

# Gametogenesis

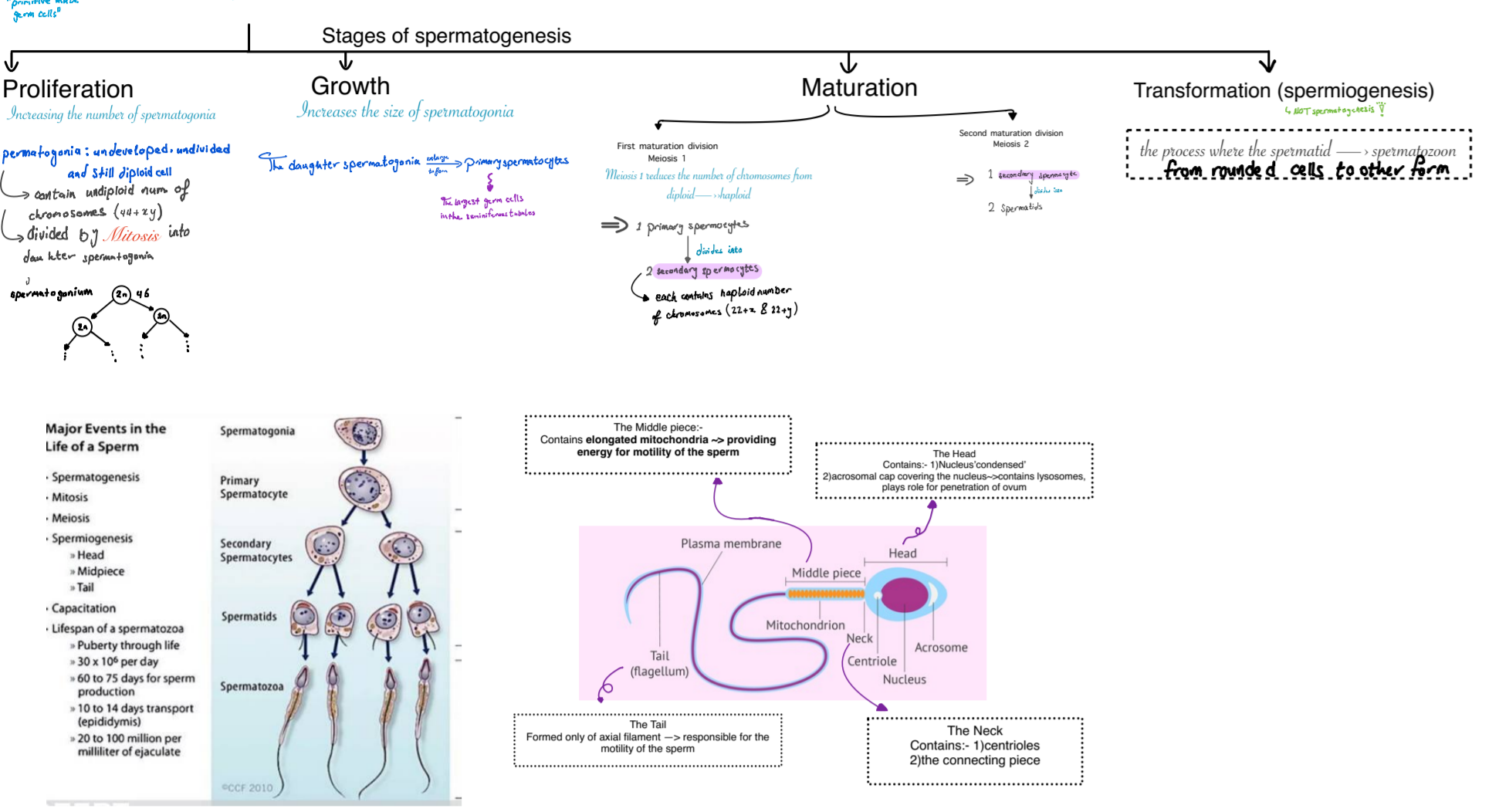
Production of mature gametes → from immature ones inside the gonads

includes changes in the:
 

- cytoplasm → increased in the ovum, decreased in the sperm
- Nucleus → meiotic division to reduce the number of chromosomes to the half

