

## Teacher's Notes for Pre and Post Tests

### What is Oncofertility?

- c. Comprehensive medical approaches to preserve fertility for cancer patients.

### In Vitro Fertilization (IVF) refers to:

- d. The process of producing embryos outside the body.

If a woman is diagnosed with cancer and wants to preserve her fertility before cancer treatment, what fertility preservation options does she potentially have? Select all that apply.

- a. Embryo banking.
- b. Egg banking.
- c. Ovarian Cryopreservation.
- d. Adoption.

### A woman:

- a. Is born with all the eggs/oocytes she will ever have.

### Cancer is best defined as:

- d. Uncontrolled cell growth.

Which of the choices below are known to contribute to cancer? Select all that apply.

- a. Certain genes.
- b. Environmental toxins.
- c. Certain viruses.
- d. Solar radiation.

### The pituitary:

- c. Produces hormones that regulate follicular development.

### Which statement about the ovary is correct?

- b. Follicles contain eggs and are located in the ovary.



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**A 22 year old woman is going to be treated for lung cancer. Would any of the following therapies be likely to affect her ability to become pregnant? Select all that apply.**

- a. Chemotherapy
- b. Radiation

**What is the function of the testes:**

- c. They produce sperm and hormones (testosterone).

**Which statement about an egg that has just been fertilized is correct?**

- b. The fertilized egg must grow to the blastocyst stage before implantation.

**Follicle development refers to**

- a. Growth of the structure in the ovary that contains the maturing oocyte.

**Before ovulation, what hormone does the follicle produce?**

- a. Estrogen

**What is the difference between the follicular phase and the luteal phase of reproduction?**

- c. Follicular phase = growth of follicles before ovulation; Luteal phase = events after ovulation.

**Menstrual bleeding:**

- b. Is the shedding of the uterine lining as progesterone declines.

**What does radiation do? Select all that apply.**

- a. Radiation causes damage to cells that may cause them to grow uncontrollably into cancer.
- b. Radiation kills cancer cells.
- c. Radiation kills non-cancer (normal) cells.

**What happens to a woman's fertility over time?**

- d. Fertility decreases gradually after age 35.

**Regarding male fertility (the ability to father children), when does sperm production begin and end?**

- e. Sperm production begins around puberty; declines around age 80.



**22 year old female with ovarian cancer**      Maybe      Possibility of fertility preservation would be determined by whether both ovaries are cancer-involved and the extent of the spread of the cancer. Since ovarian cancer is difficult to detect until advanced, most likely the ovaries and uterus would need to be surgically removed to ensure survival. Adoption might be the best option for this patient.

**30 year old female with stomach cancer**      Yes      If eggs in ovarian tissue are cryopreserved ahead of cancer treatment, she might be able to have children.

**7 year old female with leukemia (blood cancer)**   Yes      If eggs in ovarian tissue are cryopreserved ahead of cancer treatment, she might be able to have children.

**65 year old female with uterine cancer**      No      This patient has gone through menopause and has no eggs to preserve.

**24 year old male with testicular cancer**      Yes      Sperm could be collected and cryopreserved ahead of cancer treatment and the patient could be able to have children.

**Describe the key events for an egg from the beginning of menstrual cycle and following it to the start of pregnancy. (If you know timing, triggers, and where key events take place.)**

**Follicular phase (from day 1 to ovulation):** Follicle stimulating hormone (FSH) is released into the bloodstream by the pituitary gland in the brain in response to the release of gonadotropin-releasing hormone (GnRH) in the hypothalamus in the brain. FSH encourages the maturation of an ovarian follicle. Increasing levels of estrogen are released by the maturing follicle into the bloodstream. This increase in estrogen causes a decrease in FSH by inhibiting GnRH production. When the follicle fully matures, it causes a decrease in estrogen levels leading to a negative feedback in the hypothalamus in the brain which begins to produce GnRH. This, in turn, causes the pituitary gland to begin to produce leutinizing hormone (LH).

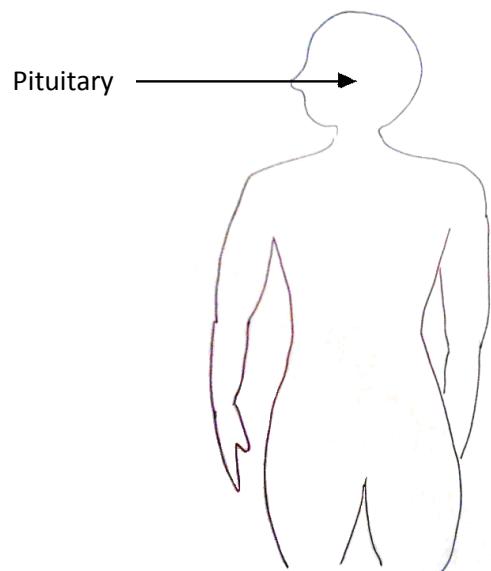
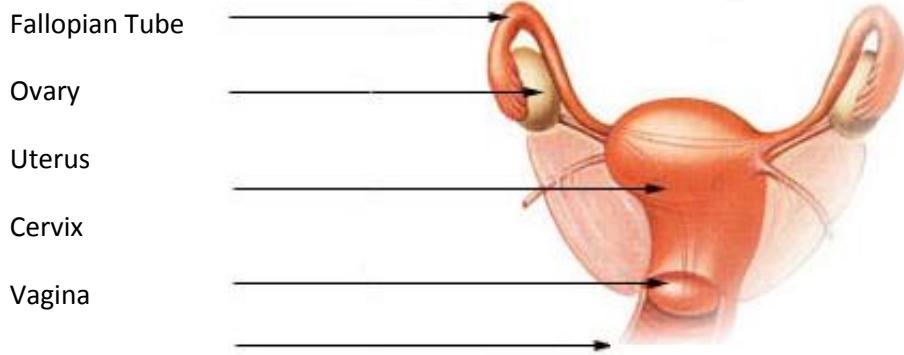
**Ovulation (around day 14)** – The production of LH triggers ovulation in which the ovarian follicle in the antral stage releases an oocyte. The oocyte is swept into the fallopian tube where it might be fertilized if sperm is present. Under the influence of LH, the antral follicle forms the corpus luteum which begins to produce progesterone. This progesterone maintains the uterine lining until implantation of the fertilized egg can take over that production of progesterone as the placenta forms. If the egg is not fertilized, the uterine lining is sloughed and menstruation occurs.



**Fertilization:** If fertilization occurs and implantation is complete, LH levels will decrease and the maintenance of the uterine lining will be done by the action of human chorionic gonadotropin (hCG) which is secreted by the new placenta. hCG acts on the corpus luteum to cause it to continue to produce progesterone during the pregnancy. LH and hCG are similar hormones but are produced in different places.

**When Linda was 16 years old, she was diagnosed with lung cancer. In order to preserve her fertility, one of her ovaries was removed and frozen for later use. Unfortunately, she died of her cancer a year later. Linda was an only child and her parents want to use her eggs to have a grandchild. List what you consider to be the ethical issues surrounding this decision. List as many as you can think of.**

- a. What would Linda want?
- b. Who would be the father?
- c. Who has legal custody of the eggs and of the child?



**In which part of the system does fertilization occur? Fallopian tubes**

