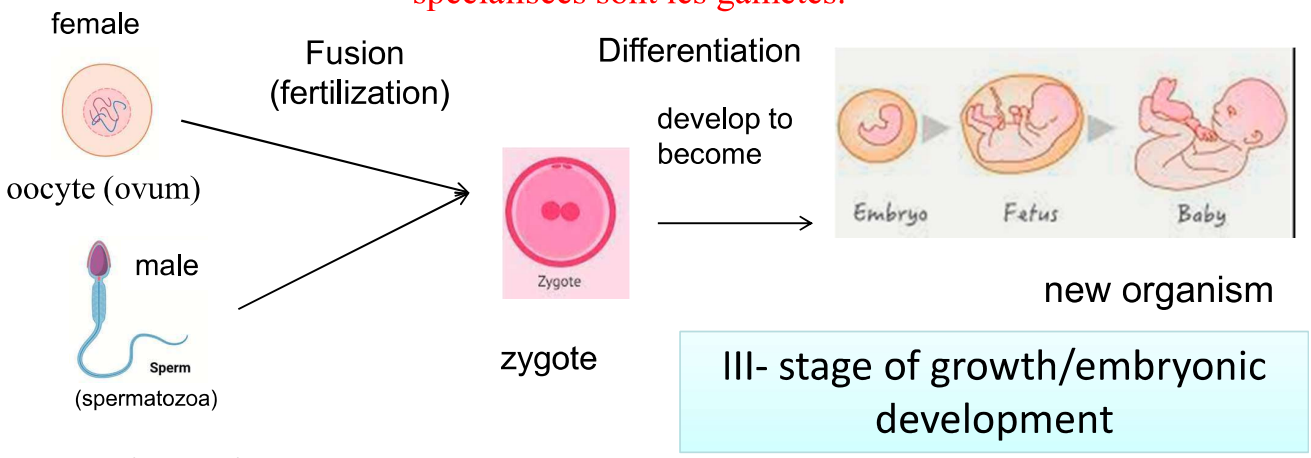
Embryology

Definitions

•**Embryology**: A continuous process that begins when an oocyte (ovum) is fertilized by a sperm to form a zygote which differentiates in to definitive organ system and thereafter in to their early functional stage.

Sexual reproduction : is carried out through the reunion of gametes (sex cells)
c'est un phénomène très important chez les métazoaires, il implique des cellules spécialisées sont les gamètes.



I- pre-embryonic

II- fertilization

III- stage of growth/embryonic development

Stages of embryogenesis
Embryonic Development

I- pre-embryonic Gametogensis

II- fertilization Zygote

III- stage of growth/embryonic development

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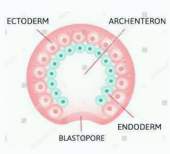
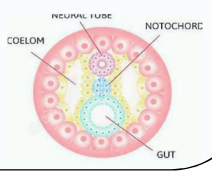
A- Embryogenesis

1- Cleavage → morula → Blastula

2- Gastrulation → Gastrula

3- Neurulation → Neurula





B- Organogenesis

Gametogenesis = process of formation of gametes

❖ **Site** — Gonads → Testis in men / Ovary in women

❖ Production of 2 cell types:

- ➢ **Spermatogenesis** → sperm (male gamete)
- ➢ **Ovogenesis** → ovum (female gamete)

❖ Sperm and ovum → **haploid** cells with **N** chromosomes

❖ Production → reductional mitosis = meiosis

❖ Gametogenesis includes, in addition to the division phases, a maturation phase → final form of the gametes.

❖ There are differences between spermatogenesis and oogenesis.

