

ONPRC Module 1B: Female Reproductive System & Regulation of Ovarian Function

Guiding Question:

How does the female reproductive system work?

Module Question	Laboratory Questions
<p>What are the important parts of the female reproductive system, and how does the menstrual cycle work?</p>	<ul style="list-style-type: none"> • How does a scientist obtain ovaries for a study? • How do researchers look at follicle morphology? • How does female reproductive anatomy differ between mammalian species (mice, humans, monkeys, sheep, horses, cats, dogs)? • What can female reproductive anatomy tell us about pregnancy in the different species?

Learning Outcomes:

Identify female reproductive anatomical structures of different species (mice, humans, monkeys, sheep, horses, cats, dogs).

Explain the ovarian cycle (process of follicular development, ovulation, corpus luteum formation).

Explain the menstrual cycle (changes that occur in the uterus under the influence of ovarian hormones).

Define the source and function of hormones involved in the female reproductive system.



Additional Reproductive Vocabulary

Gamete: a haploid sex cell called the oocyte in females and a sperm in males

Gametogenesis – one of the two major functions of the follicle in the ovary and the stem cells in the testes and the process by which precursor cells undergo meiotic cell division and differentiation to form the mature haploid gametes. In the ovary the oocyte and in the testes the sperm form as a result of gametogenesis.

Zygote: diploid cell formed by the union of sperm and oocyte; the product of fertilization

Hormone – a chemical messenger that carries information from one cell to another via the bloodstream. Major types include the small proteins (peptides) and the cholesterol-derivatives (steroids) such as insulin and estrogen, respectively.

Steroidogenesis – one of the two major functions of the follicle in the ovary, the process of producing steroid hormones; in the female ovary predominantly estrogen and progesterone and in the male testosterone

Estrous cycle – the related recurring female reproductive cycle of many placental mammals, including the mouse

Menstrual Cycle – the recurring cycle of physiological changes that occur in reproductive age humans and other primates that is hormonally regulated and results in ovulation and preparation for the events of fertilization of the mature ovum and implantation of an embryo

Receptor – a protein within a cell or on the cell membrane that binds a chemical ligand, such as a hormone, and initiates an appropriate cellular response

Corpus Luteum – the structure that develops from the somatic cells post-ovulation (through the process of luteinization) that produces progestins necessary for initiation and maintenance of pregnancy

Oncofertility – a new discipline that makes connections between oncology and reproductive medicine, providing viable fertility preservation options for people with cancer and other fertility threatening diseases.



Ovarian Cortex:

Primordial follicles

Primary follicles

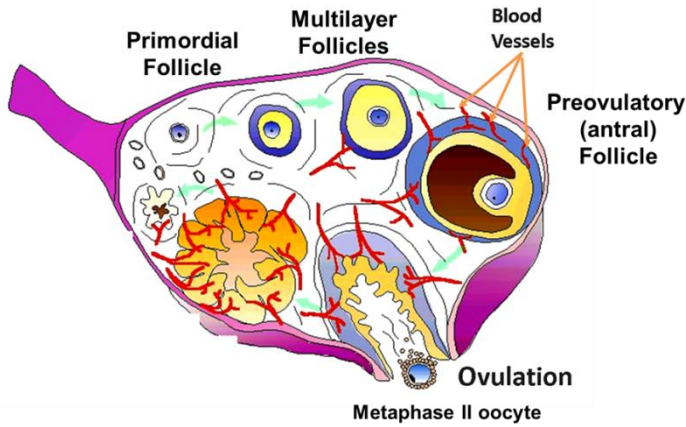
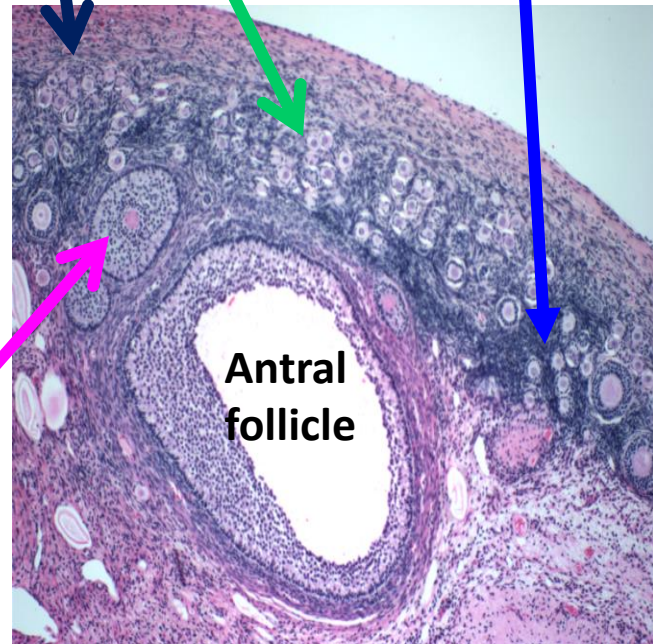


