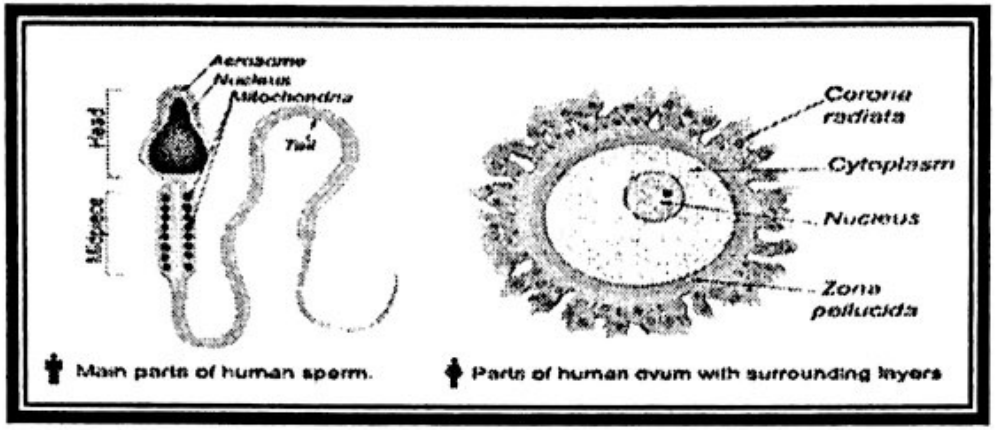
Gametes

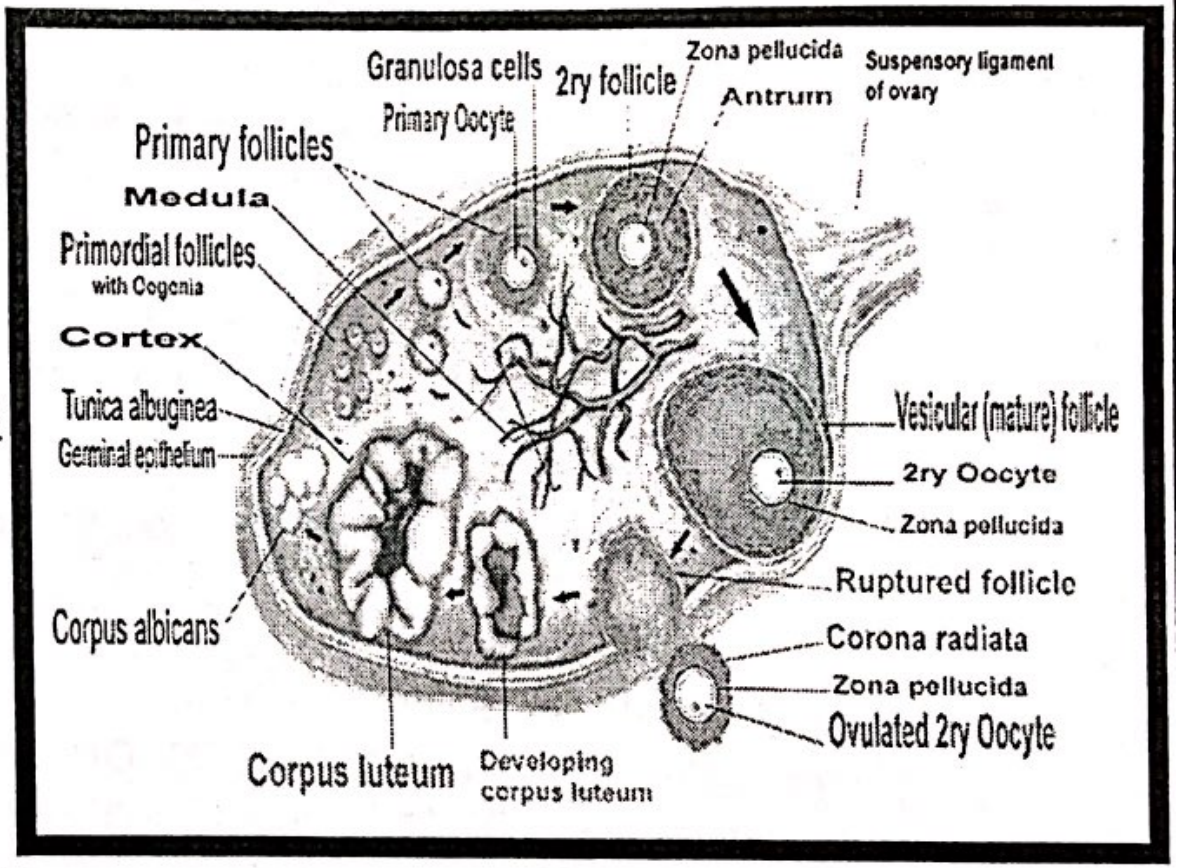


- In gametogenesis, DNA replication and centromeric division occur in separate cell cycles (Meiosis I and Meiosis II).
- Both male gamete (sperm) and female gamete (ovum) contains **½** number of chromosomes (haploid **1n** cells) that reduced during **Meiosis**.
- Each carries a mixture of **Paternal** and **Maternal** genes.
- Gametogenesis begins in males at **puberty** while in females it begins during **fetal life**.
- Thus, the time required to produce a mature ovum may extended to 40-45 years; for this reason that abnormalities in chromosome number are usually attributed to the female rather the male gamete.

