

# DEVELOPMENT



- **After fertilization a diploid cell forms which is called zygote.**
- **Zygote develops into new organism in anywhere.**
- **This process is called development.**

# Animal Development

- In animal development, there are four steps. These are:

- Cleavage

- Morula

- Blastula

- Gastrula

- Organogenesis

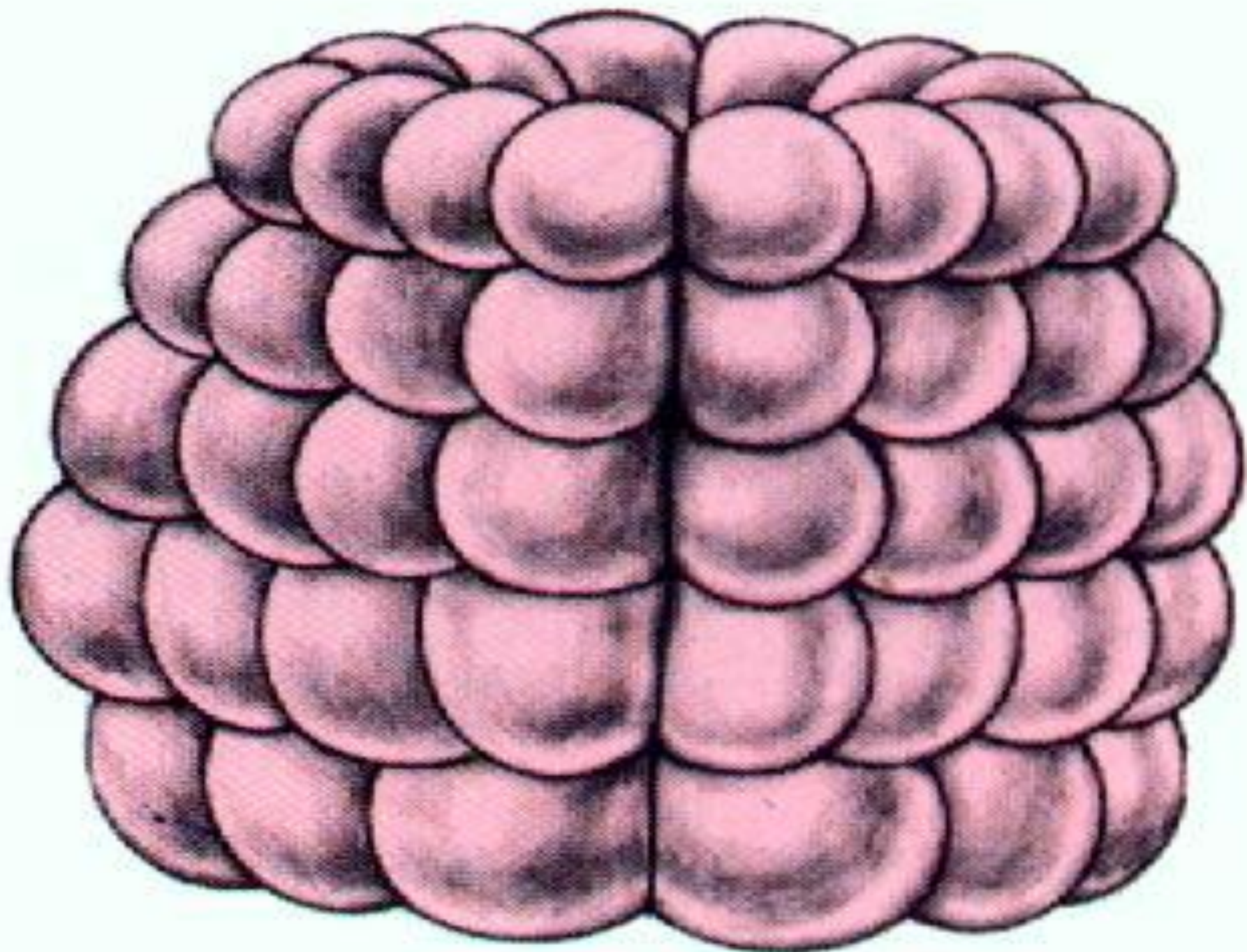
# cleavage

- After fertilization, zygote starts the first of mitotic cell division.
- Formation of two cell from zygote is known as **cleavage**.
- These cells are called **blastomers**.



