

Gametogenesis (Coursebook)

Gametes form by **meiosis** from diploid cells. We can divide the necessary processes e.g. to 4 categories: differentiation of the diploid cells to gamete precursors ("gonia"); mitosis to create enough -gonia; meiosis; differentiation of the final gamete.

The **germline cells** come from the yolk sac that produces Primordial germ cells (PGC). PGC migrate to the retroperitoneum where they settle in the primordial gonad. The gonad differentiates into testis or ovary.

In ovary, diploid oogonia stop mitosis and enter meiosis during fetal period (and change to primary oocytes), but stop in diplotene (also called dictyotene). When the follicle starts to grow under influence of FSH (in or after puberty and before menopause) the primary oocyte continues in meiosis to metaphase II. Oocytes accumulate substantial amount of stored material (building and energetic) for early embryonic development.

Though in mammals there is not such a great need like e.g. in birds, still it is no good to divide these stores. Therefore one set of chromosomes after meiosis I stays inside the oocyte, the other set is extruded with minimum cytoplasm as first polar body. Metaphase II secondary oocyte is ovulated. Fertilization triggers meiosis reactivation, this proceeds from metaphase II to the end, extruding second polar body.