Chapter VI. Embryology

I. General:

Embryology: it is the study of the development of the embryo, it is the study of the Ontogenesis of the living being.

Ontogenesis: This is the set of steps that allow a fertilized egg (zygote) to result in a Adults able to reproduce.

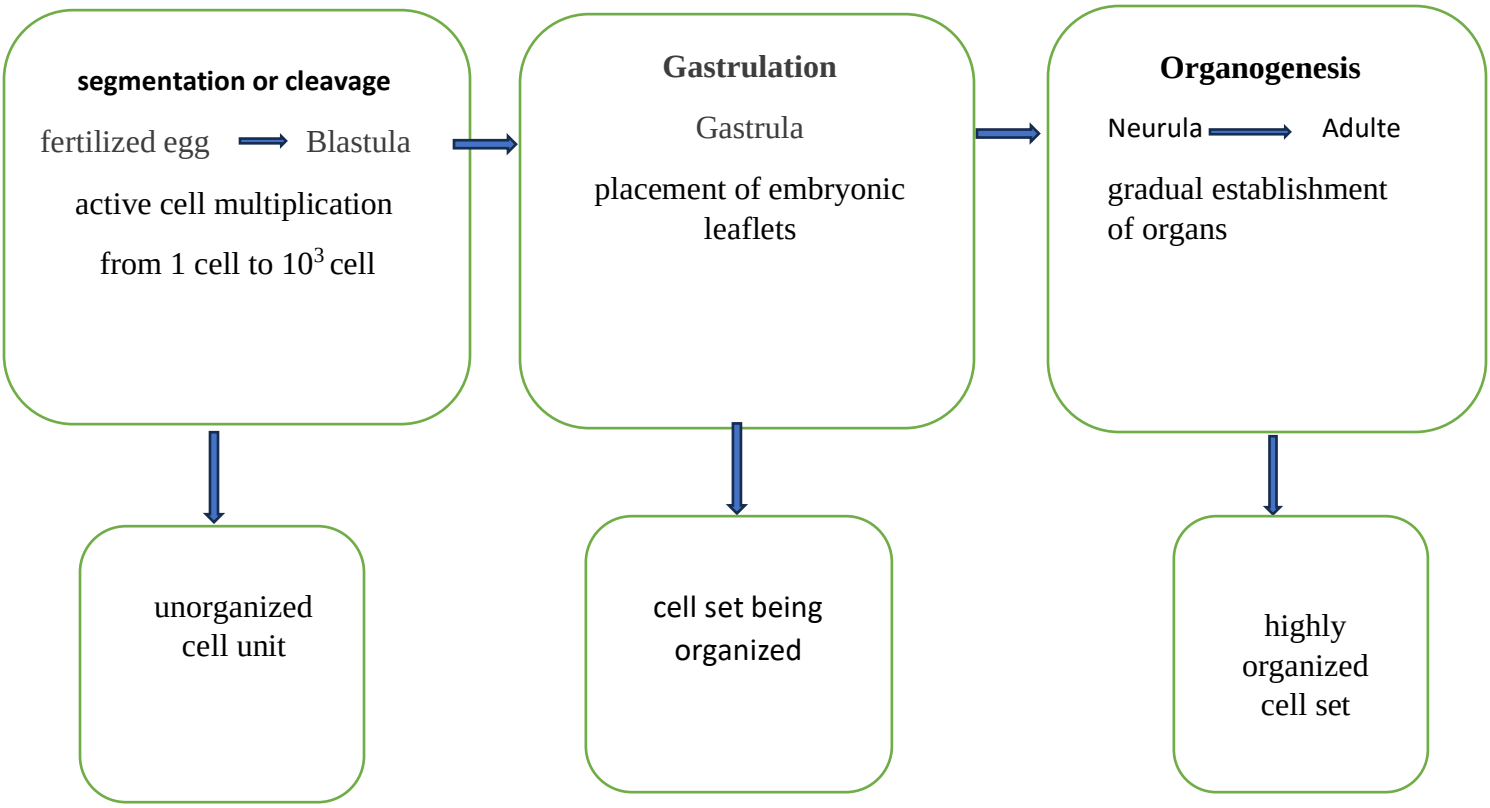


Figure 01: Main stages of embryogenesis

The Segmentation

A. The definition:

Fertilized eggs will suffer a series of cell divisions during their migration in the uterine trick. this process is called segmentation.

B.The stages of segmentation:

On the first day of embryonic development, the first cell division divides the

Zygote in two blastomers.

On the second day of development, the embryos are composed of four cells.

On the third day of development, the embryo contains eight blastomers.

On the fourth day of development, the embryos are presented in the form of a mass. the full cell is called Morula.