# morula

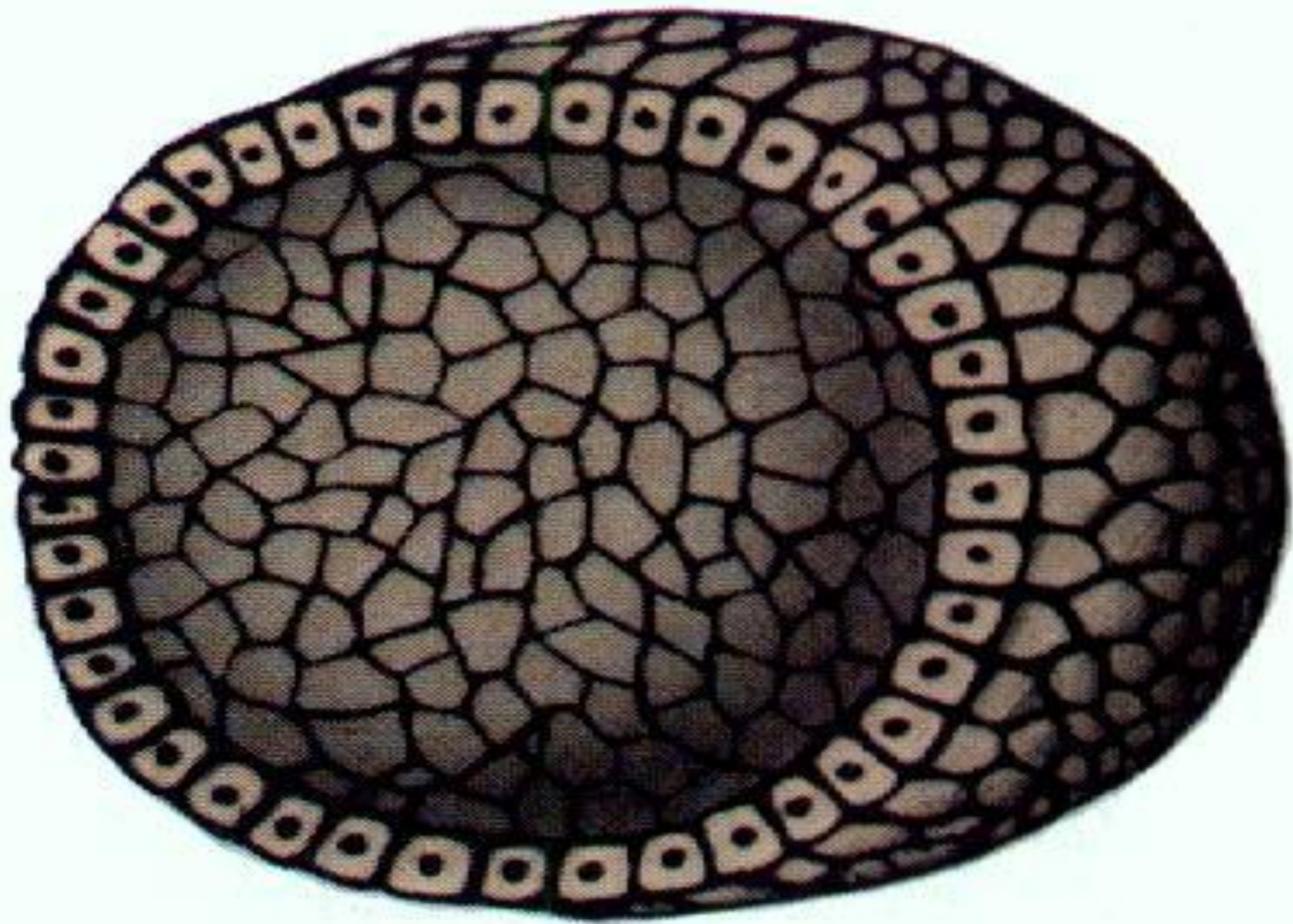
- Each blastomere divides repeatedly until 32 cells are formed.
- This group of cells is called morula.



# blastula

- **After morula, cells continue divide mitotically and forms ball like structure which is called blastula.**
- **In blastula, several hundered cells are formed around a cavity filled with fluid.**

