

# FERTILIZATION

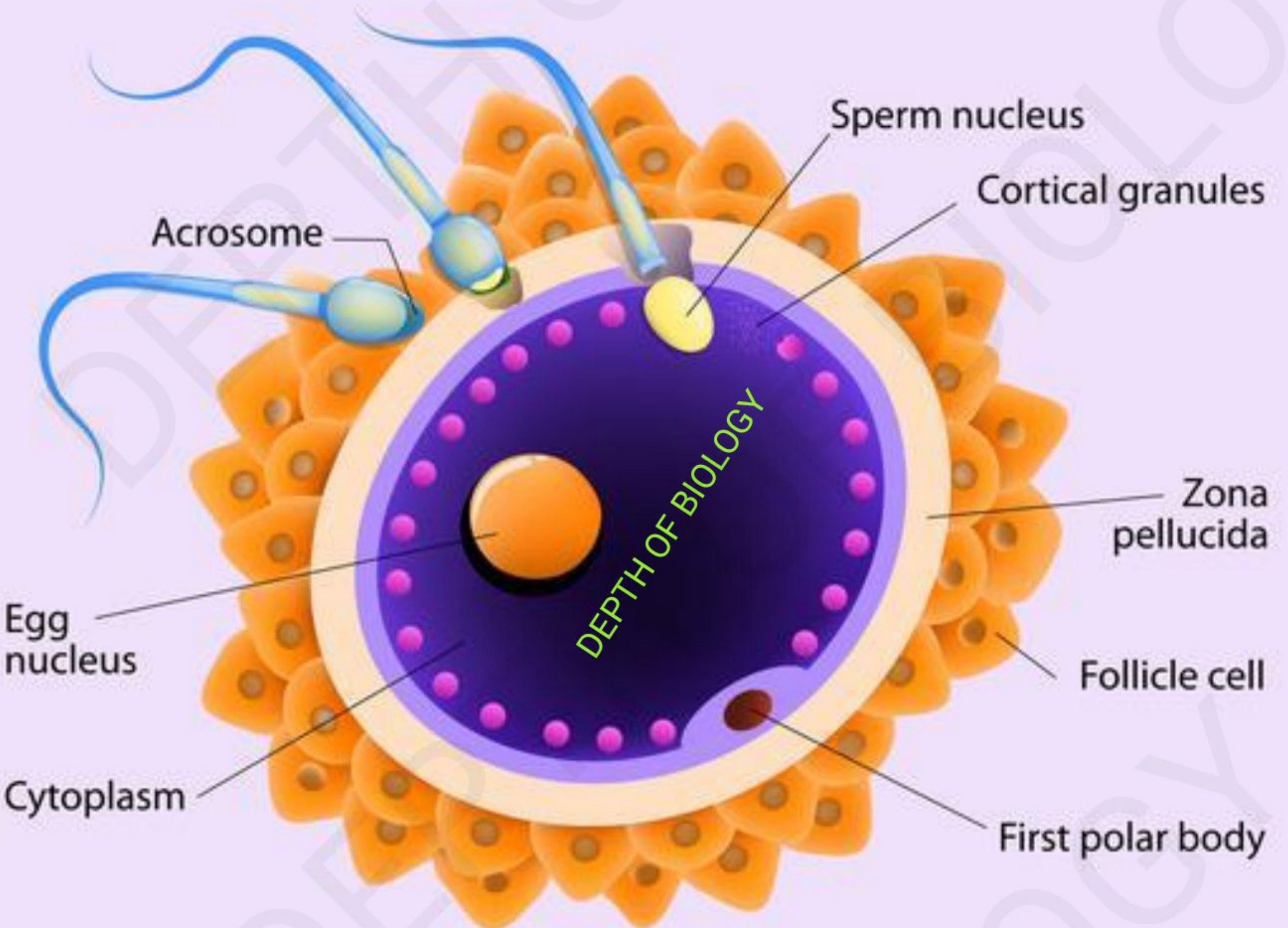
{DEPTH OF BIOLOGY}

- The process of fusion of sperm with an egg is known as fertilisation
- During copulation, semen is released into the vagina. The motile sperm swims rapidly to reach the ampullary-isthmus junction (site of fertilization)
- The acrosome of the sperm contains certain enzyme **hyaluronidase**.
- These lysins dissolve the egg envelopes and help in the penetration of sperm.



