

# Oogenesis

Degree-1

Oogenesis

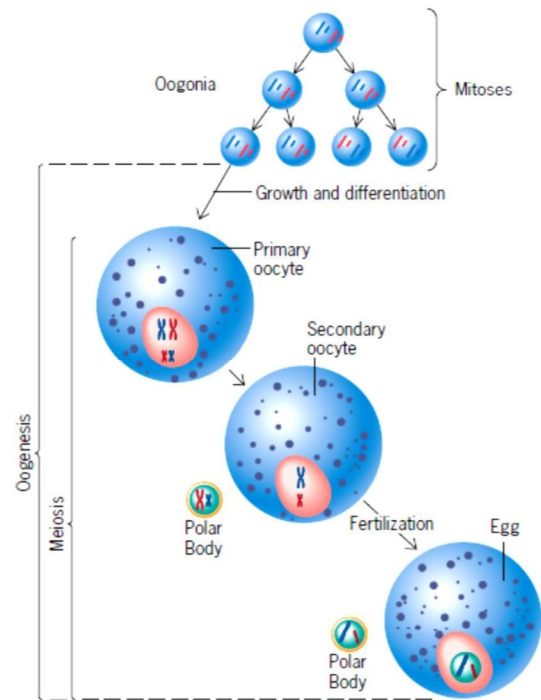
Barun Prabhat

Gamete production in female is called oogenesis. Diploid primordial germ cells within the ovary divide mitotically to produce oogonia. Oogonia can either divide repeatedly by mitosis or enter into the meiosis.

The oogonia dividing by mitosis stop at the diplotene stage of prophase I prior to birth. These arrested cells are called primary oocytes. Each of primary oocytes resides within a small follicle lined with protective cells. At the time of birth, the ovaries together contain

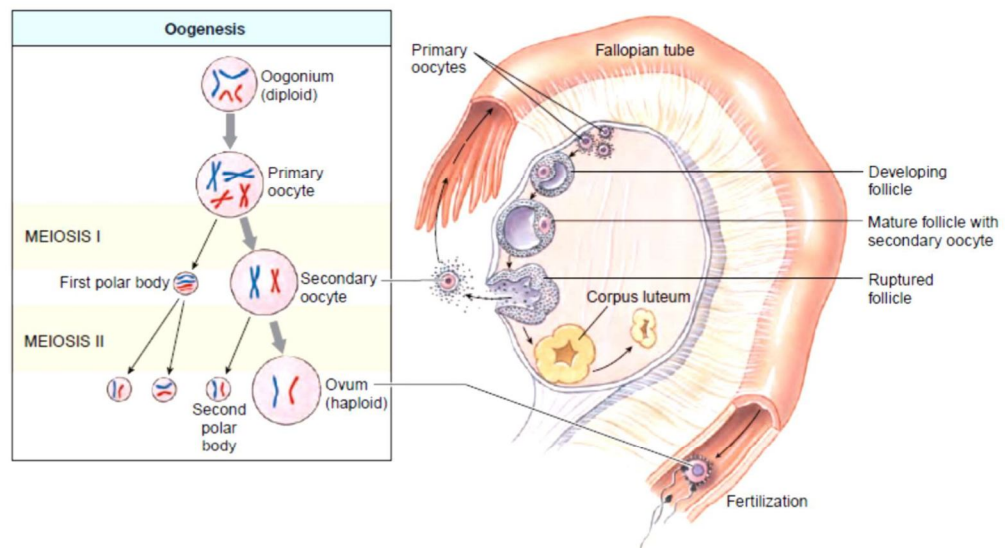
about 1-2 million primary oocytes of which about 450-500 mature fully between menarch goes to one of the two haploid cells, called secondary oocyte or ovum. The smaller cell haploid cell receives only a small part of the cytoplasm and is called first polar body. The first polar body it may or may not divide further.

From menarch onwards, follicle-stimulating hormone (FSH) periodically stimulates a small group of follicles to resume growth and development. Naturally, only one follicle matures each month. Primary oocyte of the follicles completes meiosis I. The second meiotic division begins, but stops at metaphase. The primary oocyte with arrested meiosis II is called secondary oocyte and is released at the time of ovulation. The secondary oocyte resumes meiosis II only if a sperm penetrates it. (In other animal species, sperm may enter secondary oocyte at the same stage, earlier, or later.) Each of the two



meiotic divisions undergo unequal cytokinesis, forming smaller polar bodies that eventually degenerate. Due to this, the functional product of complete oogenesis is a single mature egg that contains a sperm head.

The ruptured follicle left behind after ovulation develops into the corpus luteum. The corpus luteum secretes estradiol as well as progesterone, a hormone that helps maintain the uterine lining during pregnancy. If the egg is not fertilized, the corpus luteum degenerates, and a new follicle matures during the next cycle.



#### References:

Developmental Biology y Gilbert

Cell and Molecular Biology by Karp

Integrated Principles of Zoology by Hickman