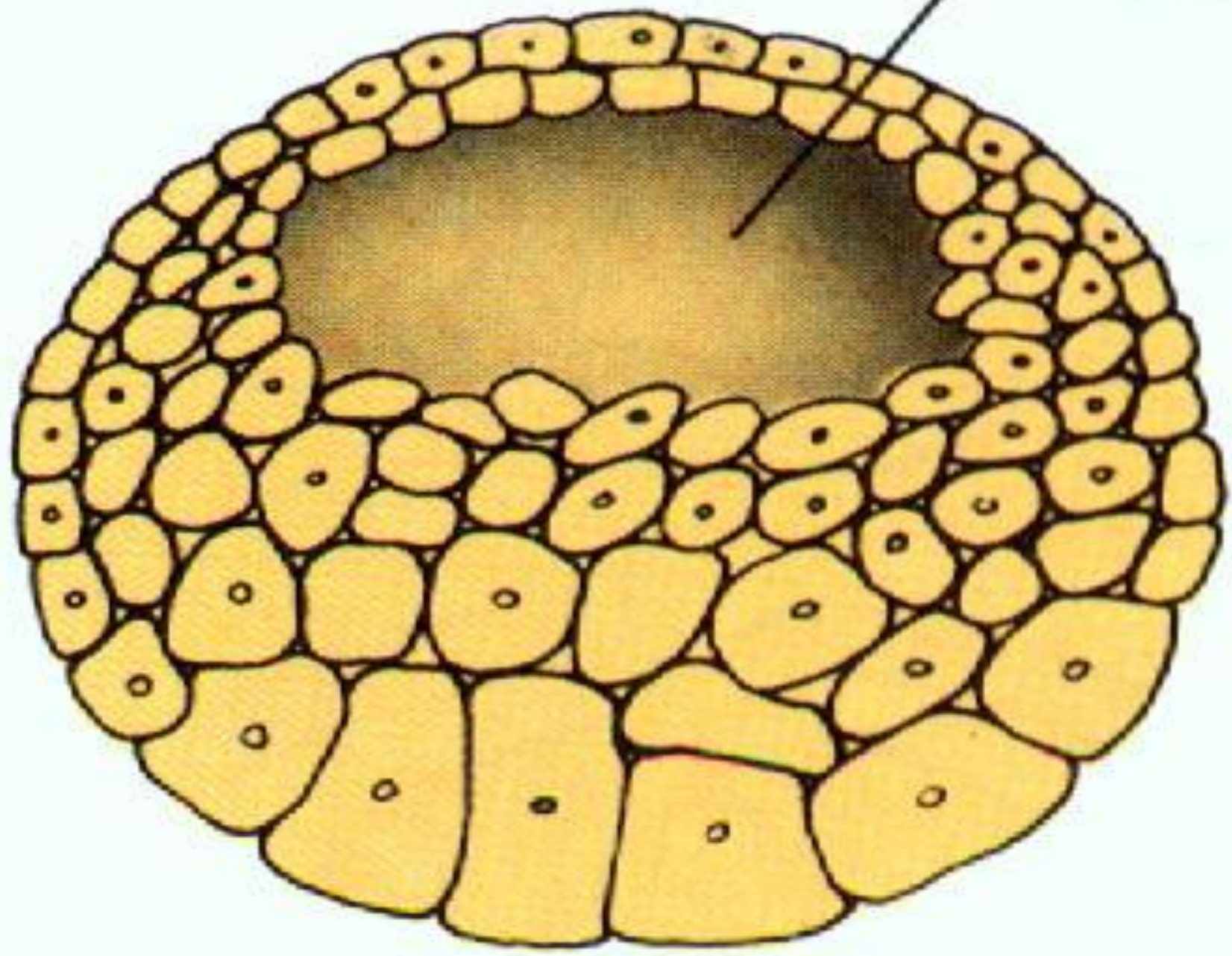




# GASTRULA

- After blastula some cells migrate. Inner portion of ball and 3 different layer are formed.
- This three layered structure is called **blastula**.
- These layers are **Endoderm, Ectoderm and Mesoderm**.

blastocoe



# Organogenesis

- After formation of these layers each layer differentiate into organs and tissues.
- This process is called differentiation.

# **During differentiation**

- **Ectoderm develops into ;  
Endocrine glands,  
Nervous system, and Skin.**

- **Mesoderm develops into;  
Blood, Skeletal system,  
Muscles, Circulatory system,  
Excretory system, and Gonads.**