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# FERTILIZATION



# Cortical reaction :

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- After the entry of sperm into the egg, the egg shows a cortical reaction to prevent the entry of more sperms.
- In this reaction, the cortical granules which are present beneath the egg's plasma membrane release some chemical substances. {DEPTH OF BIOLOGY}
- These substances elevate the vitelline membrane above the egg surface. The elevated vitelline membrane is called the **fertilization membrane**.

# IMPLANTATION

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- As the zygote moves towards the uterus, the mitotic division starts and because of cleavage, it changes into 2, 4, 8, 16 celled **blastomeres**.



ZYGOTE



2 CELL STAGE



4 CELL STAGE



8 CELL STAGE



MORULA  
(72 HOURS)

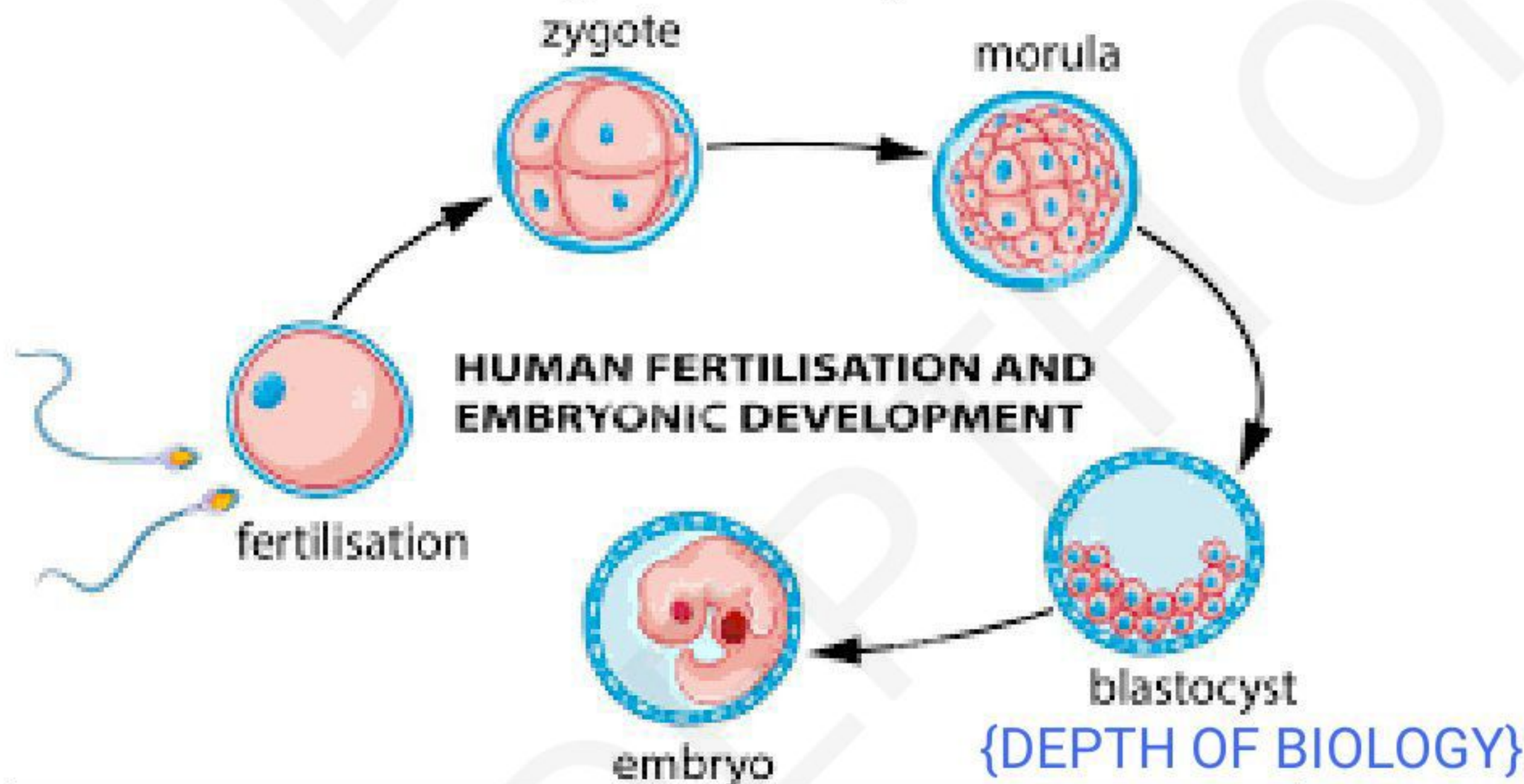


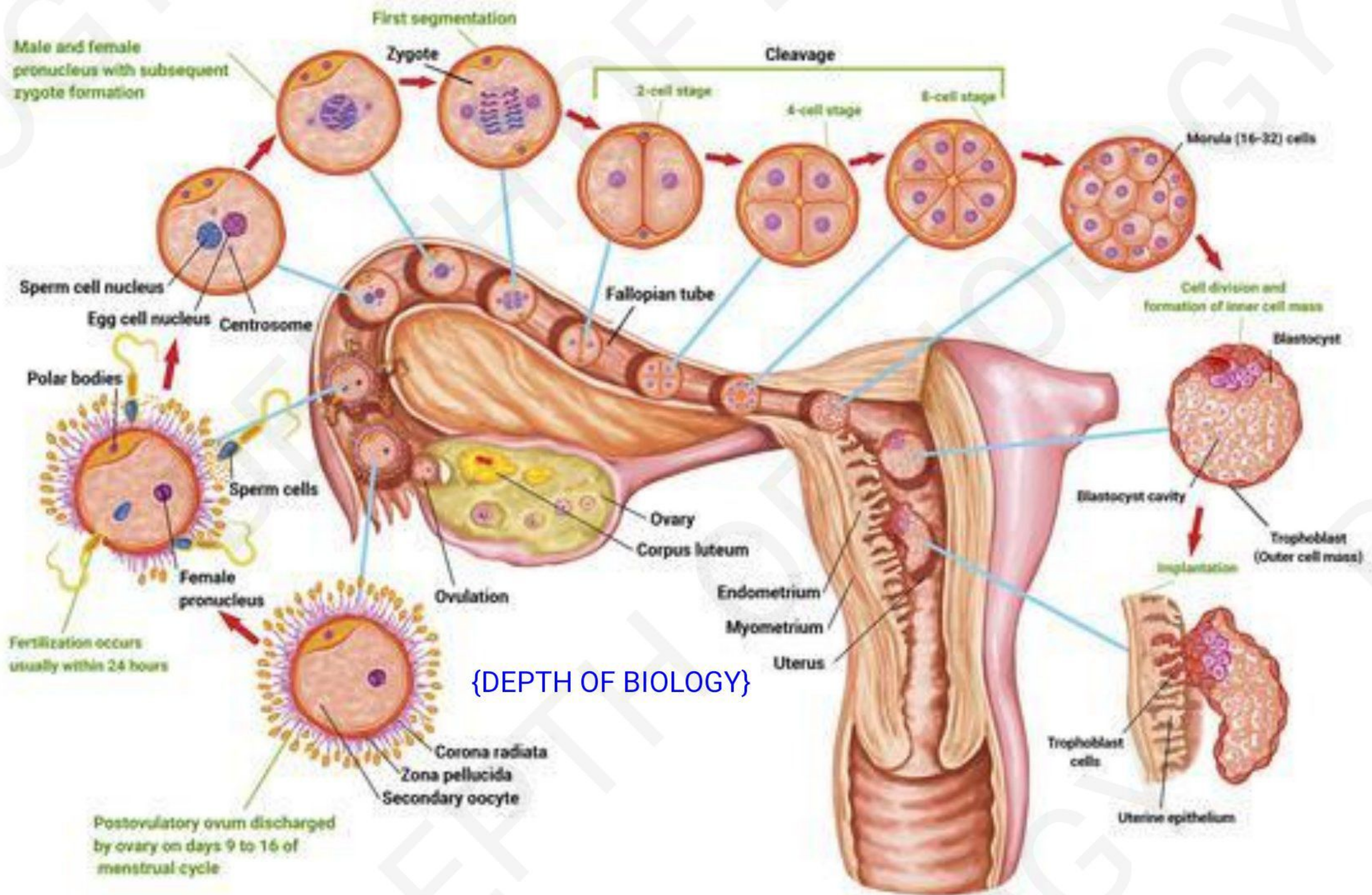
BLASTOCYST  
(4 DAYS)

