II. Gastrulation

II.1. The definition:

In this phase, the blastomers will be arranged in a harmonious manner in 3

The embryonic leaves:

The ectoblasty or ectoderm: external leaf

Endoblasty, endoblasty or endoderm: internal sheet

The mesoblast or mesoderm: the average sheet

The embryo becomes tridermic: **stage gastrula**

There are morphogenetic movements: cell movements that they will repair the position of the blastomers in the blastula.

Morphogenesis determines the morphology of the future.

According to the methods of morphogenetic movements, it can be defined there are several types of gastrulation:

A. Gastrulation by invagination (or embolism):

ex. and Oursins.

It concerns embryos with developed blastocells and cells. Endodermic low charged in vitelline reserves, therefore low-volume. The sheet of the cells of the vegetative hemisphere is immersed in the blastocell. It is reduced and tends to disappear. It delimits a second cavity embedded in the

First, the archenteron that opens outside by the blastopore. At the end of

Gastrulation is the transition between the blastopore.

The ectoderm and the invagined leaves, endorderm and mesoderm. The Endoderma limit the archenteron, the mesodermic elements that primitively borders This cavity also migrates between endoderma and ectoderma following they are different with the zoological groups.

B. Gastrulation by epilepsy:

The establishment of the ectoderm and endoderm by recovery movement.

The cells of the endoderm can or can not form the archeron.

It is mandatory during this stage.

C. The Delamination:

blastula, the cells of which are divided by mitoses: the surface cells and the deep cells are formed. The deep cells are separated and migrated into the Blastocole and will form a new layer of cell: the endoderm while the Surface cells form the ectoderm.

D. Gastrulation by Immigration:

A layer of cell surrounding the blastocle (= blastula). Some cells of

This layer in the blastocole and form a new layer:

The endoderm (the same concept as the delamination may not the same process).

E. Gastrulation by polar proliferation:

The blastocole is filled with cells that have concomitated

It applies only to discoblastula (only the cells that cover the blastocoele); this are just those cells that will proliferate and fill the blastocoele. According to the species, these Cells can fully or partially fill blastocoele. (First of the Birds) At the end of the gastrulation, two classes of animals are distinguished:

Diploblastics: consist of two types of tissues:

External or postheral (external or postheral)

Endoderm (internal or internal)

Example: The coelenters (hydres) and sponges.

Triploblastic: appearance of a third sheet between the previous two:

and the mesoderma.

Examples: amphibians, birds and mammals

III. Neurulation and becoming embryonic leaves (organogenesis)

III.1. The definition:

This is the establishment of the nervous system. Part of the ectoderm will thick.

Forming a neural plaque with bullets.

It then forms a neural gout, which will invade until it turns on it.

It also forms the neural tube.

The embryos will change shape (long according to its rear front axis) and go

increase in size. It will be called the neuron. This is the first process. of organogenesis.

III.2. Phases of Neurulation:

Neurulation is done in three stages:

1. Stage of Neural Plaque.

2. The Neural Stage.

3. The Neural Tube.

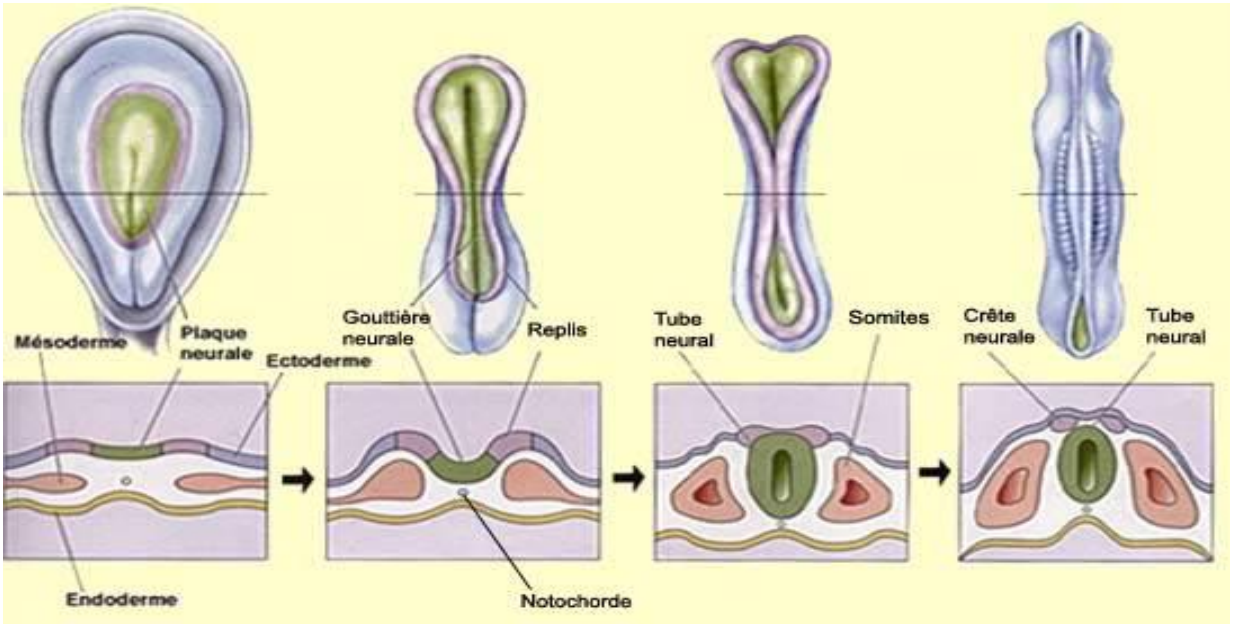

Figure 01: The Three Stages of Neurulation

The nervous system is formed from the neuroblast. This tissue is different from

the ectoblast immediately after gastrulation during the stage called neurulation for

The embryos are called neurula.

At first, the ectoblast has no cell differentiation;

Then the neuroblast is different from the ectoblast, and it will take its place inside of the organism.

The cells of the ectoblastic will begin to proliferate but without the embryos.

increase in size. It will result in a plissure of the tissue at the level of the neuroblast.

The neuroblast gradually invades the embryos.

The ectoblast will proliferate until the lips of the plump join and sweat.

The neuroblast forms now a small tube under the ectoblast, the neural tube, which

It runs through the entire embryo, from the head to the base of the tail. On both sides of the tube

dorsal, forming small cell amounts, fragments of neuroblasts that have not

Not integrated into the neural tube during its formation: the neural crusts. These two formations will have two different destinations:

- The cells of the neural tube will evolve to give the central nervous system,That is, the encephal and the spinal mouth.

Neural crises will not persist in the body. The cells are going migration throughout the body to form very diverse tissues: the system peripheral nerves, surrenaals and melanocytes of the skin.

The nervous system is now in place.

III.3. Being embryonic:

Each type of sheet gives a specific body:

Ectoderm	mesoderm	Endoderm
-Epidermis of the skin and its derivatives (including sweat glands, hair follicles) -Epithelium lining the anterior and posterior digestive tract -Cornea and lens	-Chorde -Squelette -Muscles squelettiques -Muscles du tube digestif -Appareil excréteur	-Lining epithelium of the digestive tract -Lining epithelium of the respiratory system -Lining of the urethra, bladder and genital tract -Liver

-Nervous tissue -Sensory receptors in the epidermis -Adrenal medulla -Tooth enamel -Epithelium of the epiphysis and pituitary gland	-Système circulatoire et Lymphatique -Appareil génital (sauf les cellules germinales qui se différencient en général très précocement dans l'embryon) -Derme de la peau -Revêtement de la cavité Corporelle -Corticosurrénale	-Pancreas -Thymus -Thyroid gland and Parathyroid

Table 01: From the three embryonic leaves all tissues develop

IV. Delimitation and embryonic annexes of birds

IV.1. The Delimitation:

The embryo is delimited by the transition from a triploblastic disc to a substantially cylindrical embryo. This delimitation is achieved by three folds in a transverse plane (transverse fold) and in a longitudinal plane (cranial and caudal folds).

A. The transversal plicature:

In the transversal sense, the delimitation is due to several factors:

• the rapid growth of the derivatives of the ectoblast, of the neural plaque,

which causes a bacterial outbreak of the embryo in the amniotic cavity

• Increased volume of the amniotic cavity

- Stagnation of secondary lecithocele
- The coral sphere, on the contrary, develops little, which requires the embryo and its annexes, especially the amniotic cavity, which develop actively, to take back on themselves.

Thus, the edges of the embryonic disk are pushed back to the ventrale face of the embryo, which determines the delimitation in the transversal direction: the two edges from the embryonic disc joining on the median line, it occurs a welding of the homologated tissues and the embryo is entirely cerned by the ectoderm.