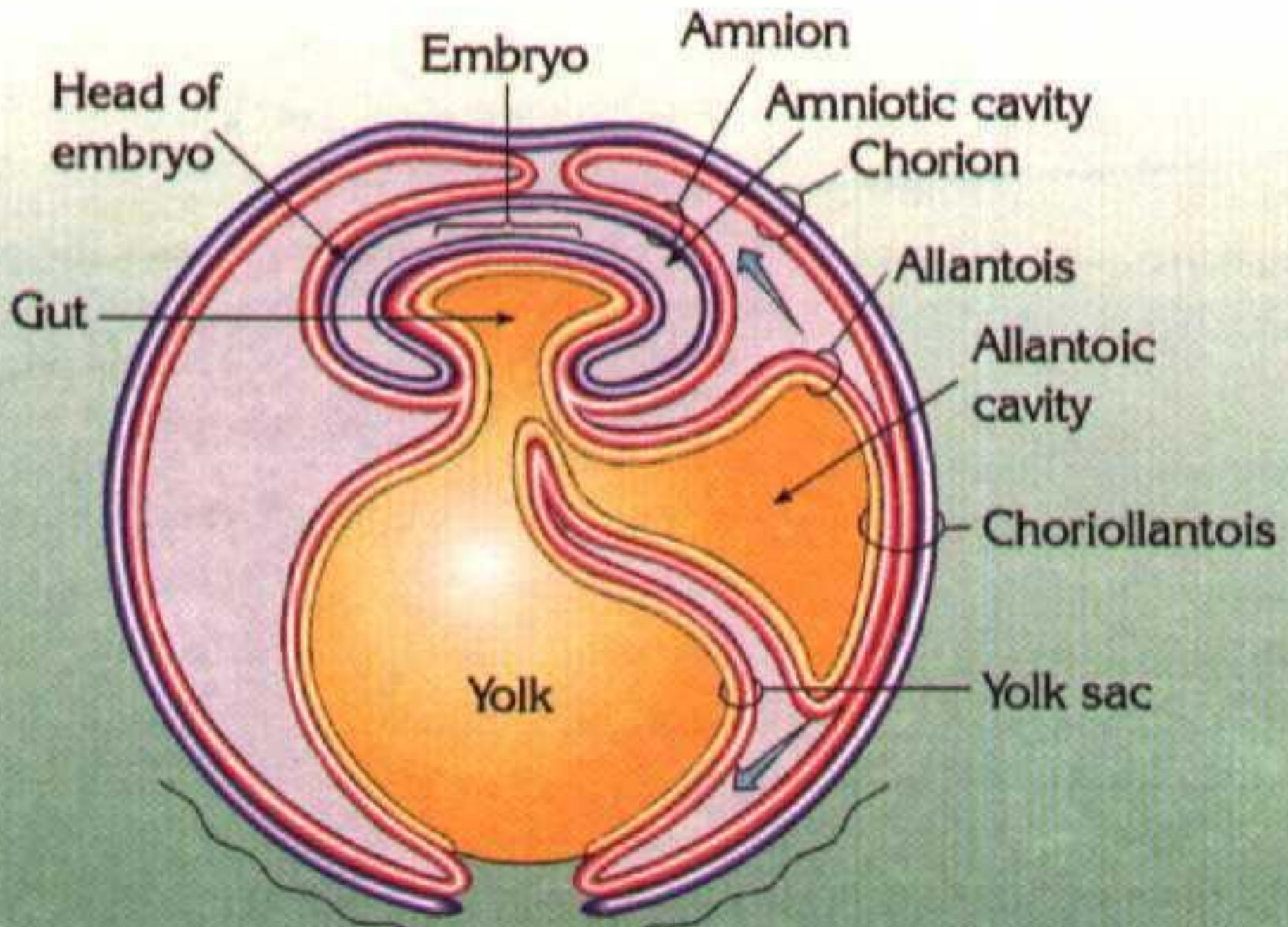
- **Endoderm develops into;  
Digestive system, respiratory  
system, pancreas and liver.**

Extraembryonic

# Membranes

- **1. Shell: Some animals lay egg with shell. Shell contains  $\text{CaCO}_3$  and it protects the embryo.**
- **It forms in oviduct after fertilization which is impermeable to water but permeable to gases.**
- **Shell is seen in reptiles and birds.**





# The Chorion

- It is located under the shell.
- Chorion allows gas exchange.

3. The Allantois: It is a sac which stores excretory substances.

- It is large in reptiles and birds and small in mammals.

# Vitellus (Yolk Sac)

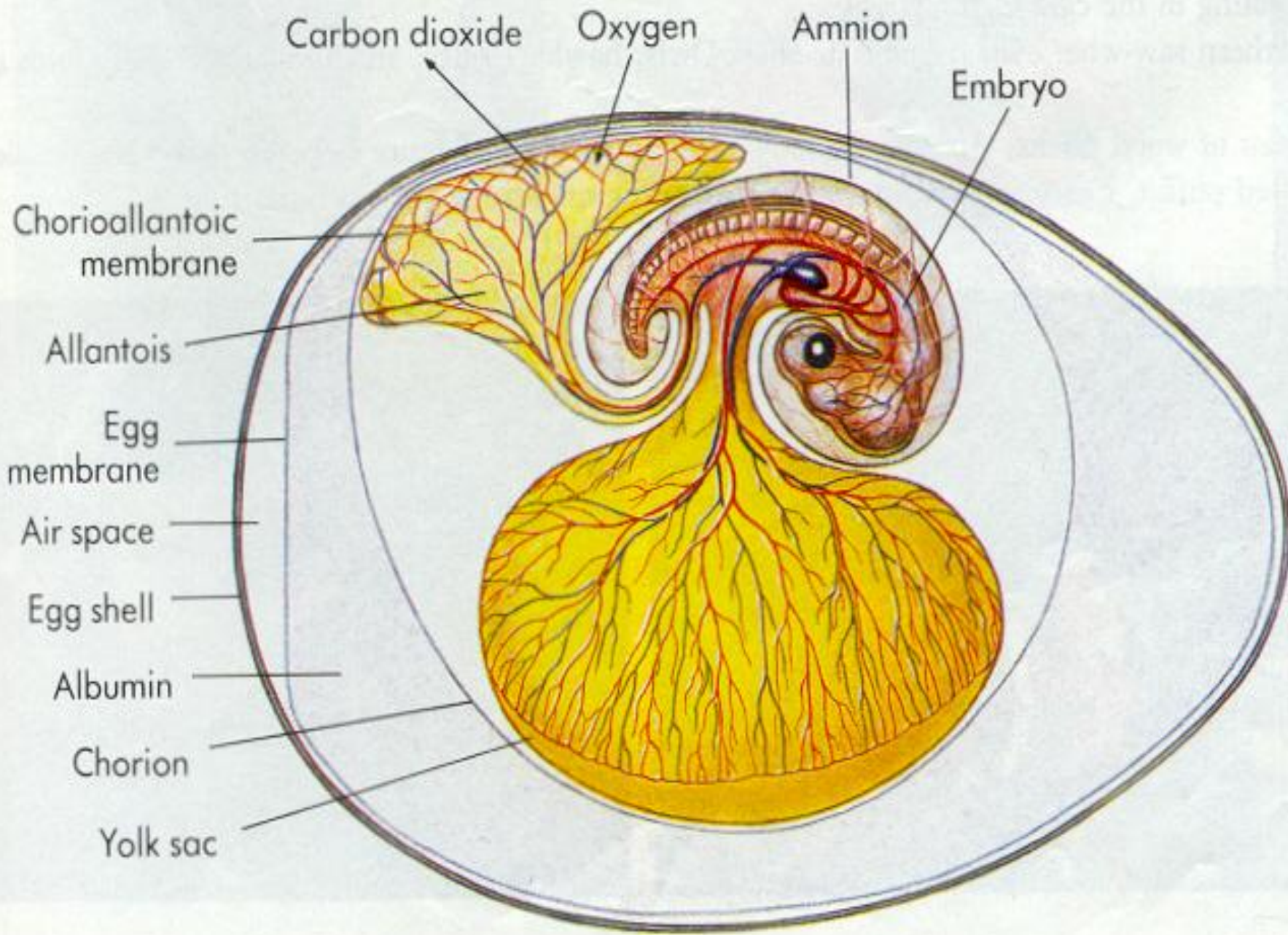
- **Yolk sac store protein, lipid and carbohydrates.**
- **It is large in reptiles and birds. But small in mammals. Because mammals embryo take nutrients from its mother.**