## Spermatogenesis

it occurs in the seminiferous tubules of the testis from puberty to old age



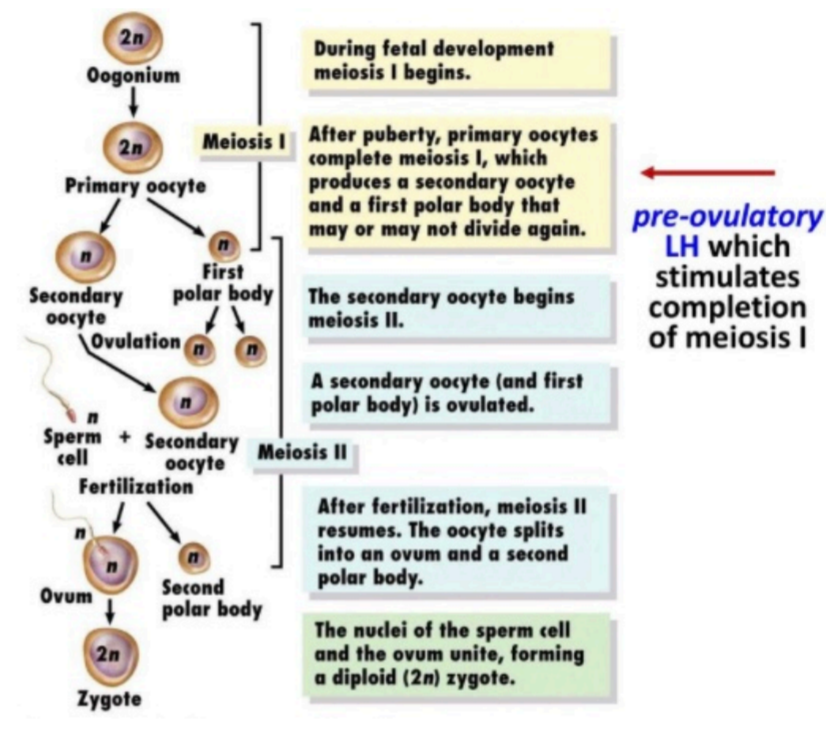
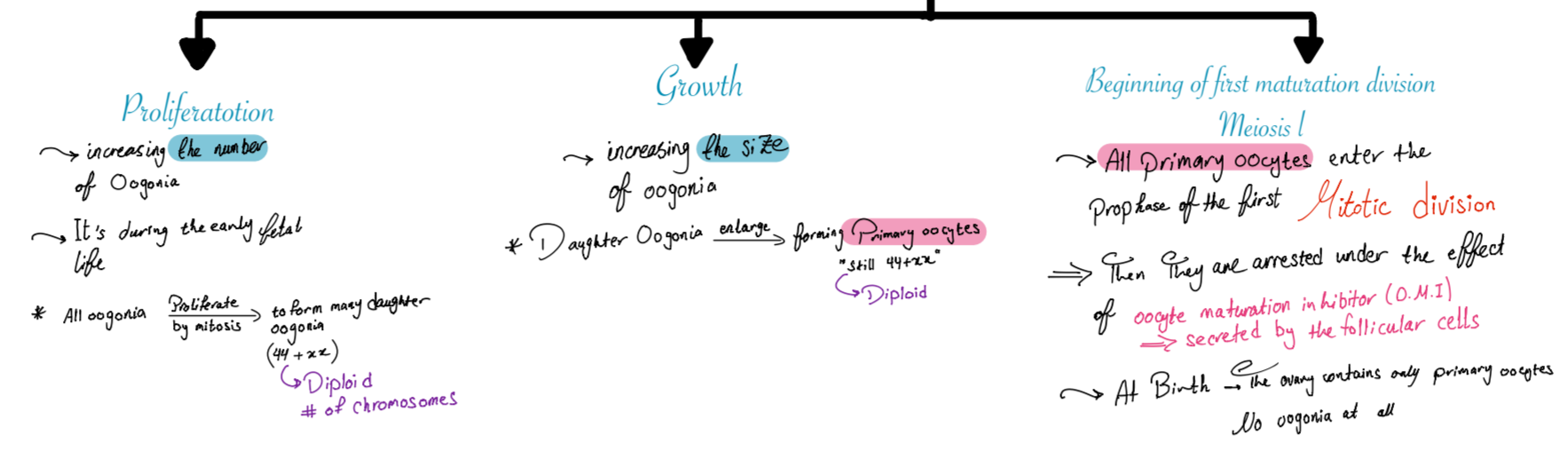
## Oogenesis

During this fertility period, one secondary oocyte, one mature ovum, success to develop from ovary or left ovary, every 28 days!

The site of Oogenesis: The cortex of Ovary. Oogenesis begins in the cortex of the ovary during the intrauterine life and arrested. Then reactivated at puberty till menopause (40-50+).

### Prenatal events of Oogenesis

During intrauterine life



### Postnatal events of Oogenesis

from puberty to menopause

occurs at puberty, once every month in either ovary. About 20 follicles are triggered but only one follicle matures "success in reaching full maturity" while the remaining follicles degenerate "called atretic follicle".

Therefore, only one primary oocyte/month completes its 1st meiosis few hours before ovulation.