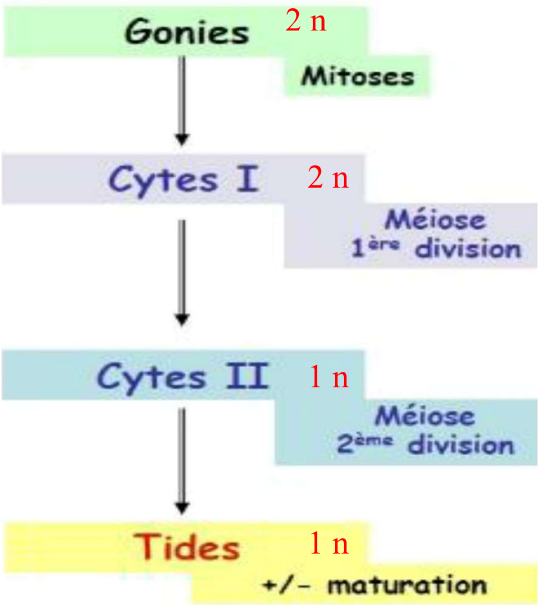
❖ But, common stages exist between spermatogenesis and oogenesis.

❖ Both types possess three main phases:

1 .Period of multiplication: *diploid* germ cells (**-gonia**) divide by mitosis and multiply in number

2 .Period of growth: During these phase **-gonia** grow into primary auxocytes **(-cyteI)**.

3 .Period of maturation:
marked by meiosis. **Auxocytes I** become *haploid*, secondary auxocytes **(-cytes II)**, then, after the 2nd division of meiosis, **-tides**. During this phase, ***cytodifferentiation*** also occurs, leading to anisogamy and resulting in the formation of functional gametes.



Spermatogenesis

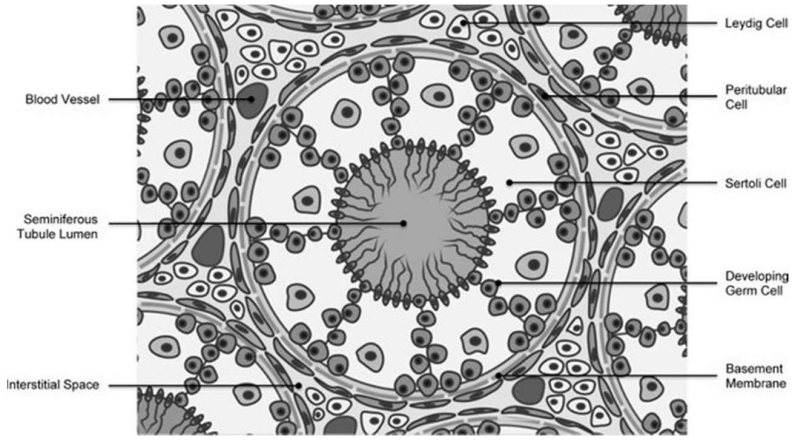
* Sperm formation

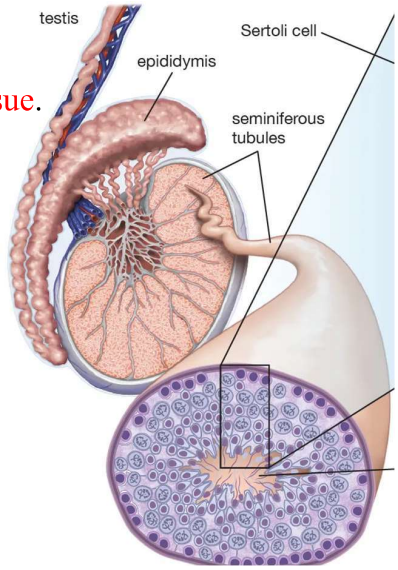
* It occurs in : the wall of the seminiferous tubules (testis)
* In humans this process is **permanent** and **not cyclical**.
* starts at **puberty** and generally continues uninterrupted until death.

There could be a slight decrease in the quantity of sperm with increase in age.