# The Amnion:

- Amnion is filled by amniotic fluid.
- It supports the embryo.

6. Placenta: Placenta is a link between embryo and mother which nutrient, and gases may pass.

- It has rich small blood vessels.



DEVELOPMENT

in

HUMAN

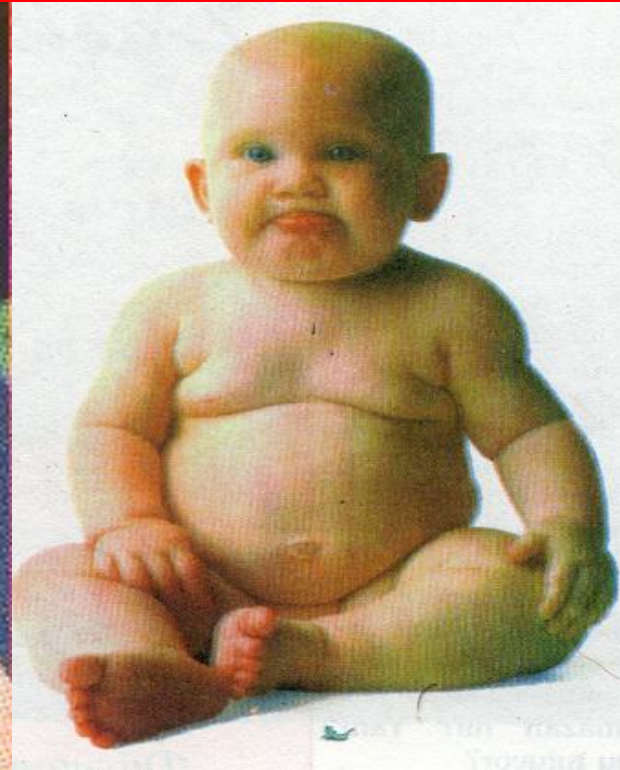
- **In human fertilization occurs in the fallopian tube.**
- **After fertilization, zygote starts division mitotically. However it is moved toward uterus by cilia.**