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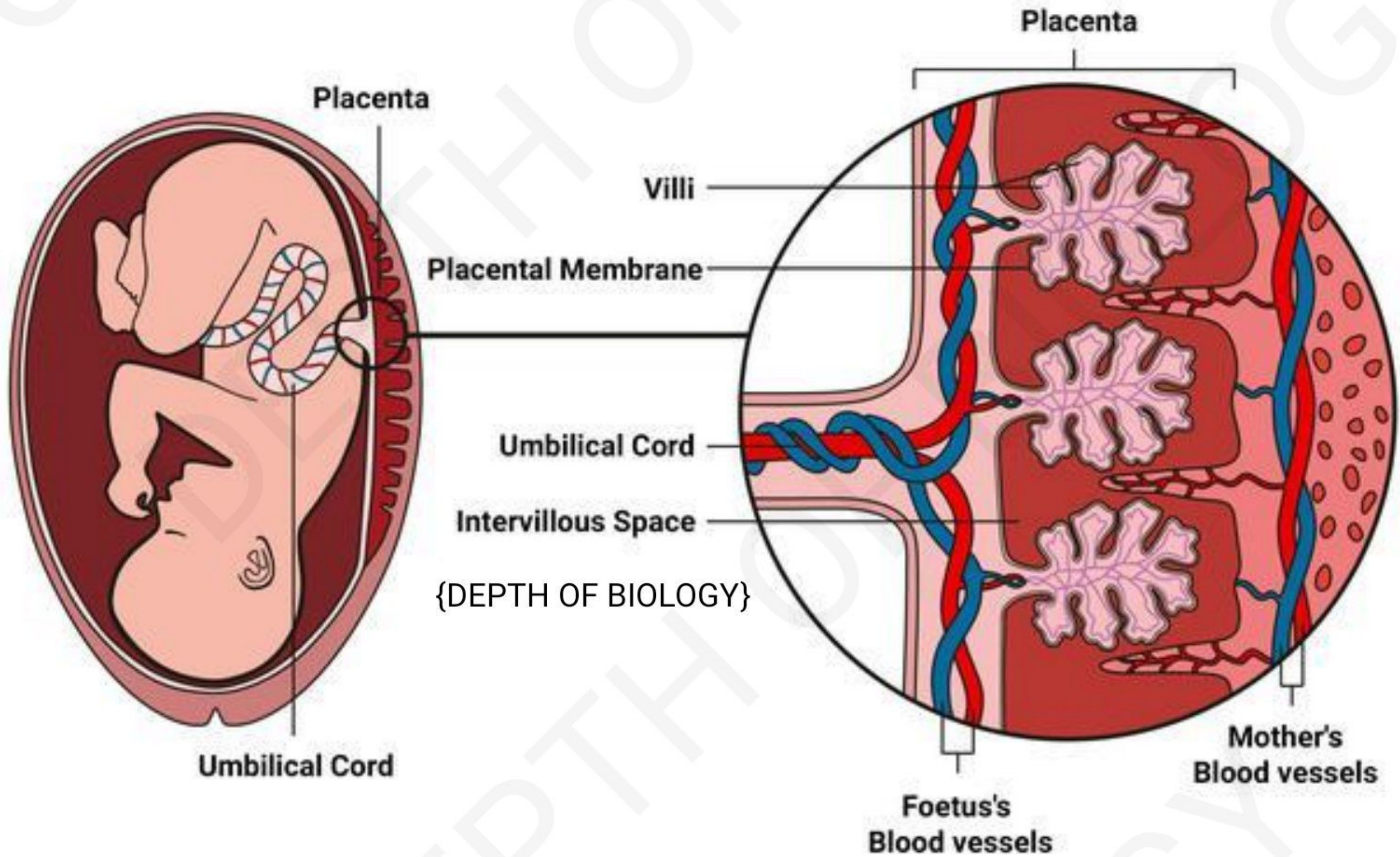
- The blastomeres having 8 to 16 cells are called the **morula**. Morula divides further to change into **blastocyst** {DEPTH OF BIOLOGY}
- The blastomeres in the blastocyst are arranged into an outer layer called the **trophoblast** and an inner group of cells attached to the trophoblast called the **inner cell mass**.
- The trophoblast attaches to the endometrium of the uterus, leading to **implantation** {DEPTH OF BIOLOGY}