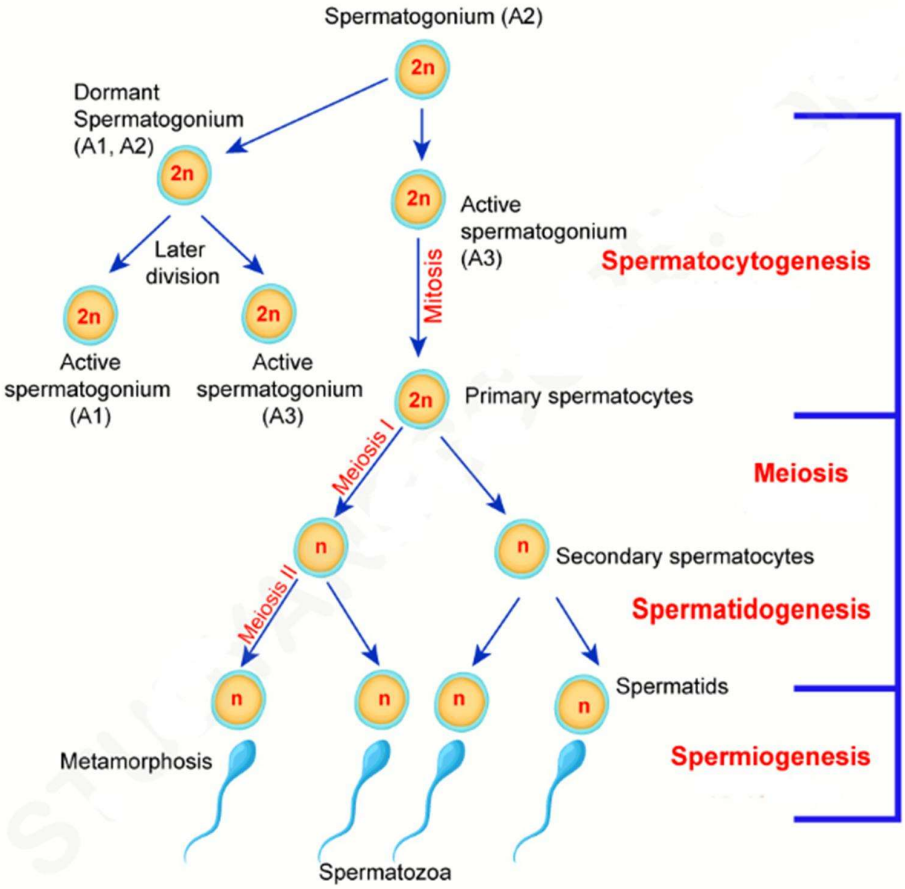
Structure of the testis

Between the seminiferous tubules are clusters of **Leydig** cells associated with blood capillaries in an interstitial in(t)ər'stiSHəl tissue.





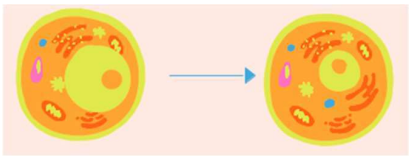
Stages of spermatogenesis



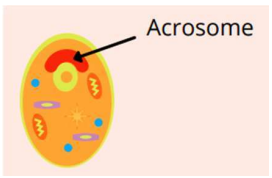
Spermiogenesis

Transformations des spermatides en Spermatozoïdes .

***Condensation du noyau:**
compaction et réduction du noyau, condensation du contenu du noyau à un volume minimal.



*** formation de l'acrosome:**
formation d'un capuchon céphalique (acrosome) contenant des enzymes qui jouent un rôle important dans la pénétration de la zone pellucide de l'ovocyte.



*** formation du flagelle:**
formation de la queue du spermatozoïde

*** Réduction du cytoplasme :**
rejet de tous composants cellulaires inutiles du cytoplasme.

Oogenesis

Definition
Oogenesis is the process of formation of the female gamete, ovum in humans, which is haploid and contains 23 chromosomes.

The formation of **oogonia** starts before birth and ends at the age of 45-50 called **menopause**.

Oocytes
~2 million at birth
~40,000 at puberty
~400 ovulated over lifetime

It occurs in the **ovaries**.

It is a discontinuous process (cyclical), beginning during **foetal** life and ending at the **menopause**.