• **Implantation takes place 7 days after fertilization in uterus.**

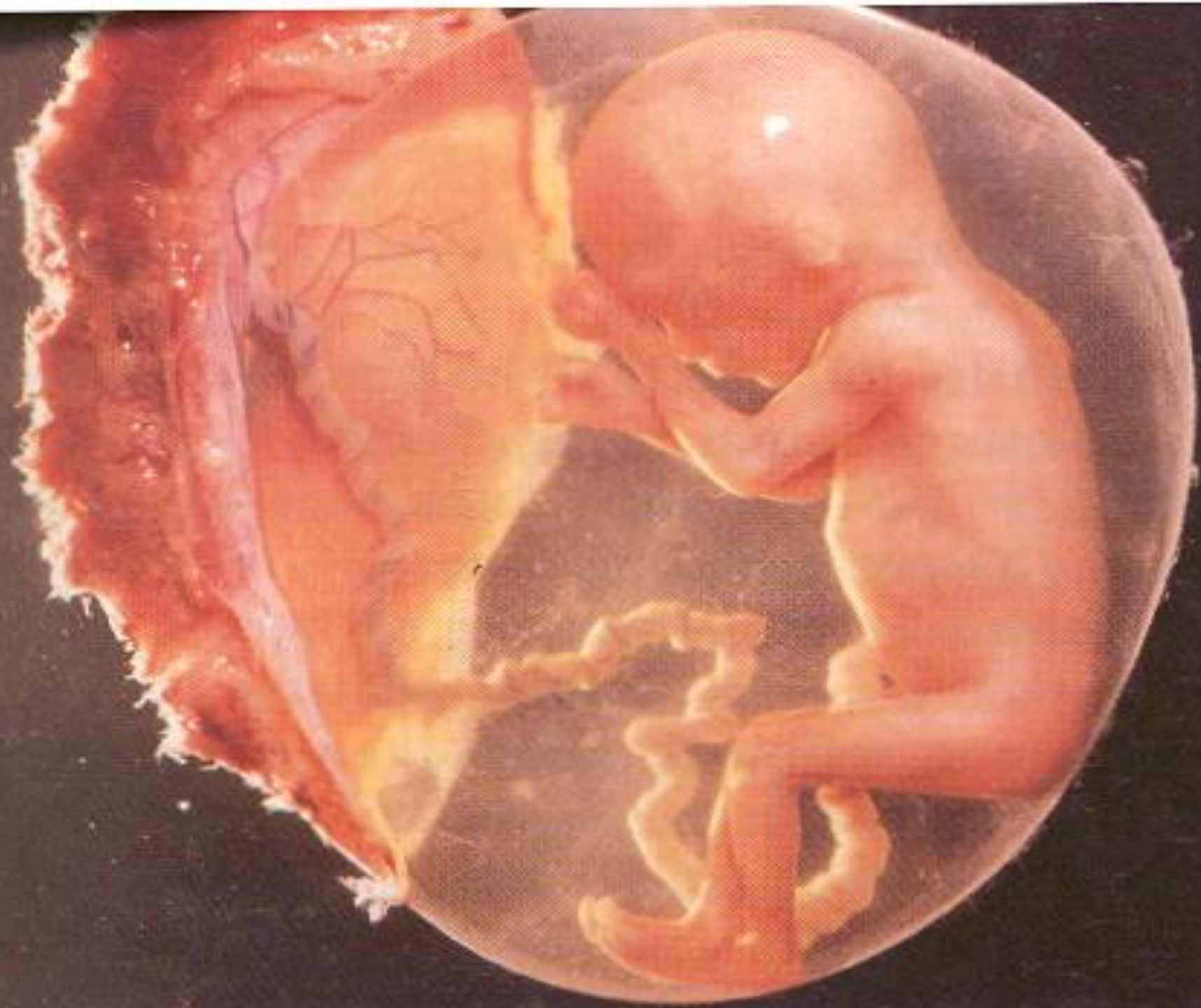
**In first months placenta forms.**

**Also after 266 days**

**child birth.