Illustration by Drs. Stouffer and Xu, Oregon National Primate Research Center



Preatranal follicle

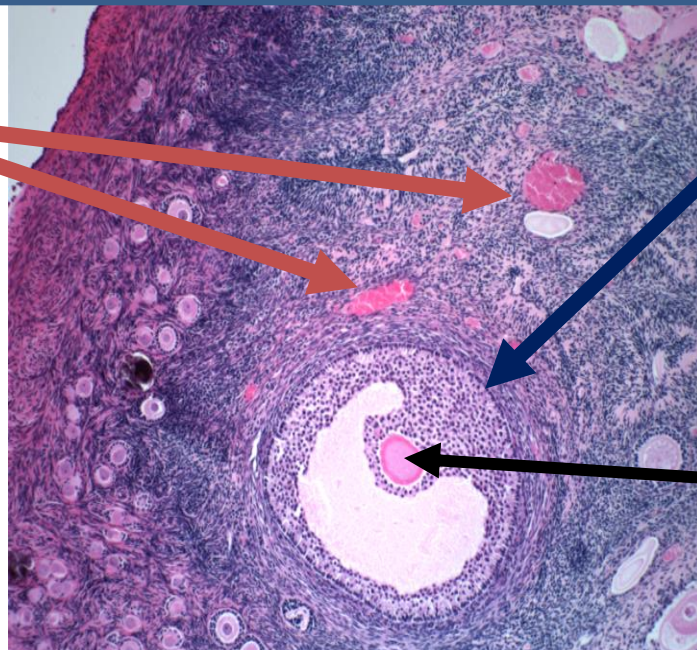
Antral follicle

Photos: Mary Zelinski, PhD, ONPRC

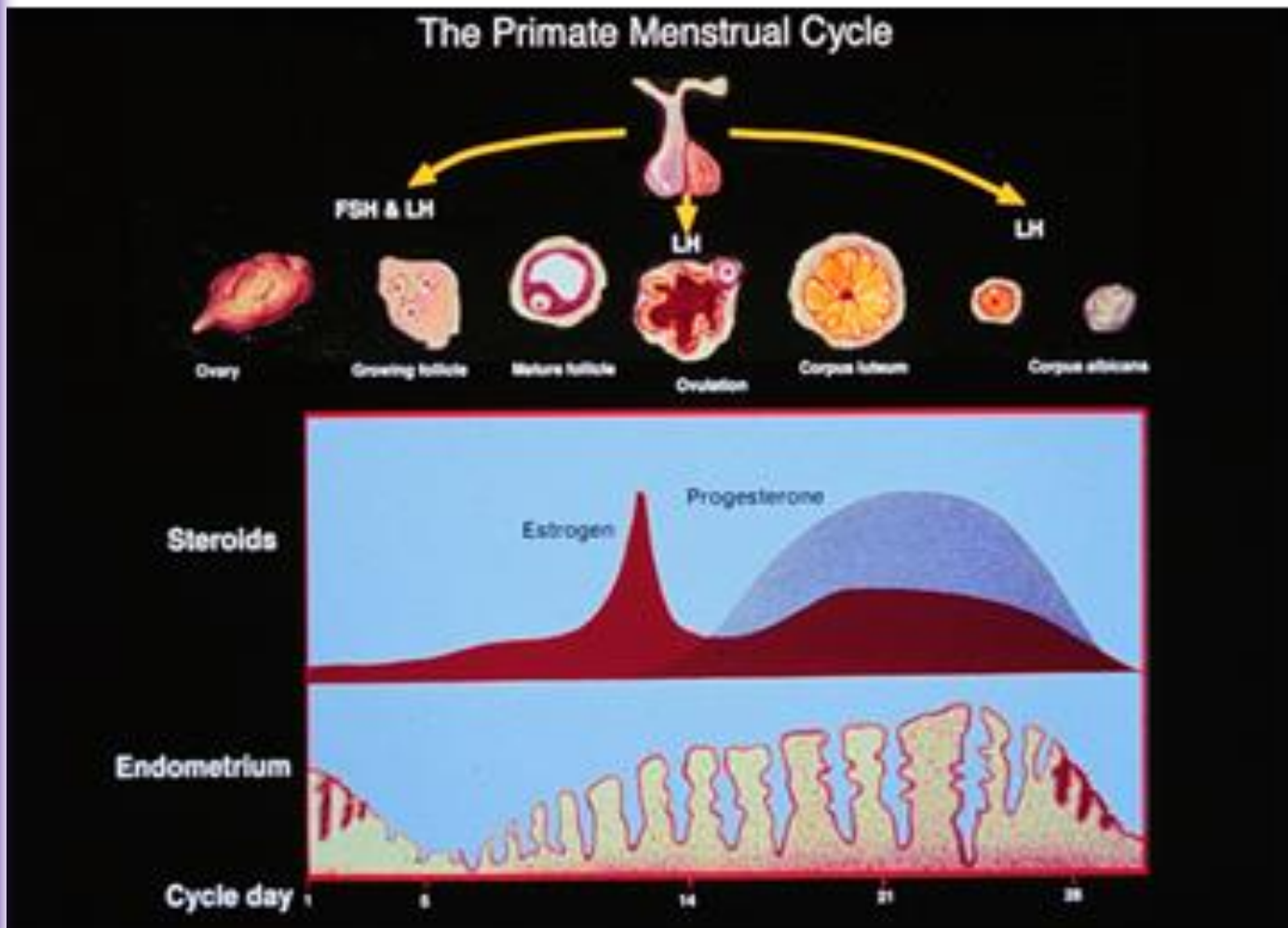
Blood vessels

Antral Follicle

Oocyte



Ovarian Cycle – changes in ovary Menstrual Cycle – changes in uterus



Top: Ovarian Follicular Changes during the Menstrual Cycle.

Middle: Hormone Changes during the Menstrual Cycle.

Bottom: Uterine Endometrial Changes during the Menstrual Cycle.

Drawing: Joel Ito, Medical Illustrator, ONPRC