Oogenesis-1

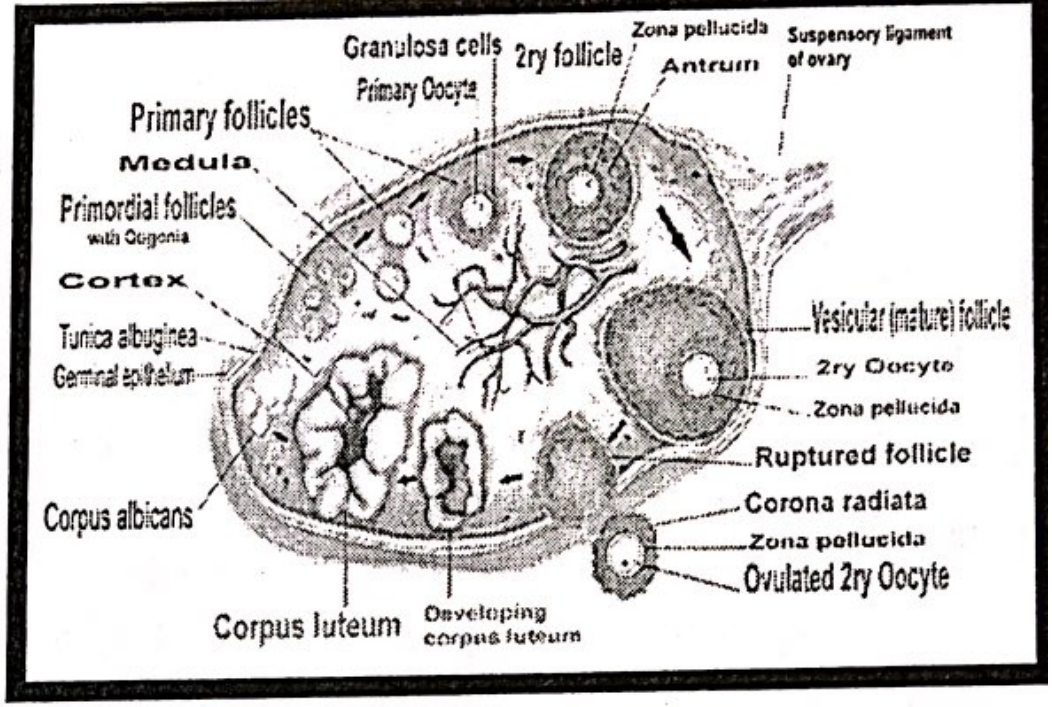
The sequence of events by which Oogonia (primitive ovum) are transformed into 1ry Oocyte. This maturation process begins during fetal life, but not completed until after puberty.

- Layers of ovary 1, 2.
- Main function of ovary, to produce mature Ovum ready for fertilization.
- Occurs in the cortex of the Ovary, which contains Oocytes at various stages of development.
- Oogenesis is a repetitive monthly ovarian cycle during females reproductive period ~ 33Y.