B. The longitudinal plicature:

In the longitudinal sense, the same phenomena are also visible:

Very rapid proliferation of neuro-ectoblast in the cervical region of the embryo Trained

The extinction of the entire cranial end which, under the effect of the push of the cavity

Amniotic, 180° swallowing and immersing under the ventric face;

• Similarly, the rise of the amniotic cavity determines a removal of the region

and caudale.

These two impulses contribute to bringing the cranial and caudal regions closer to

The embryos (longitudinal delimitation).

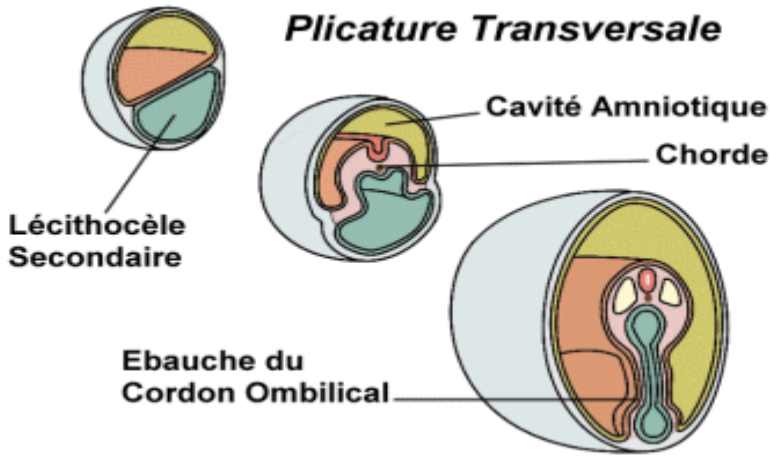

Figure 09: Scheme of the Transversal Plicature

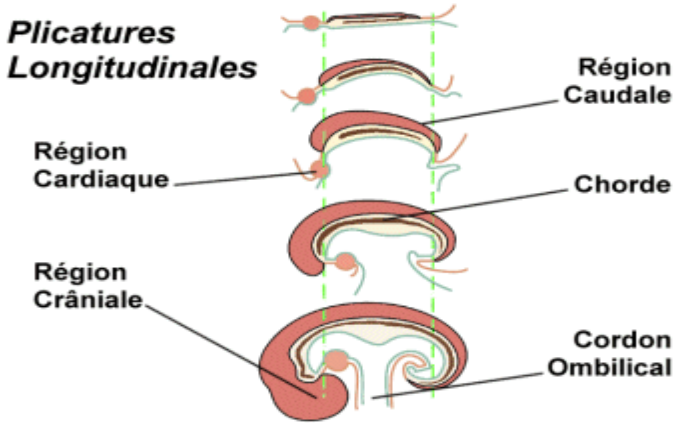

Figure 10: Scheme of the longitudinal plicature

IV.2. Embryonic annexes in birds:

The development of the embryo in birds requires attached structures:

It is located outside the embryonic body. These structures are called annexes.

They develop simultaneously in the embryo itself and in the the extension of its constitutive leaves.These embryonic annexes are transitional structures that will be eliminated at the collapse or during the days to follow.

It is about:

The VITELINE VESICULE

The Amnios

The Alantoid

These annexes ensure the protection of the embryo during its development and development and metabolic autonomy (nutrition, breathing, excretion)

A. The VITELINE VESICULE:

This is the first annex to be formed.This vesicule is the result of extension of the extra-embryonic leaves to the yellow surface.The endoderme is externally doubled by splanchnopleure. When the embryo rises, the previous and subsequent edges of the digestive tube put in place. They will meet each other at the level of the average region of the embryo and finally, the vitelline vesicule will no longer communicate with an embryo only by a vitellin pedicule.

The vitelline vesicule, whose walls are strongly vascularized, represents an organ extra embryonic nutrition. Endodermic cells through enzymes Hydrolytic, will transform the vitellus into assimilable soluble products.

The Amnios and the Serious:

Amnios is a membrane that encompasses the embryo as a bag, separating it from the embryo. the surrounding environment. An amniotic repliance is born in the previous region and then a second will appear in the later area. They are formed by double ectoderm. When the replices fuse, the internal part of the replices will be the amniotic cavity that limits the amniotic cavity. The external part will be serious. Between the Serious Amnios is the extra-embryonal coelum that communicates with the coelum.