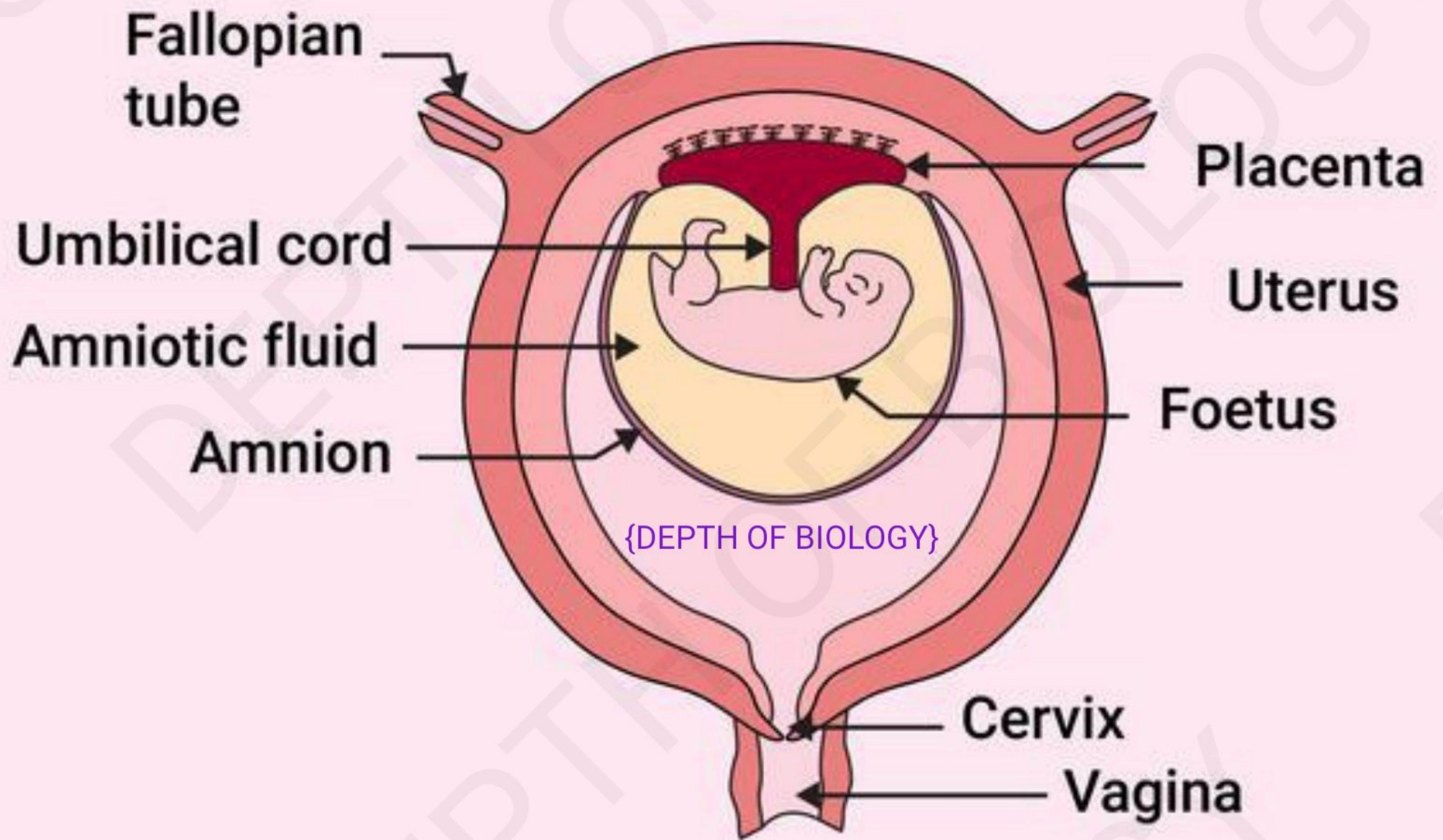


# Pregnancy

- Trophoblast after implantation develop finger like projections called chorionic villi  
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- This along with the uterine wall forms a functional unit called the placenta between the developing embryo and maternal body.
- The placenta is attached to the foetus with the help of the umbilical cord that transports food and oxygen to the embryo. {DEPTH OF BIOLOGY}







- Hormones **hCG (human chorionic gonadotropin)**, **hPL (human placental lactogen)** and **relaxin** are produced in a woman only during the time of pregnancy by the placenta.
- After implantation, the **inner cell mass** differentiates into an outer layer, **ectoderm** and an inner layer **endoderm**.  
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- A **mesoderm** appears between the ectoderm and the endoderm. These three layers give rise to all tissues and organs in adults.
- The inner cell mass contains certain cells called **stem cells** which have the potency to give rise to all the tissues and organs.  
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Yolk sac  
(lined with endoderm)

Amniotic cavity  
containing  
amniotic fluid

Amnion

Endometrium

Maternal  
blood pool

Chorion (derived  
from blastocyst  
cavity membrane)