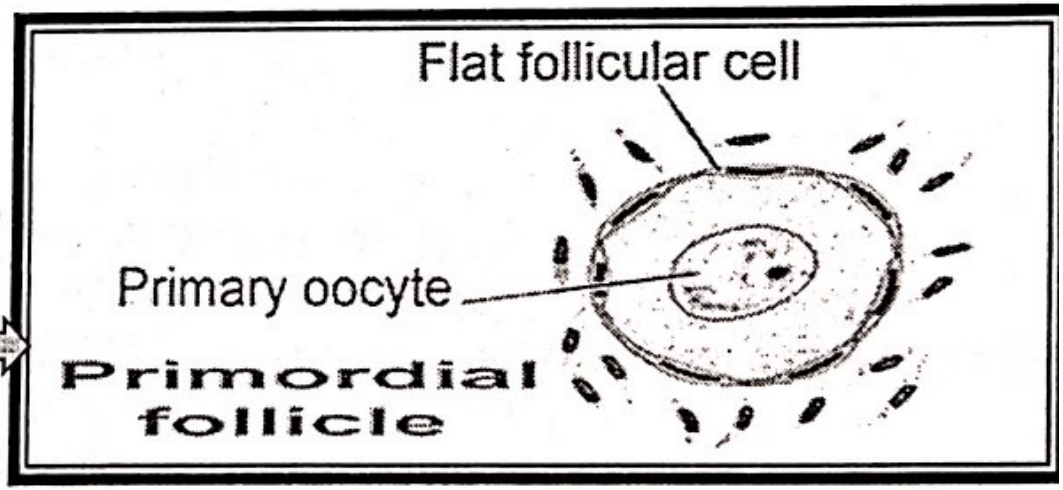
Oogenesis-2

- **By the end of 5wk,**
  The Primordial germ cells PGC **arrive** to the developing ovary and form the **(primitive ovum) Oogonia.**



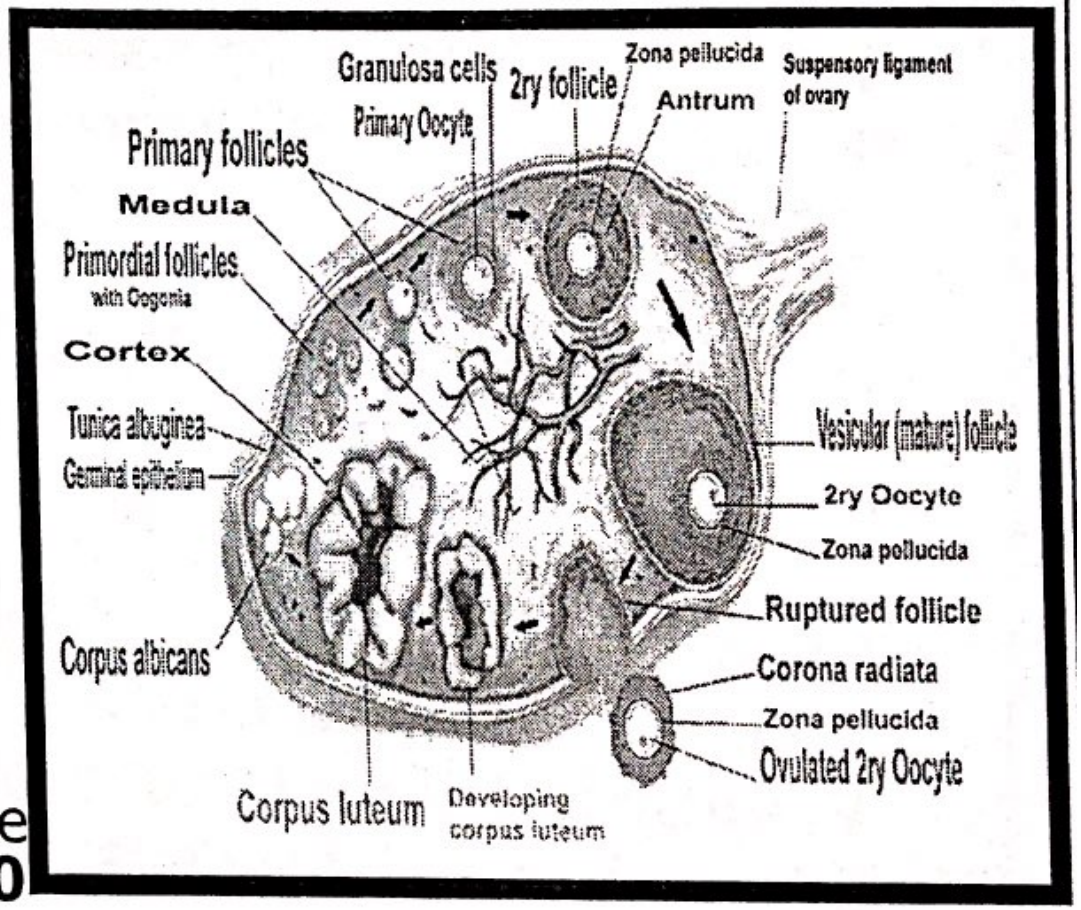
By the 3M:
Oogonia proliferate by mitosis and enlarge into **1ry Oocyte** then arrested STOP in **Prophase of Meiosis I** and may stay 40 years when cell begins its final maturation.

During this period cell carry 46 chromosomes, inside a **Primordial follicle** covered by one layer of flat cells.



Oogenesis- 3

- **By 5M:**
  Number of **Oogonia** reach about **7 million**. Start death.
- **By 7M:** Remained Oogonia are transformed into **1ry Oocytes and** arrested STOP in **Prophase Meiosis I** .
- **At birth:**
  All 1ry Oocytes enter **Meiosis I,** but arrested STOP in **Diplotene stage** طور السكون (a prolong **Prophase Meiosis I)** until puberty.
  - Up to **2M** of 1ry Oocytes are usually present in the ovaries of a newborn. Most degenerate during childhood,only**~40,000** remain until puberty. About 400 will mature and ovulated.

