

Oogenesis

Oogenesis is a process of growth and development of the germ cells in the female genital system to produce mature cells during the embryonic development and after puberty.

Oogonium (2n,)

1. Developed from the germinal zone of the ovaries
2. Small cells arrange around ovary as wheel structure (rachis)
3. Each cell has a cone shape, the up toward the rachis.
4. Small nucleus near the bottom of the cell.
5. Has duplicated chromosomes with 2n,
6. Enter the mitosis to produce the primary oocytes

2) Primary Oocyte (2n,2c)

We can study this cell in the cavity of the ovary

1. Larger than the oogonium.
2. After penetration of sperm it enters the meiosis I
3. After the sperm enters the oocyte, each homologous chromosome binds together and each one consists of 2 chromatids, so this called the tetrad near the surface of the oocyte.
4. after complete the meiosis I, produce 2 daughter cells, one is the **secondary oocyte (1n) and the other is the first polar body (1n)** attaches to the inner surface of the cell inside perivitelline space

3) Secondary Oocyte (1n, 2c),

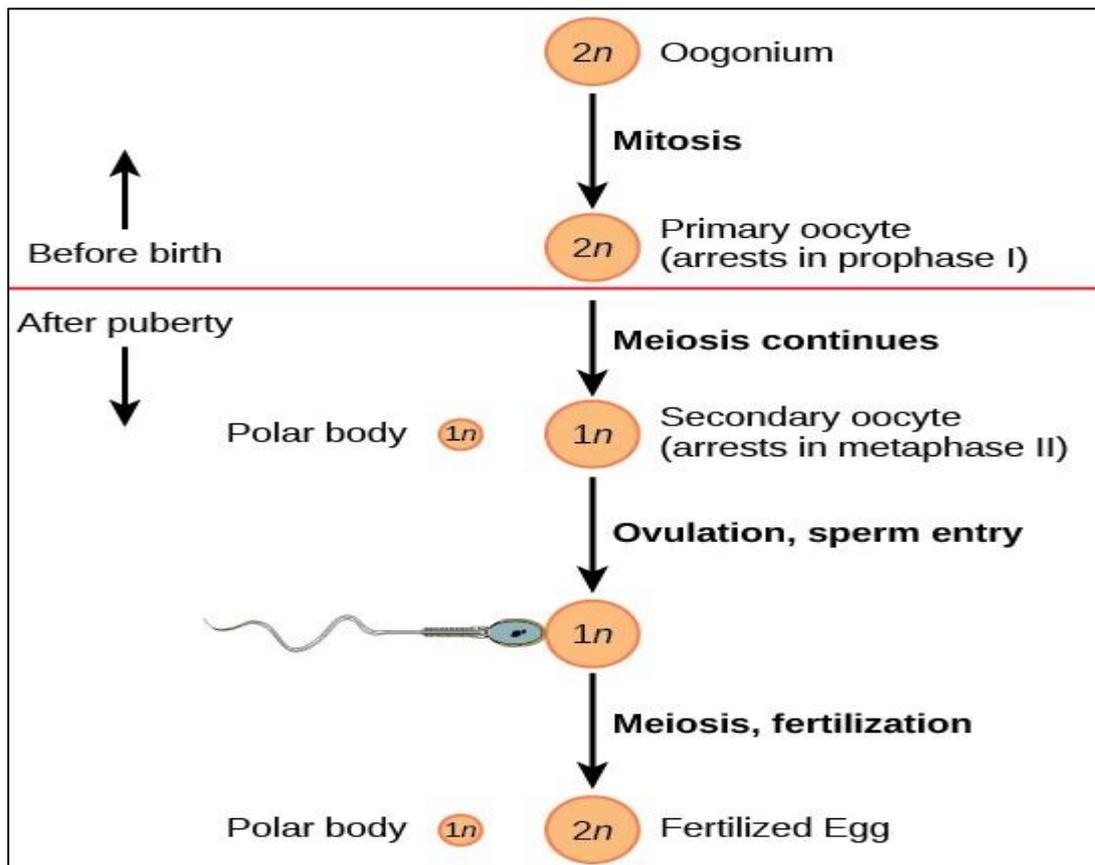
1. Enter the meiosis II to produce 2 daughter cells, one is the mature ovum (1n) and the second is the second polar body(1n)
2. The sperm is still in the cytoplasm of this cell.
3. The first polar body attaches to the inner surface of the secondary oocyte.
4. The sperm is in the center of the cell.

4) mature ovum (1n,1c)

1. A cell contains 2 chromosomes only (1n).
2. The first and second polar bodies appear at the inner surface
3. The sperm is in the center of the cell.

5-Male and Female Pronuclear (zygote)

1. This cell contains both the male and female nuclei at the center of the ovum.
2. At the final stage of this process the 2 nuclei will fuse to form the zygote and the number of chromosomes retains 2N.
3. The male pronuclear is larger than the female pronuclear.
4. The zygote enters the cleavage (mitosis)



مخطط يوضح تكوين البويض والاحداث الحاصله خلال المرحلة الاولى والثانية من الانقسام الاختزالي (عن سادلر)

The Egg

Egg of carnates varies in the amount of yolk they contain and in the distribution of yolk within the egg .They are as follow:-

Amount of yolk	Terminology	Example
	Microlecithal	Amphioxus ,mammals ,
	Mesolecithal	many fish, Amphibia
	Polylecithal	,sharks, Monotrem

