Use the following information to answer the next question.

In 1979, a young man had samples of his sperm frozen prior to undergoing treatment for testicular cancer. The cancer treatment was successful, but it made the man infertile. The sperm that had been frozen were used for in vitro fertilization, which resulted in the birth of a healthy baby boy in 2002.

↳ fertilization outside body

—based on Horne et al., 2004

Horne, G., A. D. Atkinson, E. H. E. Pease, J. P. Logue, D. R. Brison, and B. A. Lieberman. 2004. Live birth with sperm cryopreserved for 21 years prior to cancer treatment: Case report. *Human Reproduction* 19 (6): 1448–1449.

13. Which of the following rows identifies the structures that were damaged by the cancer treatment and the process that normally occurs in the structures?

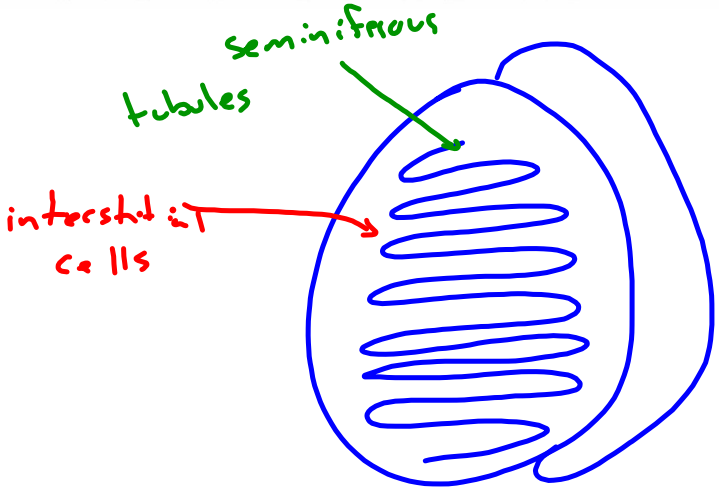
Row	Structures Damaged	Process
A.	Interstitial cells	Gamete formation
B.	Interstitial cells	Gamete maturation
C.	Seminiferous tubules	Gamete formation
D.	Seminiferous tubules	Gamete maturation

→ make testosterone

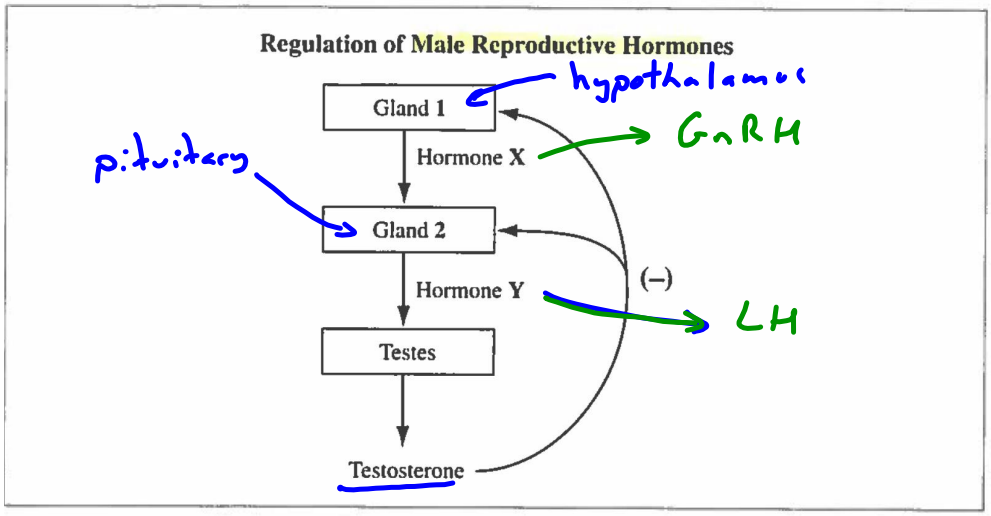
→ make sperm

→ seminiferous tubules

→ epididymis



Use the following information to answer the next question.



14. Which of the following rows identifies Gland 1, Gland 2, Hormone X, and Hormone Y, as shown in the diagram above?

Row	Gland 1	Gland 2	Hormone X	Hormone Y
A.	Pituitary gland	Hypothalamus	LH	GnRH
B.	Hypothalamus	Pituitary gland	GnRH	LH
C.	Hypothalamus	Pituitary gland	GnRH	FSH
D.	Pituitary gland	Hypothalamus	FSH	GnRH

LH - triggers testosterone production

FSH - triggers sperm production

15. The development of gametes at puberty is stimulated by the production of

↳ egg / sperm

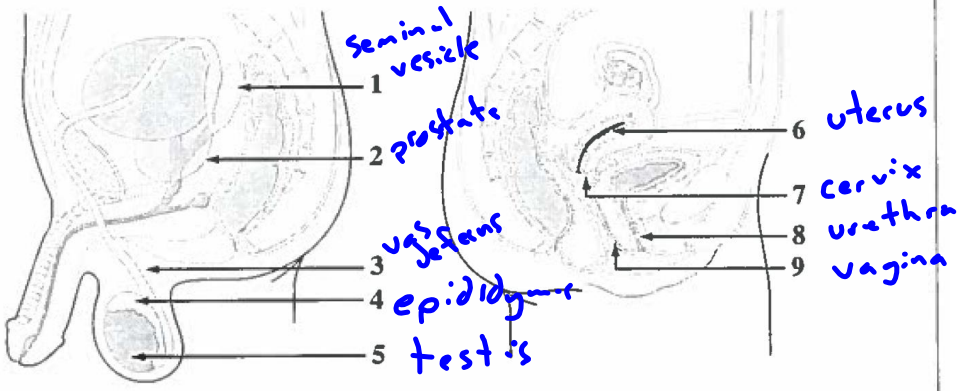
A. LH in both females and males
B. FSH in both females and males
C. FSH in females and LH in males
D. estrogen in females and testosterone in males

secondary sex characteristics

Use the following information to answer the next question.

