

# Embryology

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# Embryology:

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- *Introduction:*
- *The study of the development from fertilization to the birth.*
- *The embryonic development include all the processes where by single cell- the fertilized egg or zygote –give rise to first an embryo, then a fetus which at birth has the capacity to adept to post natal life .*

# *Introduction to Embryology:*

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- *The intra uterine development is often divided into an embryonic period and fetal period.*
- ***Embryonic period:** It the time from fertilization when the Oocyte is penetrated by the spermatozoon , to the earliest (primordial ) stages of organ development (about 30 days in dog , cat , sheep , pig , almost 60 days in horse , cattle and human .*
- ***Fetal period :**The time between the embryonic period and parturition (the end of gestation ) during which organs grow and begin to function*

# *Introduction to Embryology:*

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- *The development of the organism does not stop with birth, however organs continue to grow and maturation at least until puberty and many tissues need continuous replacement throughout life .*
- *Essentially all higher animals start their lives from a single cell, the fertilized ovum zygote .*
- *The time of fertilization , where the spermatozoon meets the egg.*

## Zygote

*The zygote has dual origin from two gametes- a spermatozoon from the male parent and an ovum from the female parent.*



# *Gametogenesis .*

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- *Refers to the formation of haploid ( $1N$ ) gametes (sperm or oocytes) by diploid ( $2N$ ) germ cells (primary spermatocytes or primary oocytes) through a process called meiosis.*
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# *Spermatogenesis*

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- *(duration varies: 34 days in mouse; 36 days in stallion; 74 days in human)*
- • **spermatocytogenesis**
- —spermatogonia ( $2N$ ) proliferate, producing themselves & primary spermatocytes ( $2N$ )
- —primary spermatocyte ( $2N$ ) produces two secondary spermatocytes ( $1N$ ) via Meiosis I
- — two secondary spermatocytes ( $1N$ ) divide into four spermatids ( $1N$ ) via Meiosis II
- • **spermiogenesis**
- —transformation of a spermatid into a sperm (spermatozoon) cell

# Oogenesis

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- *(duration: from before birth to sometime between puberty and loss of fertility)*
- *— oogonia (2N) proliferate themselves and primary oocytes (2N) in the embryo & fetus*
- *— primary oocyte (2N) remains in prophase of Meiosis I until it is ovulated then, it divides into a secondary oocyte (1N) and a polar body (1N)*
- *— following fusion with sperm , the secondary oocyte (1N) completes Meiosis II; the result is a fertilized ovum or zygote (now 2N)*