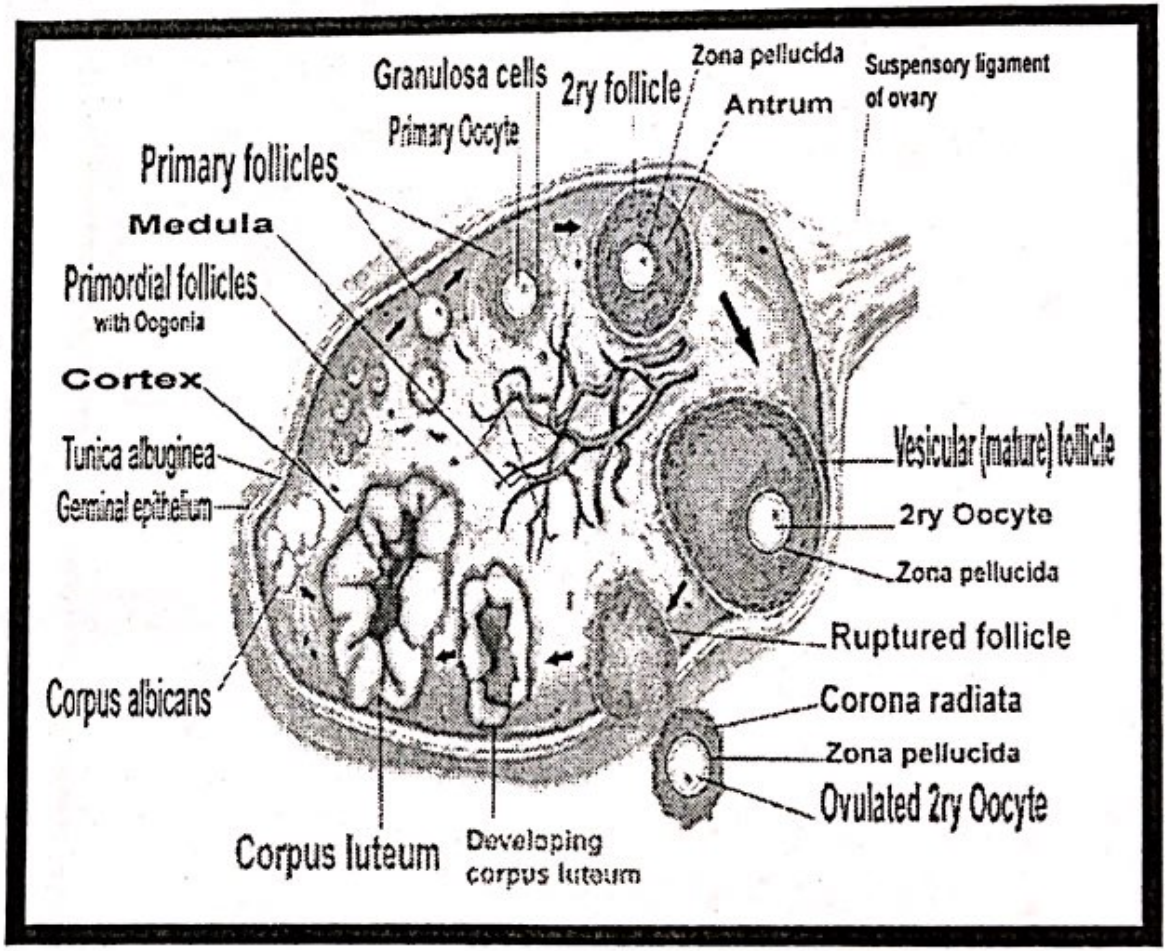


Oogenesis- 4

- **At puberty:**

  In each ovarian cycle, only 1 out of 20 **1ry Oocytes** reach maturity and ovulated.

- ➢ Only **~ 400 1ry Oocytes** will be ovulated during the female fertile life **(~ =33 years)**.



Oogenesis- 5

- **Shortly befor ovulation:**
- 1ry Oocyte complete **Meiosis I** and form the **2ry Oocyte + 1st polar** body that soon degenerate.

- **At Ovulation:** 2ry Oocyte enter **meiosis II** but arrested STOP in **Metaphase II** and only completed at **fertilization.**

At **Day 14** of the female reproductive cycle, the 2ry Oocyte is ovulated under the influence of the **LH** hormone with its covering layers.

- Ovulated ovum enter into uterine tube in anticipation to be fertilized and stay viable only **~ 24 hours**.