

# "Oogenesis"

## ● Origin

- PGCs → Epiblast (at 2nd week) → Through Primitive Streak to Yolk Sac (at 4th week) → Developing Gonads (at 5th week) → Testis/Ovaries → Mitosis → Meiosis → Haploid

## ● Initiation: Before Birth

- Differentiation of Oogonia to Oocyte starts before birth

## » 3rd Month

- Follicular cells formation (cluster of oogonia surrounded by flat epithelial cells derived from ovarian epithelium)

1) Majority oogonia: Undergo mitosis → At 5th

month, become 7 million

2) Few oogonia: undergo Meiosis

## » 5th Month

- All of the above mentioned 7 million oogonia have started meiosis now, so are called Primary Oocytes
- Characteristics of this meiosis
  - 1) Incomplete
  - 2) Arrested in Diplotene of Prophase-I
  - 3) Forms Primary Oocyte

## » Pathway

- Primary Oocyte + Flat Epithelium → Follicular Cells → Meiosis I → Arrested Primary Oocyte + Primary Follicles → Primordial Follicles

### ● Degeneration of Follicles

- Occurs during 5th to 7th month
  - At birth: 600,000 to 800,000
  - Childhood: 40,000
  - Ovulated: 500



## ● After Birth: At Puberty

- Out of 40,000 primordial follicles, 15-20 primordial follicles are rescued under the influence of FSH at puberty → One ovulated  
→ Others form Corpus Atreticum

## ● Changes in Primordial Follicle: (Is surrounded by ovarian CT)

- Zona Pellucida formation: By secretion from Granulosa cells and Primary Oocytes themselves
- Theca Folliculi formation: By surrounding Ovarian CT
- Now called a "Primary Follicle"

## ● Antral / Vesicular Stage

- Theca interna + externa formation
- Formation of crescent shaped antral space called Antrum
  - Now called a Secondary Follicle
- Theca interna produces: Androstenedione and Testosterone
- Granulosa Cells convert them into Estrone + 17 beta estradiol
- Theca externa: Fused with ovarian CT

## ● Graffian Follicle with Secondary Oocyte:

- Enlarged Antrum
- At puberty, LH Hormone Surge -> Meiosis 1 completed -> Meiosis 2 initiated



## ● Ovulation Stage:

- Occurs on Graffian follicle having the Secondary Oocyte
  - Cumulus Oophorus formation
- This secondary oocyte is arrested at Meiosis 2

## ● If Fertilized:

- Meiosis 2 completion
- Corpus Luteum → Corpus Luteum Gravidis → Secretes Progesterone for Uterine Endometrium

## ● If Not Fertilized:

- Degeneration
- Corpus Luteum → Corpus Albicans
- This Progesterone starts "Secretory Phase"

## ● Syncytiotrophoblast

» If fertilization occurs:

- hCG from syncytiotrophoblast maintains corpus luteum → Becomes Corpus Luteum

Gravidis

- Secretes Progesterone until 4th month

- After 4th month, Syncytiotrophoblast takes over Progesterone secretion

» If no Fertilization:

- Corpus Albicans formed → Decreased Progesterone → Uterus degenerates → Menstrual bleeding