**Results of First Meiosis:**

- Two cells are developed: secondary oocyte and 1st polar body.
- Each cell contains the haploid number of chromosomes (22+x).
- Both cells enter the second meiosis, till the metaphase stage at which ovulation occurs. The secondary oocyte which pass from the surface of the ovary to the lateral 1/3 of uterine tube waiting for fertilization.

**Second Meiosis:**

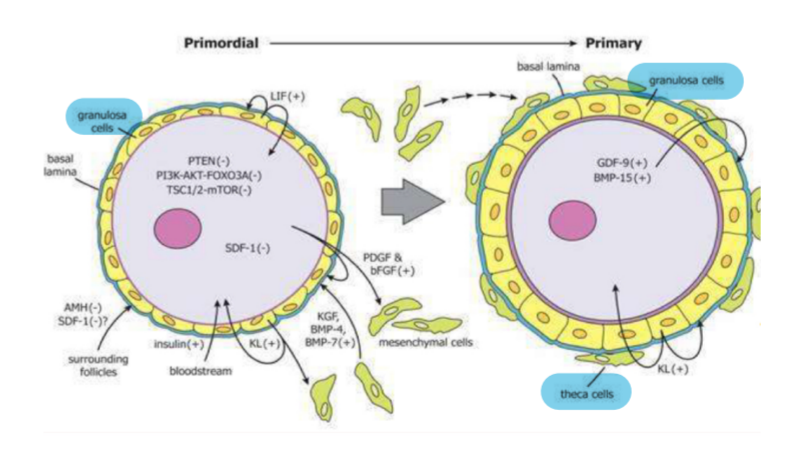
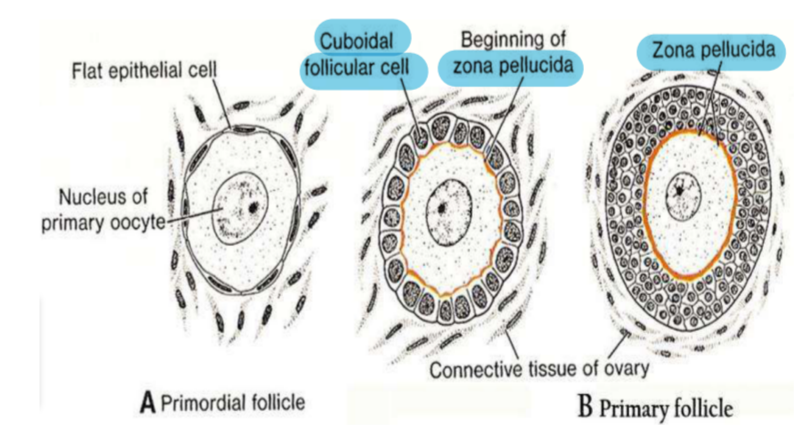
- occurs in the uterine tube.
- only if fertilization occurs.
- If fertilization occurs: The secondary oocyte (22+x) divides into Mature ovum (22+x) + secondary polar body. Non-functional & degenerates.
- If fertilization doesn't occur within 12-24 hours after ovulation → it degenerates.

### Abnormalities of the sperm

- Abnormalities in shape:** Double head, large head, pin head, taper head, double tails, dwarf sperm.
- Abnormalities in the motility:** Normally it's actively motile.
- Abnormalities sperm count:**
  - Oligospermia: less than 20 million/ml (low number of sperms)
  - Azospemia: complete absence of sperms in the semen
  - Microspermia: Dead sperms in the semen

### Development of the follicular cells:

- Aim:** protection of developing ovum & production of hormones
- 1) Primordial follicles:** It's a primary oocyte "arrested in the first mitotic division" surrounded by a single layer of flat follicular cells.
- 2) Primary follicles:** starts at puberty under effect of FSH of pituitary gland. Follicle-stimulating hormone. The follicular cells proliferate forming many layers of Granulosa cells around the primary oocyte. The Granulosa cells deposit glycoprotein substance that surrounds the oocyte to form Zona pellucida. Theca folliculi develop around the primary follicle from the surrounding stromal cells of the ovary.
- 3) Secondary follicles:** Between Granulosa cells, there's a fluid which form small irregular spaces that's secreted from Granulosa cells. Uniting these spaces form a single cavity called follicular antrum. Follicular antrum + Theca cells differentiate into theca interna "cellular vascular layer" and theca externa "fibrous layer".



- 4) Graafian follicle "tertiary follicle":**
  - Zona granulosa (membrane granulosa) → 3-4 layers of polyhedral cells lining the central cavity
  - Basement membrane → granulosa cells rest on
  - Theca folliculi layer → the outer dense theca externa inner less vascular theca interna
  - Follicular cavity → filled with follicular fluid secreted by follicular cells containing estradiol
  - The Oocyte → surrounded by follicular cell called cumulus oophorus