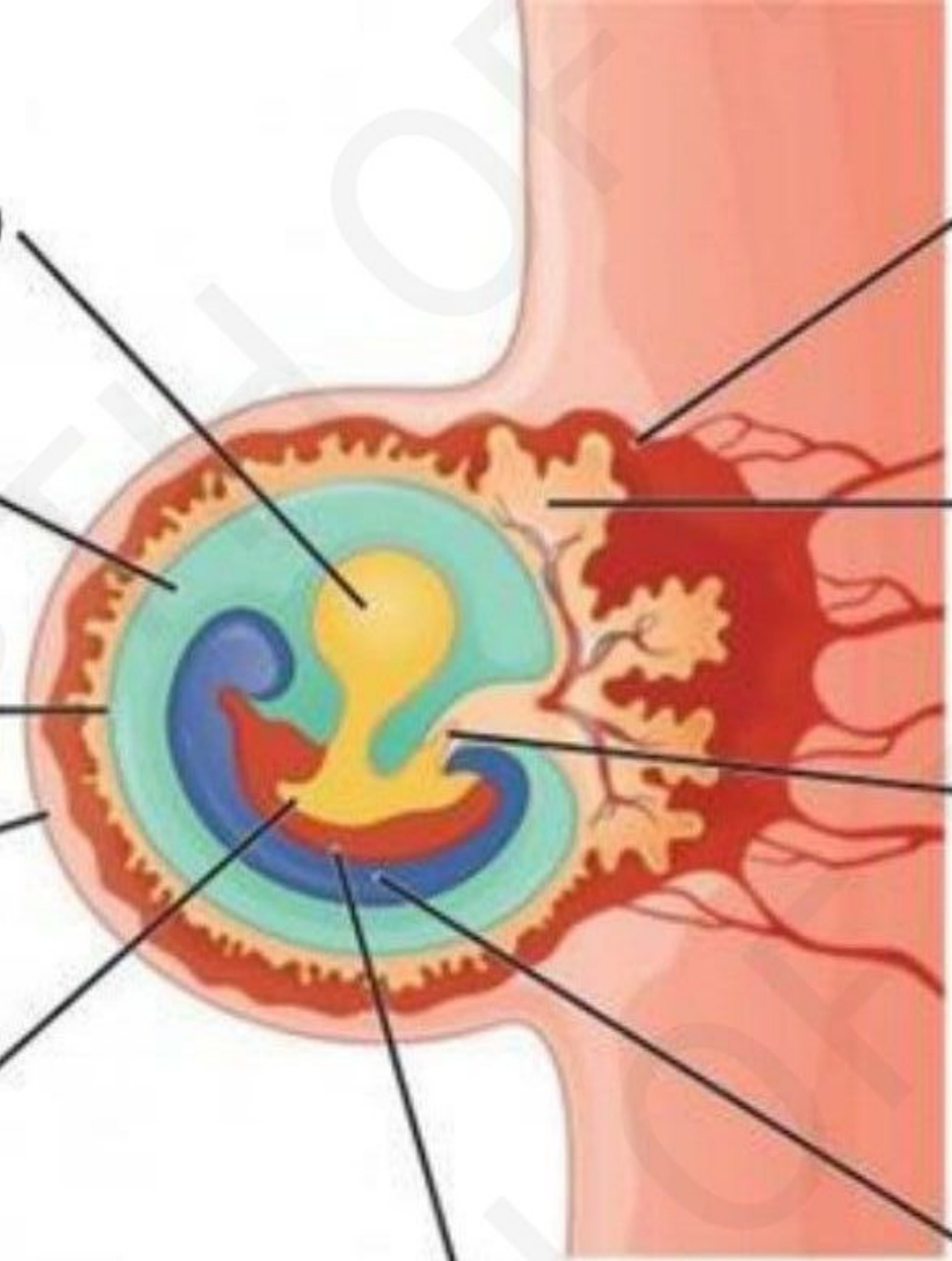
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Endoderm layer  
becomes:  
1) Digestive system  
2) Liver  
3) Pancreas  
4) Lungs (inner layers)

Mesoderm layer  
becomes:  
1) Circulatory system  
2) Lungs (epithelial layers)  
3) Skeletal system  
4) Muscular system

Ectoderm layer  
becomes:  
1) Hair  
2) Nails  
3) Skin  
4) Nervous system



# ***EMBRYONIC DEVELOPMENT***

- In human beings, after one month of pregnancy, the heart of the embryo is formed.
- By the completion of the 2nd-month limbs and digits are formed.
- By 12 weeks, major organs and external genital organs are developed.
- The first movement of the foetus is observed during the 5 months.
- By the end of 24 weeks, the body is covered with fine hair, eyelids and eyelashes are developed. {DEPTH OF BIOLOGY}
- At the end of 9 months, the foetus is fully developed.

# Fetal Growth From to 40 Weeks



9 weeks



12 weeks



16 weeks



20 weeks



24 weeks



28 weeks



32 weeks



36 weeks



40 weeks

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# Parturition

- The process of delivery of a fully developed foetus is known as parturition.
- The signals for parturition originate from the fully developed foetus and placenta.
- This induces mild uterine contractions called **foetal ejection reflex**. {DEPTH OF BIOLOGY}
- The foetal ejection reflex triggers the release of **oxytocin** from the maternal pituitary {DEPTH OF BIOLOGY}