On the fifth day of development, the liquid begins to accumulate within the Morula forms a cavity called blastocele.

In the sixth day of development, the embryos appear as a sphere. It contains approximately 100 cells called blastocyste. The blastocyste is made up of 2 cell groups:

• Separative peripheral cells: these cells form the trophoblast. The Origin

nutrient tissues, which will become the placenta;

• Larger and more central cells, forming the embryonic button, It will become the embryos itself.

It is at this stage that it enters the uterine cavity and begins to implant in it.

The endometrium. The implantation allows the embryo to be connected to the maternal body.

This means that they have a nutritional exchange to continue.

and development.

Before implantation, the pellucide area breaks down and the embryo is then released.

On the 7th day, the trophoblast is implanted in the uterine mucosa.

At the embryonic button level, a cell sheet is already distinguished:

and endoblast.

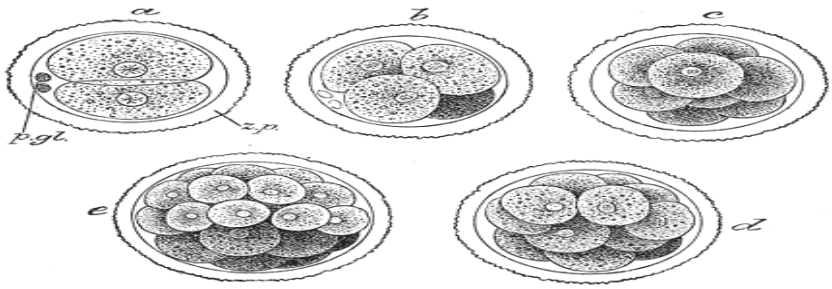


Figure 2: The Segmentation

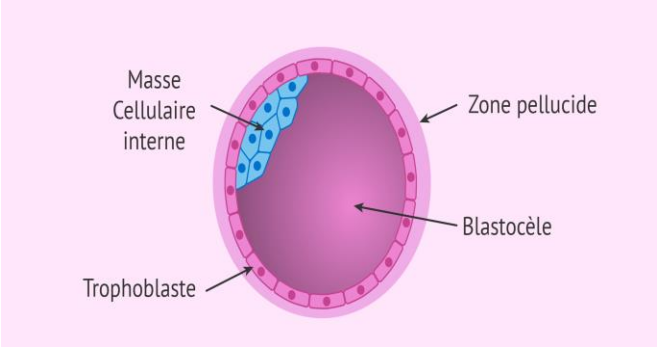


Figure 03: Structure of the embryos at the stage of the blastocyste

C.Different types of eggs:

Depending on the amount of vitellus, there are 5 types of eggs:

Alecithe: no vitellus.

Oligolecite: a few vitellus.

Heterolecite: a significant amount of vitellus.

Centrolecite: the vitellus is concentrated at the top of the cell.

Telolecite: a significant amount of vitellus.

D.The different types of segmentation:

The segmentation mode depends on two main parameters: the quantity and the distribution of the vitellus in the egg, during the ovogenesis, the ovocytes this charge of the nutrient made up of lipid and carbohydrate protein, this substance is called “vitellus”.

According to the reference types of eggs, two major types of segmentation are observed:

Total segmentation and partial segmentation.

A. Total segmentation (holoblastic): The whole cell is divided.

It can be:

1. Total equal: The divisions relate to the whole germ and all the Blastomers are the same size (alecithic and oligocithic eggs)

2. Total inequal: The divisions affect the whole germ but it leads to the formation of large blastomers or macromers and Small blastomers or micromers (the heterolecite eggs).

B. Part segmentation (meoblastic): only a limited part of the Cytoplasma, characterized by poverty in vitellus, is divided (the eggs Centrolecite and telolecite).Notice: regardless of the type of segmentation, a gen is obtained at the end. It is called “blastula”.

The methods of segmentation:

1**. The total segmentation** is Fig.05.

The total segmentation can be of 4 types:

Radial, Spiral, Bilateral and Rational

A. Total Radial Segmentation: The First Two Division Plans are meridians and perpendicular to each other in such a way that after There will be four cells of the same size. This type of segmentation

For example, it is observed in Echinoderms (oursin) and Amphibians and Xenope.

B. Total Spiral Segmentation: In this case, in each division cycle the zones rotate by angles of 45° compared to the PA-PV axis. This type of the segmentation is observed, for example, in the Annélides (Sangsue) Escargot and the Mollusks (Moules).

C. The Bilateral Total Segmentation: The Bilateral Symmetry Plan

Two axes:

- Anteropostory axis (or animal/vegetative pole axis in the case of

  and embryos)

D. Total Rational Segmentation: Contrary to Radial Segmentation

The second division is meridian and is perpendicular to each other.

