct where the egg is?



2. Implantation

Vocabulary

- On the path to the uterus and within 30 h of being fertilized, the zygote divides by the process of

- Mitotic division continues , however the new cells do not enlarge and the overall size of the zygote remains the same. This process of rapid cell divisions without cell enlargement is called:

Once the zygote begins to divide, it proceeds through the following developmental stages:

_____ : consists of 16 or more cells
- no cell enlargement , just cleavage

_____ (~5th day): a fluid-filled cell structure with two different groups of cells:

-outer sphere of cells (trophoblast)

- inner cells:

implantation:

Once implantation occurs, the woman is now said to be _____

Hormonal control:

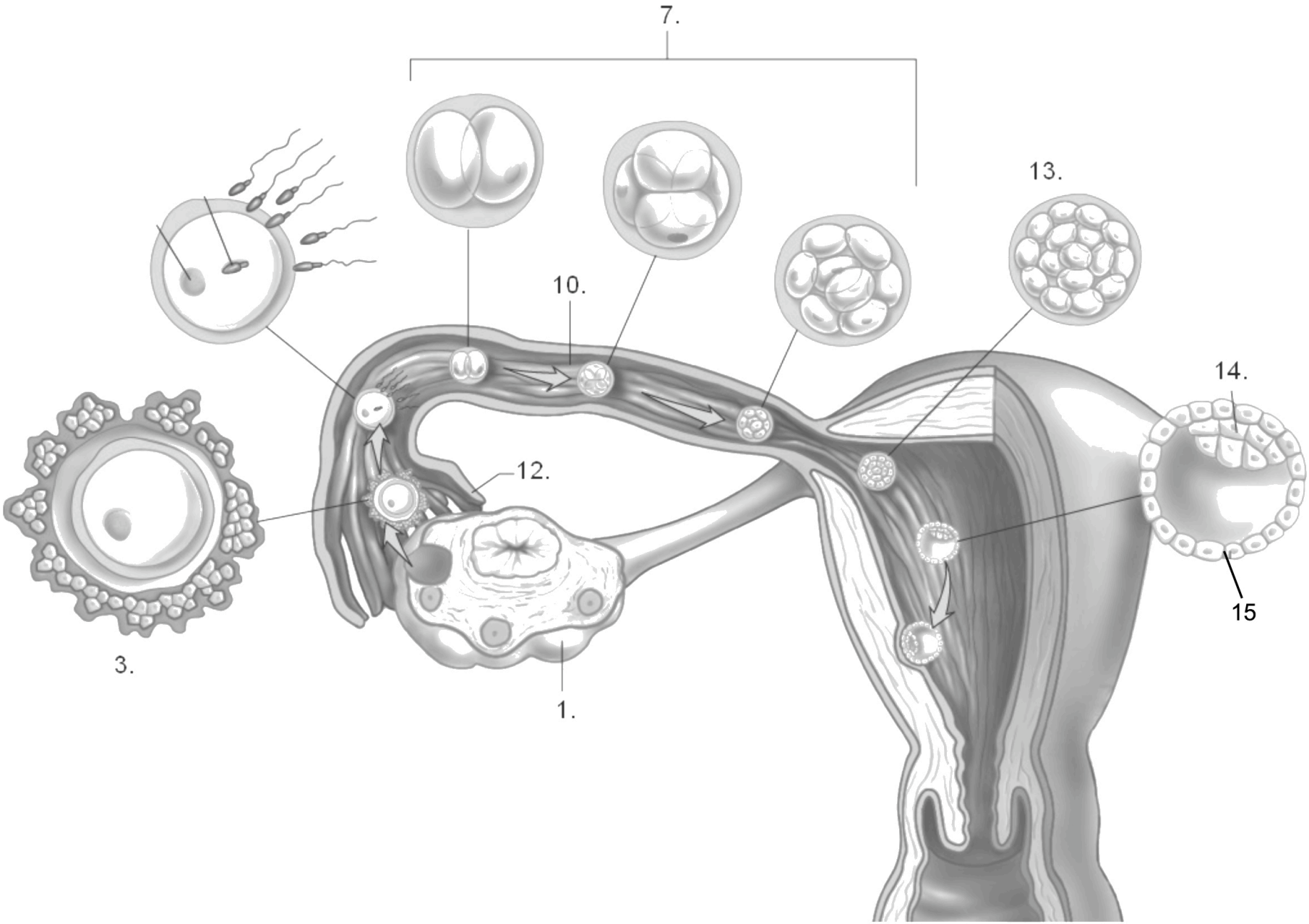
The outer layer of cells (*trophoblast*) secretes the hormone called human chorionic gonadotropin (hCG)

Target of hCG:

Effect of hCG:

Locate the following...