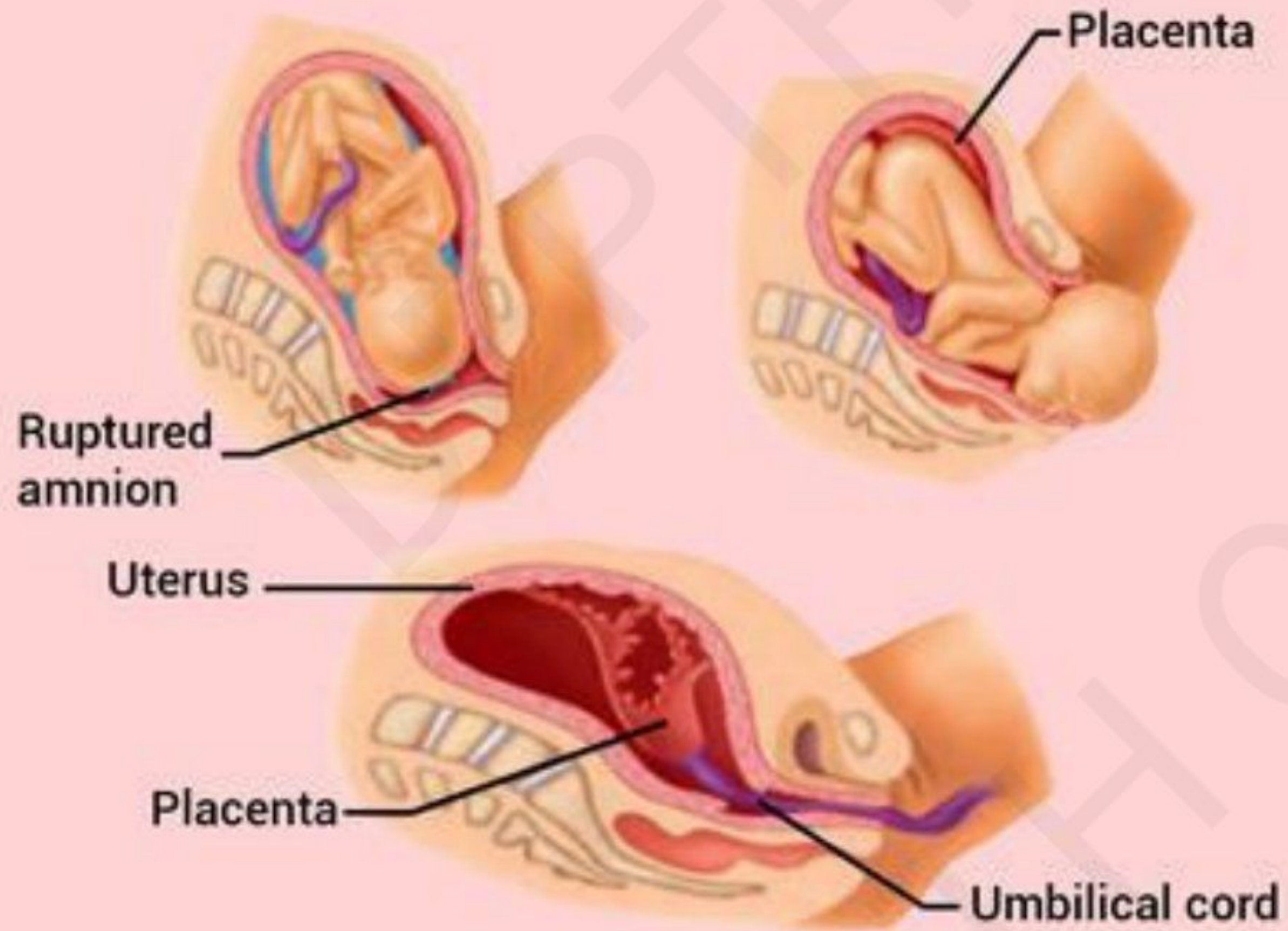
# Lactation

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- After delivery, the mammary glands of females start producing milk. This happens at end of pregnancy by the process of lactation.
- The milk produced during the initial few days is called **colostrum**, which is rich in antibody IgA

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## Parturition



## Lactation



{DEPTH OF BIOLOGY}