**







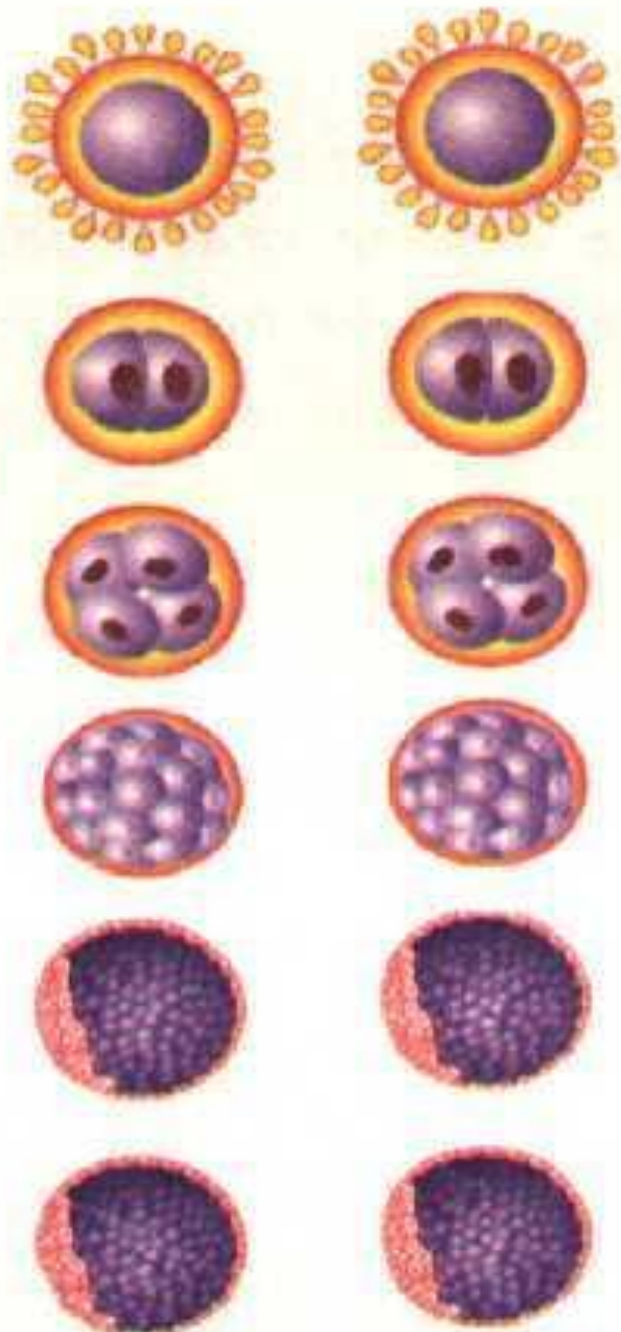
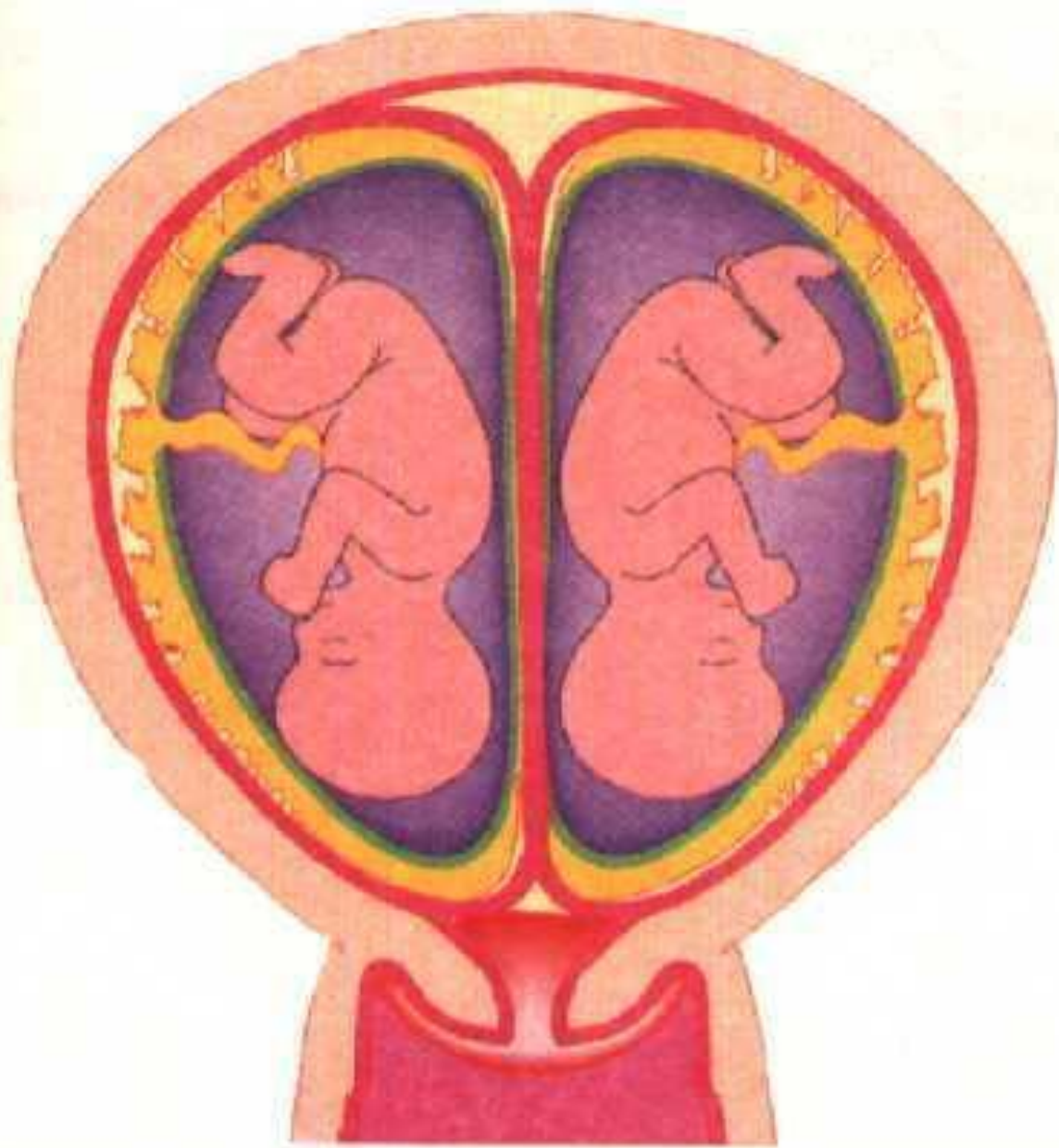
# MULTIPLE BIRTHS

- **A) FRETERNAL TWINS:**

In some woman both of two ovary produce egg in month.

