

Difference Between Secondary Oocyte and Ovum

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Key Difference – Secondary Oocyte vs Ovum

Gametes are mature haploid sex cells which are capable of fertilization during sexual reproduction. The process which produces gametes is known as gametogenesis. Meiosis is the main event that occurs in gametogenesis. Haploid gametes are produced from parent diploid gametocytes by meiosis. Gametogenesis differs in males and females. In humans, male gametes are known as sperms and the process which produces sperms is known as spermatogenesis. Female gametes are known as egg cells or ova and the process that produces mature ova is known as oogenesis. Oogenesis is a complicated process than spermatogenesis. Oogenesis begins even before the birth of the female baby. Oocytes are the female gametocytes which undergo meiosis to form ova. They are immature diploid cells produced in the ovary of the females. Oocytes divide by two meiotic cell divisions to form mature ova. When an oocyte begins to mature and divide, it is known as primary oocyte. Primary oocyte is subjected to first meiotic division and produces secondary oocyte. Secondary oocyte is an immature female gamete produced after the completion of meiosis I. Second phase of meiosis is paused until the secondary oocyte is fertilized with a sperm. Soon after fertilization, secondary oocyte undergoes meiosis II and produces mature egg cell called ovum. Ovum nucleus fuses with sperm nucleus and produces the zygote, which can develop into an individual. The key difference between secondary oocyte and ovum is that **secondary oocyte is an immature egg cell that is formed after the first meiotic division while ovum is the mature gamete that is formed after the second meiosis division.**

What is Secondary Oocyte?

Secondary oocyte is an immature female gamete produced from primary oocyte during oogenesis. When oogenesis begins, primary oocytes, which have 46 chromosomes, undergo first meiotic cell division. It results in secondary oocytes which contain a haploid number of chromosomes (23 chromosomes). Secondary oocyte undergoes second meiotic cell division and produces mature female gamete, which is the ovum. Second meiosis is arrested till the secondary oocyte is fertilized with a sperm. Soon after the fertilization, meiosis completes and a mature egg cell is produced.

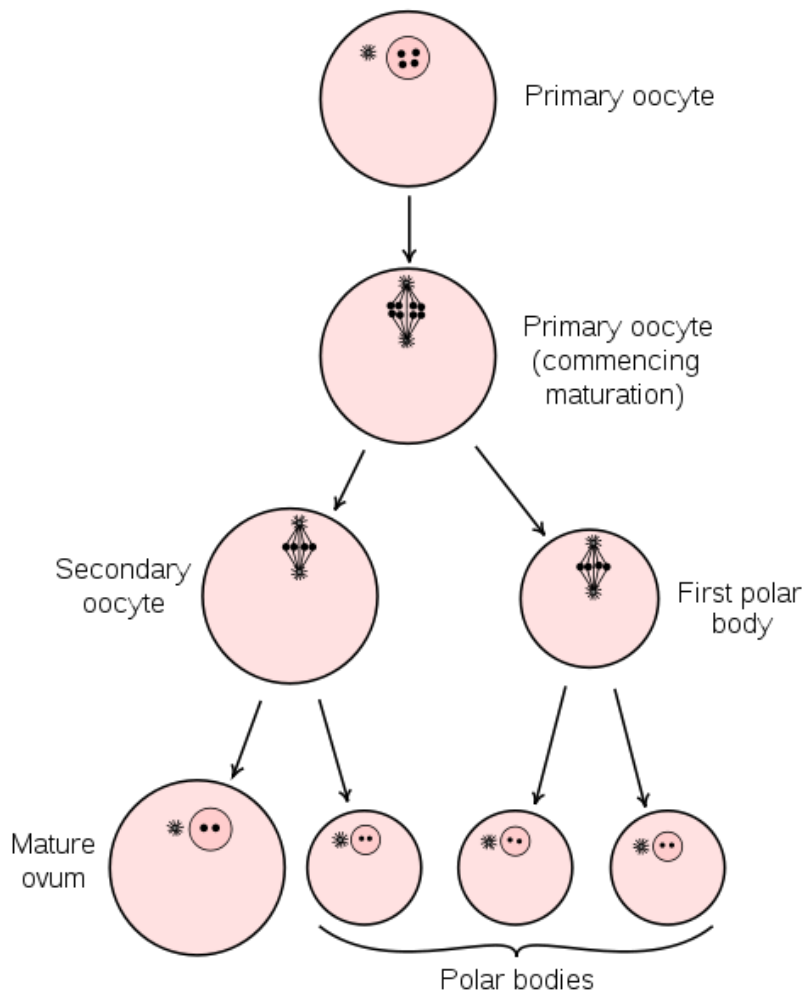


Figure 01: Oogenesis and Secondary Oocyte

Secondary oocyte is a larger cell containing a big **cytoplasm**, nutrients, and organelles. Once it is fertilized, it produces one mature large cell called ovum and a polar body. During oogenesis, the cytoplasm divides unequally. Most of the cytoplasm comes into the secondary oocyte and then to the ovum. It is important to have cytoplasm since zygote receives cytoplasm only from the egg cell.

What is an Ovum?