Gonorrhea and chlamydia are two sexually transmitted infections (STIs) that are caused by bacteria. The bacteria cause inflammation of the prostate gland and the epididymis, and they infect the cervix and vagina.

Male and Female Reproductive Systems



Numerical Response

2. The structures of the male and female reproductive systems numbered above that are affected by gonorrhea and chlamydia are 2, 4, 7, and 9.

(Record all **four digits** of your answer **in any order** in the numerical-response section on the answer sheet.)

Use the following information to answer the next question.

During menopause, some women take hormone replacement therapy (HRT). A woman may take estrogen alone, progesterone alone, or a combination of estrogen and progesterone administered together.

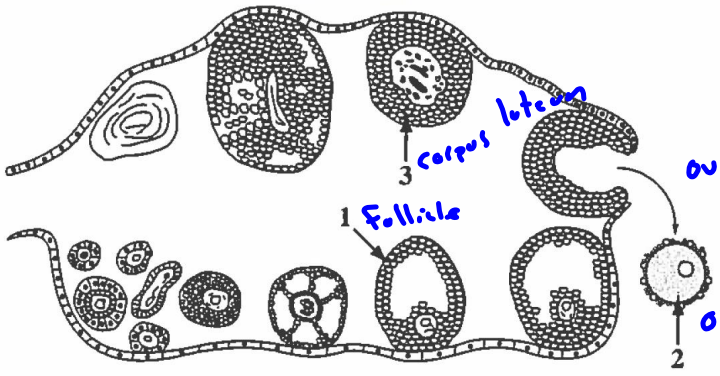
16. When a woman's HRT includes a combination of estrogen and progesterone administered together, the hormones replaced are those normally secreted by the

A. uterus
B. follicle
C. corpus luteum
D. pituitary gland

estrogen + progesterone - produced in ovaries
- estrogen produced by developing follicle + corpus luteum
- progesterone produced by corpus luteum

Use the following information to answer the next question.

A Human Ovary



Numerical Response

3. Match each structure in the human ovary numbered above with its name given below.

Structure:	2	1	3
Name:	**Ovum** (egg)	**Follicle**	**Corpus luteum**

(Record all **three digits** of your answer in the numerical-response section on the answer sheet.)

Use the following information to answer the next two questions.

A tumour in the pituitary gland can alter the secretion of hormones from the gland. The most common type of pituitary tumour is an endocrine-inactive tumour, which destroys some of the hormone-producing cells in the pituitary gland.

17. In a woman, a symptom of an endocrine-inactive tumour in the pituitary gland could be

A. a stopping of the menstrual cycle
B. a decrease in secretion of GnRH
C. an increase in follicular development
D. an increase in secretion of progesterone

less pituitary hormones (LH + FSH)
↓ FSH + LH

18. A structure whose function is **not** affected by an endocrine-inactive tumour is the

A. follicle
B. endometrium
C. corpus luteum
D. Fallopian tube

Use the following information to answer the next two questions.

Preimplantation genetic diagnosis is a screening procedure that is performed on an embryo after in vitro fertilization and before implantation. During the procedure, one cell is removed from a mass of eight cells and is screened for genetic abnormalities. If no abnormalities are present, the remaining mass of seven cells is placed into a woman's uterus.

19. A cell that is removed from a mass of eight cells is useful for genetic screening because it

A. is more specialized than a zygote not true
B. has undergone many cell divisions true but not relevant
C. contains one copy of each human chromosome not true
D. contains a complete set of human chromosomes

20. A cell can be removed from a mass of eight cells for genetic screening without affecting the development of the embryo and fetus because the remaining seven cells have

A. differentiated
B. ~~been fertilized~~
C. not differentiated ✓
D. not been fertilized

21. In a pregnant woman, one effect of a lower-than-normal amount of hCG could be the inability to

A. ovulate
B. develop mature follicles
C. maintain the endometrium
D. produce other gonadotropic hormones

hCG - human chorionic gonadotropin hormone

- maintains corpus luteum
- keeps progesterone levels high
- progesterone maintains lining of uterus
- placenta replaces corpus luteum starting in month 4

Use the following information to answer the next question.

The presence of fetal testosterone during development results in the development of male reproductive organs in the fetus. In the absence of testosterone, the fetus will develop female reproductive organs.

22. Which of the following statements describes a genotypically male fetus that developed in the absence of testosterone?

A. The fetus has two X chromosomes and is phenotypically male.
B. The fetus has two X chromosomes and is phenotypically female.
C. The fetus has X and Y chromosomes and is phenotypically male.
D. The fetus has X and Y chromosomes and is phenotypically female.

23. Which of the following rows identifies the hormone that stimulates uterine contractions during labour and the gland from which this hormone is secreted?

Row	Hormone	Gland
A.	Estrogen	Ovary
B.	Estrogen	Pituitary gland
C.	Oxytocin	Ovary
D.	Oxytocin	Pituitary gland