Intra-embryonary on the side lames. The amniotic cavity is filled with serosity from dehydration of The album. It has a role in preventing the embryo’s discharge and protecting it.

the allantoid:

It is an endodermic diverticule of the rear intestine. The invasions of The endoderme throws the splanchnopleure in front of them. The alantoid will be formed.

Externally doubled endoderma of splanchnopleure.

The alantoid will understand itself considerably in a way that will surround everything the amniotic and vitelline vesicule, by pulling the album into the small part of the Allantoid has four main roles:

The external and serum allantoid set is the allantochorion which, Extremely vascular, has respiratory function (a number of gas exchanges).

• The close contact of the alantochorion with the shell allows the absorption of salts It will be used to build the embryonic squelette.

• The proximity of the allantoid and the albumin bag allows the absorption of the White: the nutritional role.

• Allantoid stores the products of the kidney excretion.

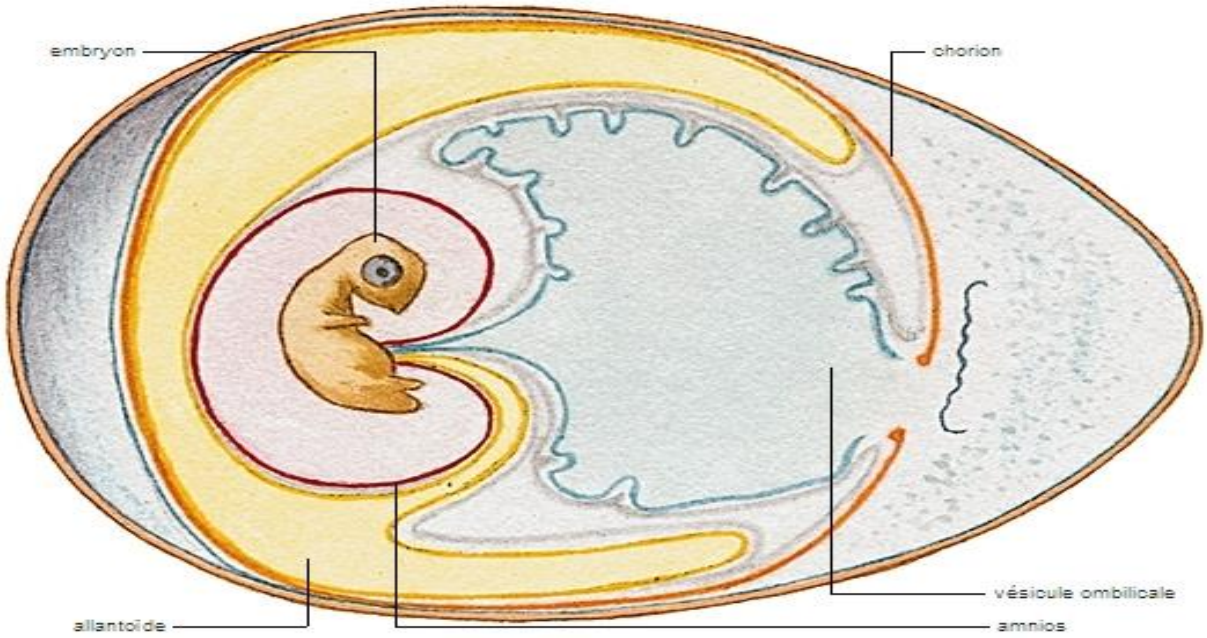

Figure 11: Embryonic annexes of birds

Particularity of human embryology

I. Introduction :

Human development lasts 9 months (39 weeks of pregnancy or 41 weeks)

A single cell will give a newborn 3kg and about 50kg.

The development is made in five stages:

-The zygote fertilization (a fertilized egg) has 2n chromosomes.

-The Segmentation (Succession of Myths)

-Gastrulation (formation of 3 leaves: the 3 definitive embryonic leaves, The embryos will grow.

-Neurulation (SNC = central nervous system)

-Organogenesis (formation of organs)

II. and the nidation:

II.1. Introduction to:

the nidation describes the stage during which a young embryo is implanted in the endometrium of the uterus, in mammals. After the fertilization that takes place In the trumps, the egg cells migrate to the uterus while dividing into two, then Four, eight... The embryo becomes a morula (small mature) on the fourth day following Fertilization and a blastocyste on the sixth day. This includes a cavity.It is called blastocele.