Ovum is the mature germ cell of a female which is ready to fuse with a male germ cell. It is the final result of oogenesis. Ovum contains a haploid number of chromosomes and it can produce a new organism, which has the diploid number of chromosomes after fusing with the haploid sperm cell. Human ovum is a larger cell and it consists of **protoplasm** that contains some yolk. Protoplasm is enclosed

within a cell wall composed of two layers: inner layer (zona pellucida) and outer layer (vitelline membrane). Inside the ovum, there is a larger nucleus.

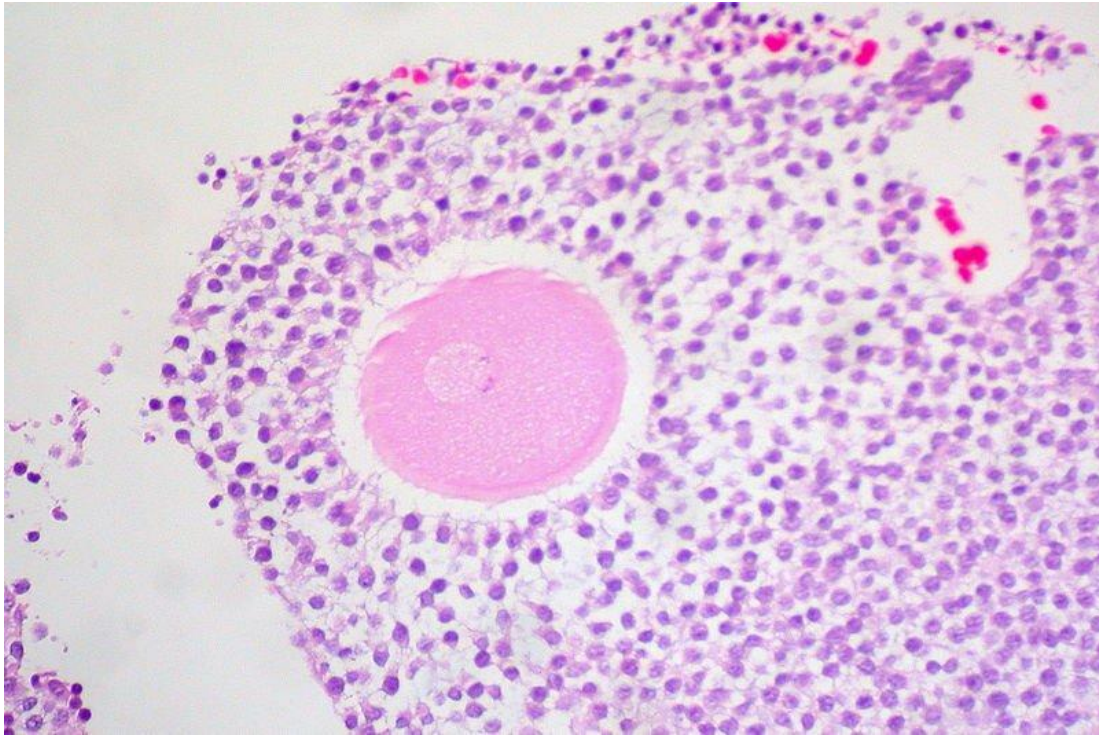


Figure 02: Ovum

What are the similarities between Secondary Oocyte and Ovum?

- Secondary oocyte and ovum contain 23 chromosomes.
- Both cells are haploid.
- Both cells are produced inside the female reproductive organ.
- Both cells are products of female gametogenesis.

What is the difference between Secondary Oocyte and Ovum?

Secondary Oocyte vs Ovum

Secondary oocyte is an immature female gamete which results from the first meiotic division of primary oocyte.

Ovum is the complete female germ cell which has attained the maturity to fuse with male germ cell.

Completion of Meiosis I and II	
Secondary oocyte has completed only one phase of meiosis	Ovum has completed the second phase of meiosis.
Maturity	
Secondary oocyte is an immature cell.	Ovum is a mature cell.
Formation	
Secondary oocyte is derived from the primary oocyte.	Ovum is derived from the secondary oocyte.
Ability to Divide	
Secondary oocyte can undergo meiosis.	Ovum cannot undergo meiosis.

Summary – Secondary Oocyte vs Ovum

Oogenesis is the process that forms a mature female germ cell which is known as the ovum. Oogenesis has two major cell divisions; meiosis I and meiosis II. Primary oocytes begin the oogenesis and divide into secondary oocytes and polar bodies. Secondary oocytes are immature female gametes which have not attained the proper maturity to fuse with male germ cell. Secondary oocyte undergoes second meiosis division and produces a mature female germ cell called ovum and a polar body. Ovum is the final product of oogenesis. It is mature enough to fuse with male germ cell nucleus and produce a zygote. Secondary oocyte is an intermediate product of oogenesis whereas ovum is the final complete product of oogenesis. This is the difference between secondary oocyte and ovum. Secondary oocytes and ova are largest cells found in female bodies.

References:

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2. "The Ovum – Human Anatomy". Theodora.com. N.p., n.d. Web. [Available here](#). 30 July 2017.

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2. "Ovum in Cumulus Oophorus, Human Ovary (6264021209)" By Ed Uthman from Houston, TX, USA – Ovum in Cumulus Oophorus, Human Ovary Uploaded by CFCE (CC BY 2.0) via [Commons Wikimedia](#)

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