Ovary, fimbrae, ova, cleavage, morula, blastocyst inner cell mass, oviduct, trophoblast (chorion),



3. Differentiation

Vocabulary page 532-533

differentiation:

gastrulation:

morphogenesis: (see notes)

During the second week , inner layer of cells differentiate into:

_____ and _____

Shortly, a third layer,_____, forms between the ectoderm and endoderm.

All future tissues, organs and organ systems of the body will develop from the cells of the germ layers.

Body organs arising from the three germ layers

Ectoderm	Mesoderm	Endoderm

4. Structures That Support The Embryo

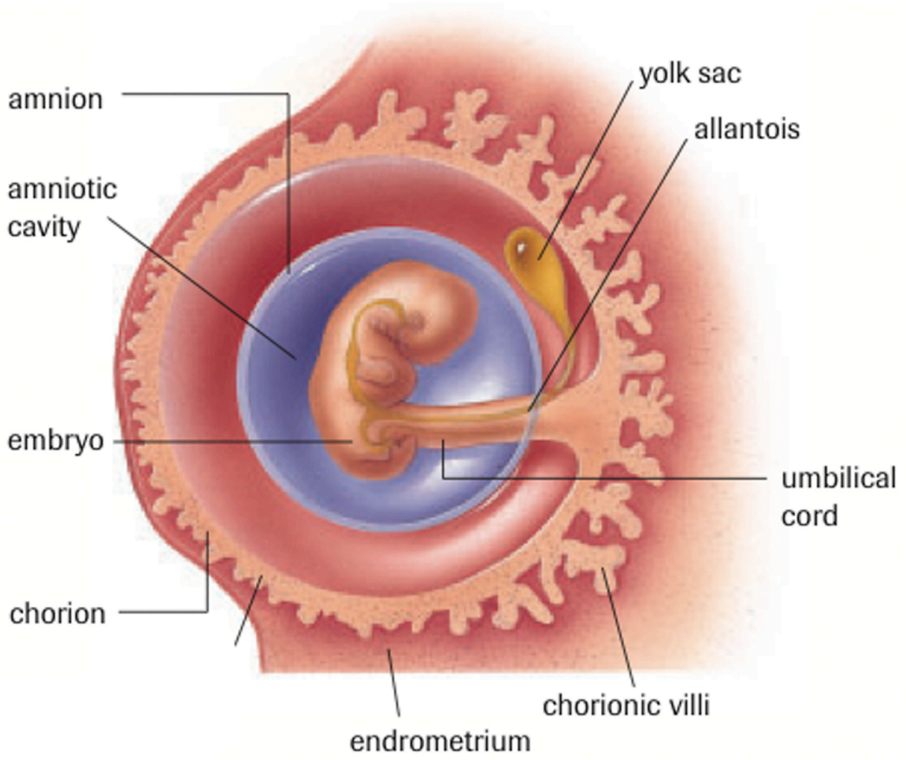
Extra-embryonic membranes

There are four **extra-embryonic membranes** that develop along with the three germ layers. *text p.516*

Vocabulary

Use the following below: Amnion, chorion, yolk sac, allantois,

Extra-embryonic membrane	Description
	-a transparent, fluid-filled sac -protects the embryo from trauma; allows freedom of movement
	-contributes to the formation of the digestive tract -produces the first blood cells
	-forms the umbilical artery and vein -forms the urinary bladder
	-forms the fetal portion of the placenta



*Note: the yolk sac does NOT supply nutrients to a human embryo as it does in birds

5. The Placenta

The placenta is a disk-shaped organ that is rich in blood vessels.

The placenta is a shared organ between mother and fetus.