The migration of the young embryo to the uterus is facilitated by contraction of smooth muscle cells and by the movement of the cells of the mucous cell.

In women, the blastocyste is implanted in the uterus on the seventh day following the Fertilization is the nidation.

2. Becoming a trophoblast:

During the first half of the 2nd week (7 to 10 days), the blastocyste penetration into the wall of the uterine mucosa (or endometrium).Within the contact zone with the uterine mucosa, the trophoblast goes to proliferate. The layer of the internal cells (the closest to the center of the blastocyste) It remains compact and the cells are well individualized.

Penetrating more and more deeply into the mucosa, cells emitted to from the cytotrophoblasts proliferate and are the source of a synthetic tissue (core) separate and grouped without individualized membranary limits) (Syncytiotrophoblasty) The syncytiotrophoblast gradually invades the entire wall of the endometrium and comes to dissociate the transformed cells from the uterine mucosa (Decidal cells) as well as the maternal vascular spaces (blood sinuses).

The cytotrophoblast + the syncytiotrophoblast + a component of the mesoblast extra-embryonary will form expansions, the coral villosities penetrating the maternal sinus and the origin of the formation of the placenta.

After leaving a transitory scarring (fibrine shell) at the level of implantation in the mucosa, the embryo through the trophoblast It is completely nested in the uterine wall.

3. Pregnancy and nidation:

As soon as the nidation occurs, the embryo begins to produce a hormone: hCG. (Human chorionic gonadostimulin), which has a similar action to that of LH. hCG allows the body to maintain yellow and the production of progesterone. thanks to the action of the hCG hormone, the uterine mucosa isined and the menstruation will not This is the beginning of pregnancy.

4. The evolution of the annexes:

There are two types of structures that can be distinguished from organogenesis:

1. Individual systems and organs (which allow the individual to survive in the world)

and external).

2. Embryonic annexes: specific structures facilitating the development of the embryo by providing protection, nutrition and storage of waste.

The embryonic annexes are made up of extra-embryonic tissues.Continuity with the embryos. It allows the vascular relationship between The embryos and the external environment. It is the vitelline vesicule (nutrition), the amniotic (protection and hydration) and allantoid (respiration and accumulation of waste). The mammals are also characterized by the presence of the placenta.

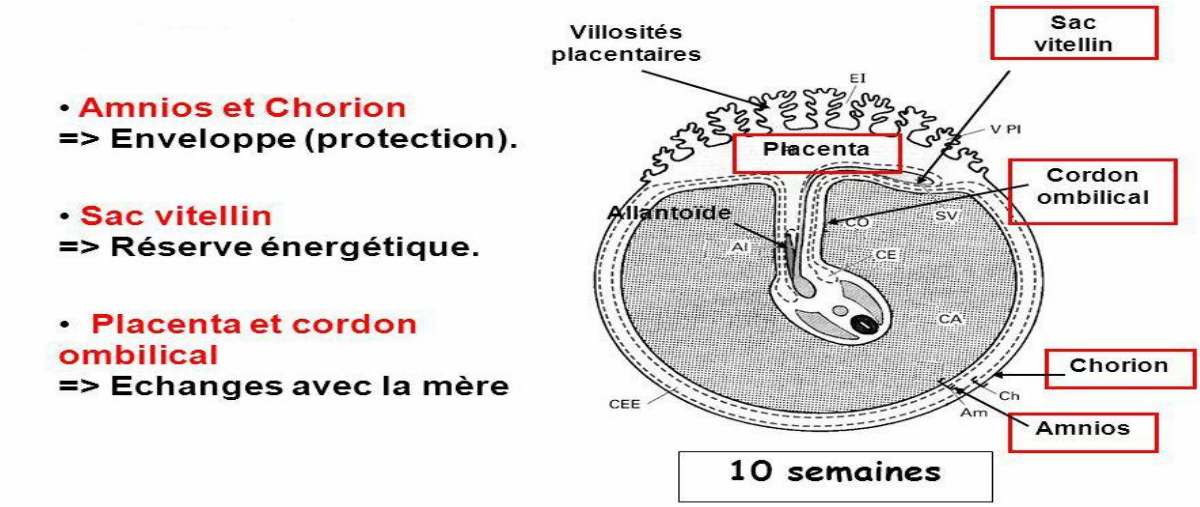

Figure 1: Embryonic annexes of the human embryo

A. The chorion is the most external membrane. This membrane provides direct contact of the embryos with the uterus. The corion participates in the training of the placenta.