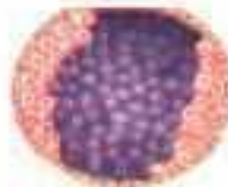
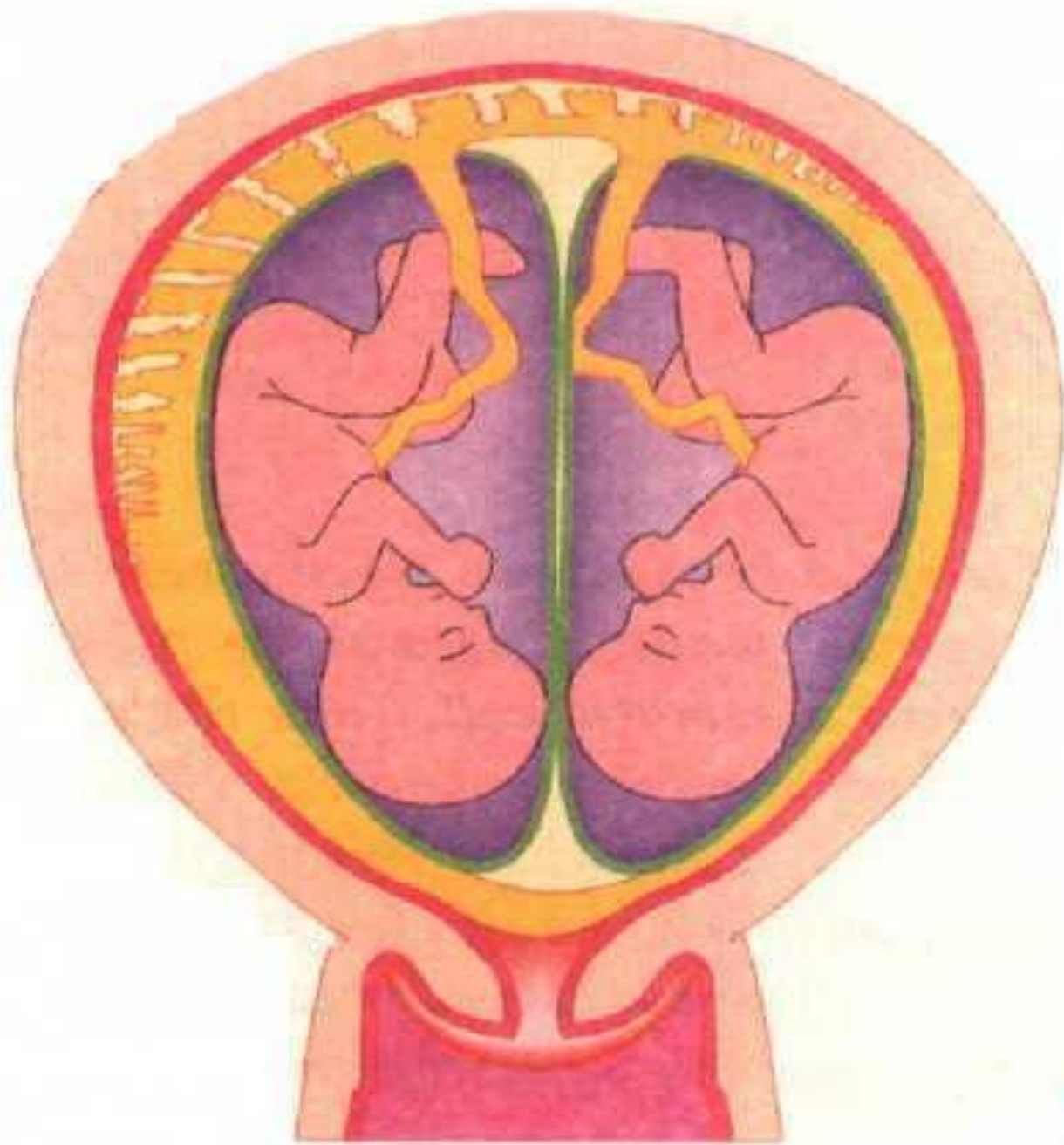
- **If there are sperms in oviduct at ovulation time. Two eggs are fertilized by two different sperms.**

- **They implant at different sites of uterine wall and develops independently.**



# IDENTICAL TWINS

- **After formation of zygote from one egg and sperm. It divides mitotically.**
- **Group of cell splits into two parts in blastula stage.**
- **Each group of cells develop into a child independently.**
- **Identical twins have identical properties.**





# WONDERFULL

## facts

About Reproduction

- **The offspring of Black Bear is about 300 grams at birth.**
- **The heaviest offspring is African Elephant, 110 kilograms.**
- **The smallest offspring is Kangaroo, 0,75 grams.**



- **The longest gestation periods of development is seen in Indian Elephant, 607-641 days.**
- **The least gestation periods of development is seen in Opossum; 13 days.**

- **The mice reach the ability to reproduce 35-49 days after birth.**
- **The whale can reach the ability to reproduce 6-12 years after birth.**
- **Human can reproduce 12-15 years after birth.**

- **The highest number of offspring in one birth is seen in rabbits;  
–15 offsprings in one birth.**