The 1st Southern Division follows a 2nd Division or one of the blastomers it is divided according to the equatorial plan and the other is divided according to the meridian plan.

It is observed in mammals and nematodes .

2. Part segmentation: Fig.06.

A. Part discodal segmentation:

In the case of telolecithic eggs the segmentation divisions do not take place in a small cytoplasmic enclave (vitellus absent); there is the formation of a blastoderm.

B. Peripheral or surface segmentation:

In the case of an egg centrolecithe the cell divisions and the different generations Blastomers are located on the surface of the germ.

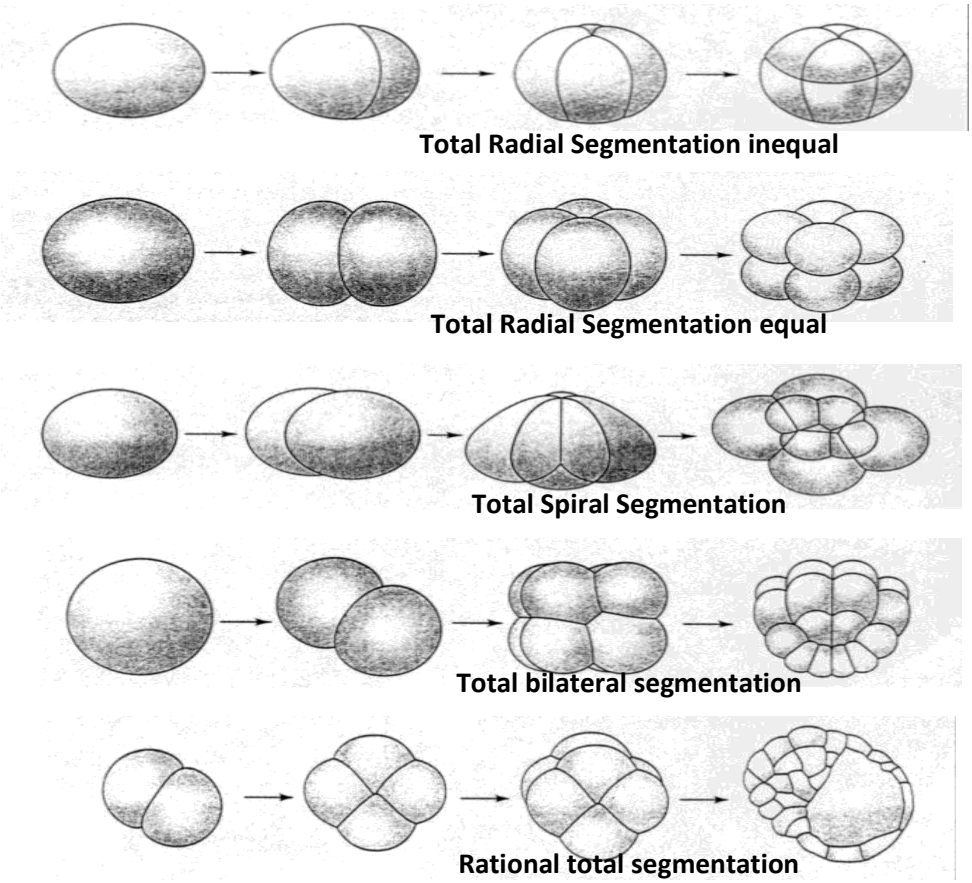
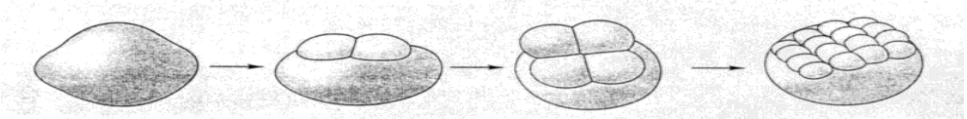
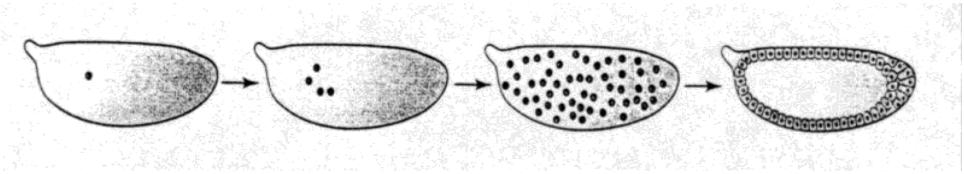


Figure 05: The methods of total segmentation





Superficial partial segmentation

Figure 06: The methods of partial segmentation