B. Amniotic: membrane that delimits the amniotic cavity in which the amniotic cavity is located.

An amniotic fluid that covers the inner wall of the placenta. The membrane Amniotics surround the embryo. This fluid and this fluid are and functions:

The absorption of shocks

Protect the fetus from dehydration

Ensure the freedom of movement of the fetus

- to dilate and lubricate the pelvic canal during release in mammals.

C. Allantoid: Participates in the formation of the placenta.

Allantoid stores the products of the kidney excretion.

D. Placenta: provides the exchange between the mother and the fetus.

E. Vitelline vesicule: is the nutrient organ by excellence in derived embryos Eggs It surrounds the vitelline reserves ("the yellow") of the egg and develops the system. Vitellin blood is responsible for the nutrition of the embryo. In the mammals placenta, the vitellin bag appears, but does not develop or little, it regresses the development of allantoid. It does not contain any nutritional reserves; theVitellin bag is absorbed in the abdominal cavity shortly before the clot.

F. The ombilical cord: it connects the placenta to the fetus.

II. 5. the placenta:

The placenta is a transitional organ necessary forining the gestation,Method of physiological exchanges of the fetus. It is an organ of origin and fetal. The phyto-placental complex is a natural allograph that is resistant to rejection. The Corion swim directly in the mother's blood without tissue interposition.

A.Origin of the placenta

Placenta is derived from the peripheral or trophoblastic cell layer.Cover the egg at the time of nidation.

B.The development of the placenta edema

The trophoblastic tissue emits more and more prolongations that They ramify and form important villosites. Maternal blood from Open arteries circulate in a series of spaces called maternal blood lakes.

The capillaries connect to a vascular network that connects to the large vessels to reach the ombilical cord and then to the embryonic circulation This is the possibility of mutual exchange between fetal and maternal blood level of blood lakes.

C.Functions of the placenta

The placenta is a temporary organ, expelled after childbirth. It ensures them Interchange between the mother and the future baby. Especially through him that The oxygen and nutrients necessary for fetal development are transmitted. The Placenta is also a protective barrier for the fetus: various agents Pathogens and dangerous substances cannot pass through it. However, he can not stop everything: alcohol, for example, can still wait for the fetus. and finally,The placenta produces various hormones necessary for fetal development and lactation.

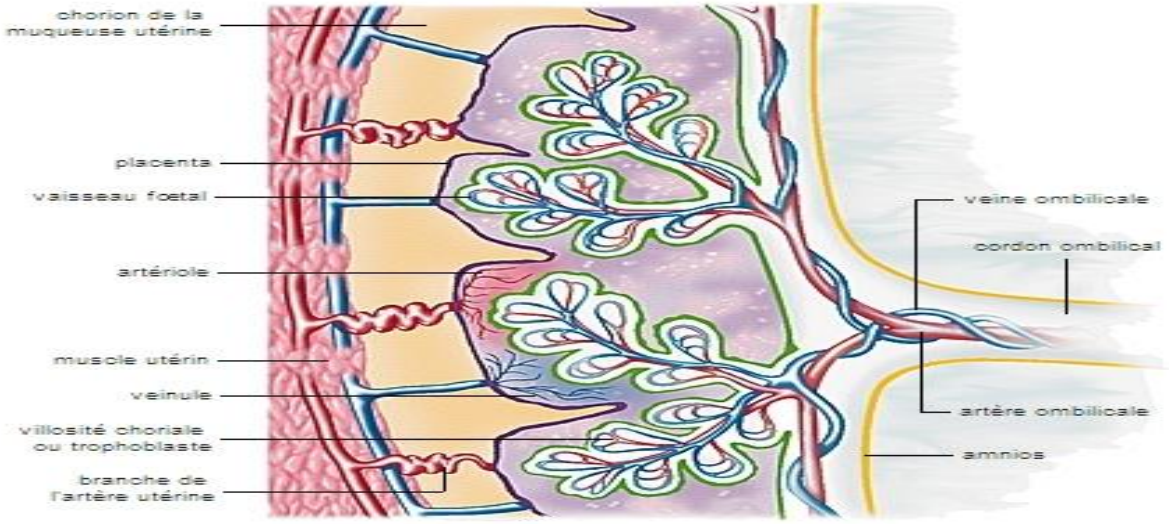

Figure 2: The Placenta Cup