The placenta is a combination of:

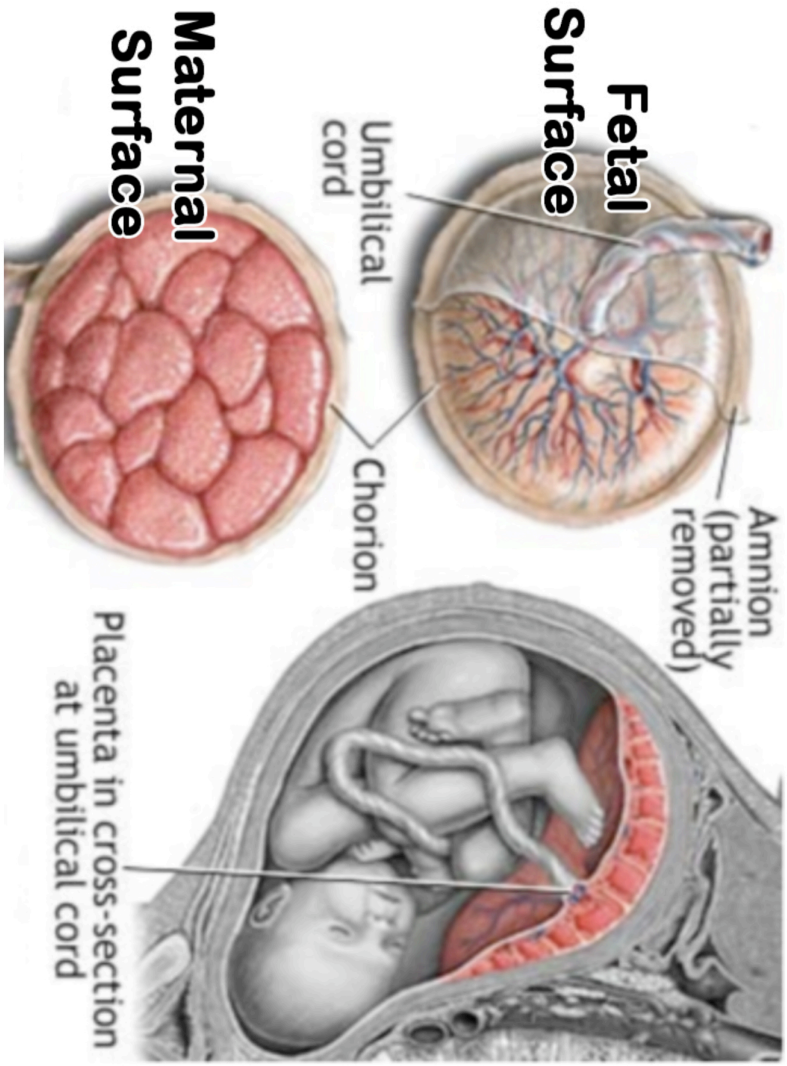
fetal tissue:

AND

maternal tissue:

Vocabulary

umbilical cord:



2. Fetal Development page 533 - 534

Fetal development starts during the _____ and lasts until _____.

The main differences between embryonic and fetal development;

Embryonic Development	Fetal Development

Events that occur in each trimester of embryonic and fetal development:

page 533 GENERAL DEVELOPMENTS

First Trimester

Second Trimester

Third Trimester

3. Environmental factors that effect embryonic and fetal development page 536-537

- Substances that a mother ingests or inhales ends up in her circulating blood
- Some of these substances pass through the placenta to the fetus's blood.

Vocabulary teratogen:

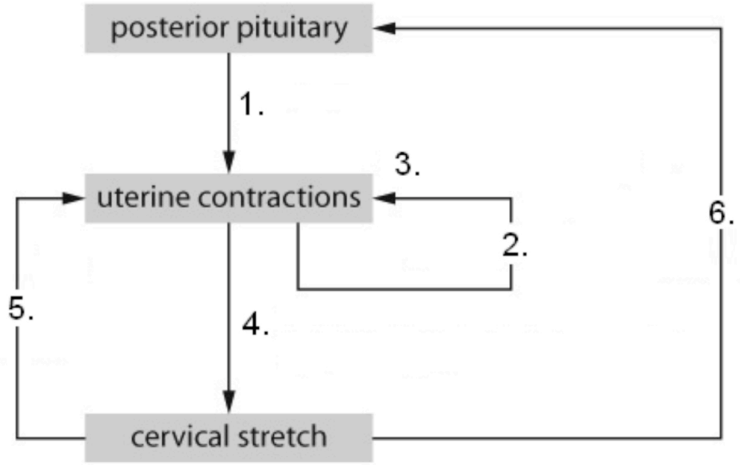
Factor that effects embryonic and fetal development	**Description of how this factor influences development**
MATERNAL LIFESTYLE	
Proper nutrition	
TERATOGENS	
viral infections	
radiation	
drugs: cigarette smoke	
drugs: alcohol	
drugs: prescription drugs	

⇨ When is the fetus most susceptible to teratogens?

4. Parturtion page 539 - 541

Vocabulary

Partuirition is



Major events of childbirth