Distribution of yolk	Terminology	Example
	Isolecithal	Therian mammals ,
	Telolecithal	Amphioxus of most nontheriar craniates

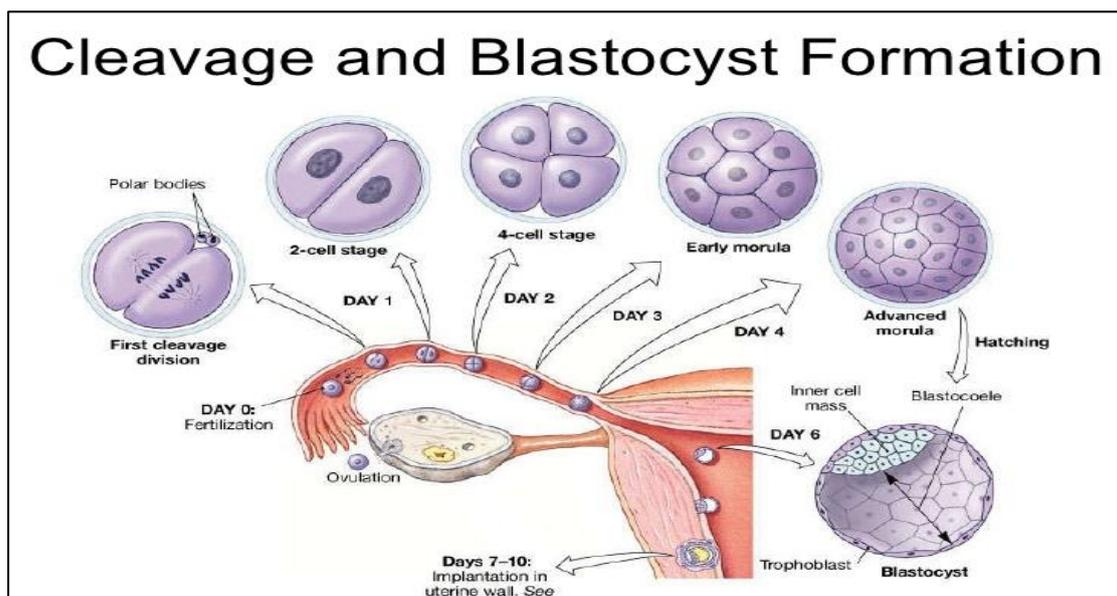
Fertilization: - is the fusion of secondary oocyte and a spermatozoon to form a zygote.

Cleavage is a series of cell divisions that subdivides the cytoplasm of the zygote.

The first cleavage produces a pre-embryo consisting of two identical cells; the **two identical cells produced by cleavage divisions** are called **blastomeres**

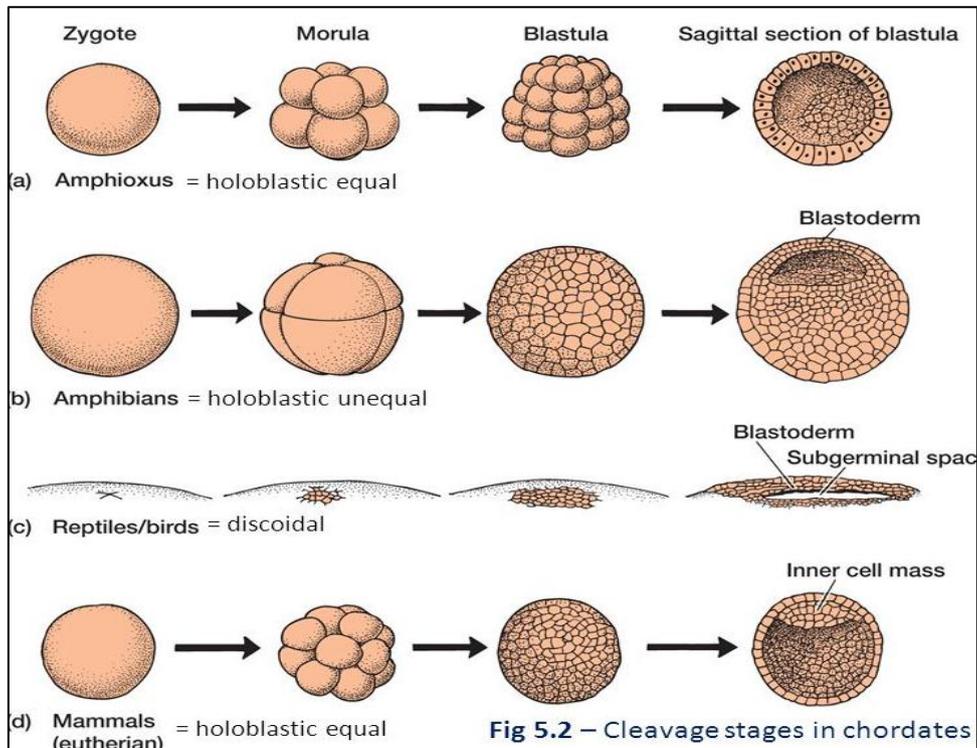
After the first division is completed subsequence division occur to form 4- cell stage

Early morula, advanced morula, blastula



Cleavage patterns in Chordates

Cleavage patterns	Yolk Accumulation	Animals
Holoblastic	Microlecithal	Amphioxus ,placental mamma
	Mesolecithal	Lamprey Bowfin ,Gar Amphibia
Meroblastic	Macrolecithal	Elasmobranchs Teleost fish
Discoidal	Macrolecithal	Reptiles Birds Monotermata



Cleavage stage in different chordates