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ANATOMY

Prof. Ashfaqur Rahman

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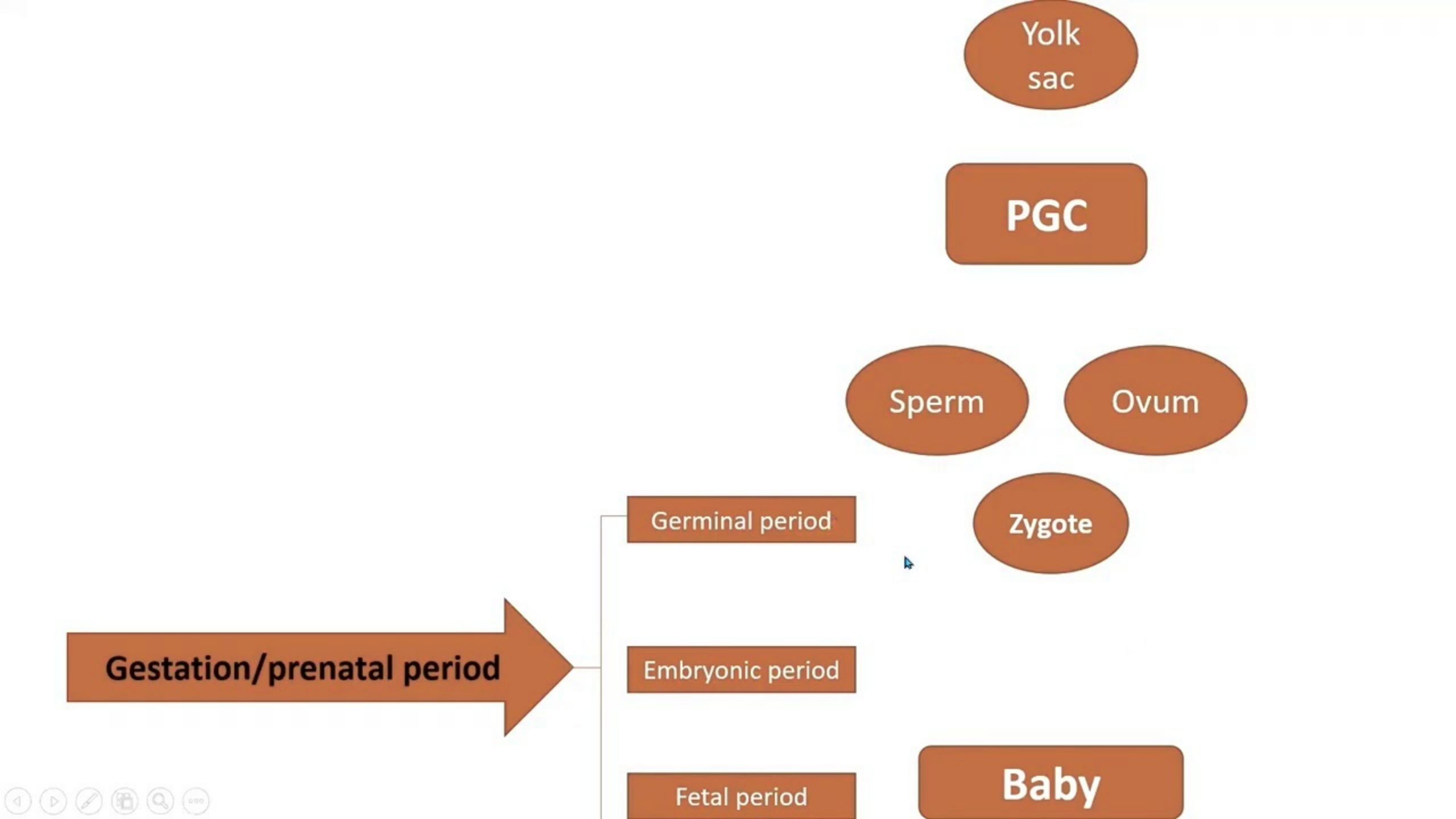
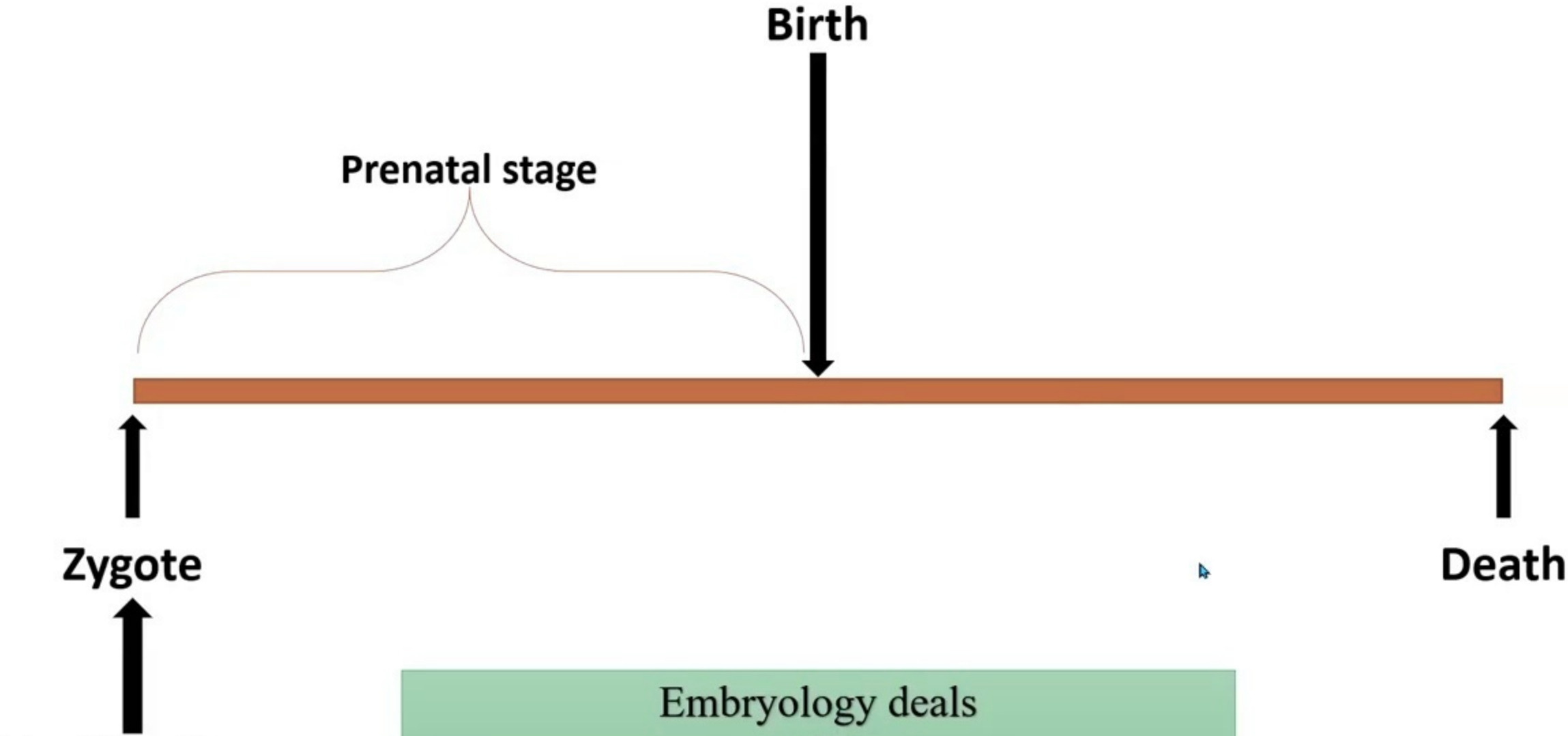
my YouTube video channel

WE LIKE ANATOMY

Prof. Dr. Md. Ashfaqur Rahman
Professor of Anatomy


Yolk sac
PGC
Sperm
Ovum
Zygote
Germinal period
Gestation/prenatal period
Embryonic period
Fetal period
Baby



Embryology deals
with
prenatal stages of development

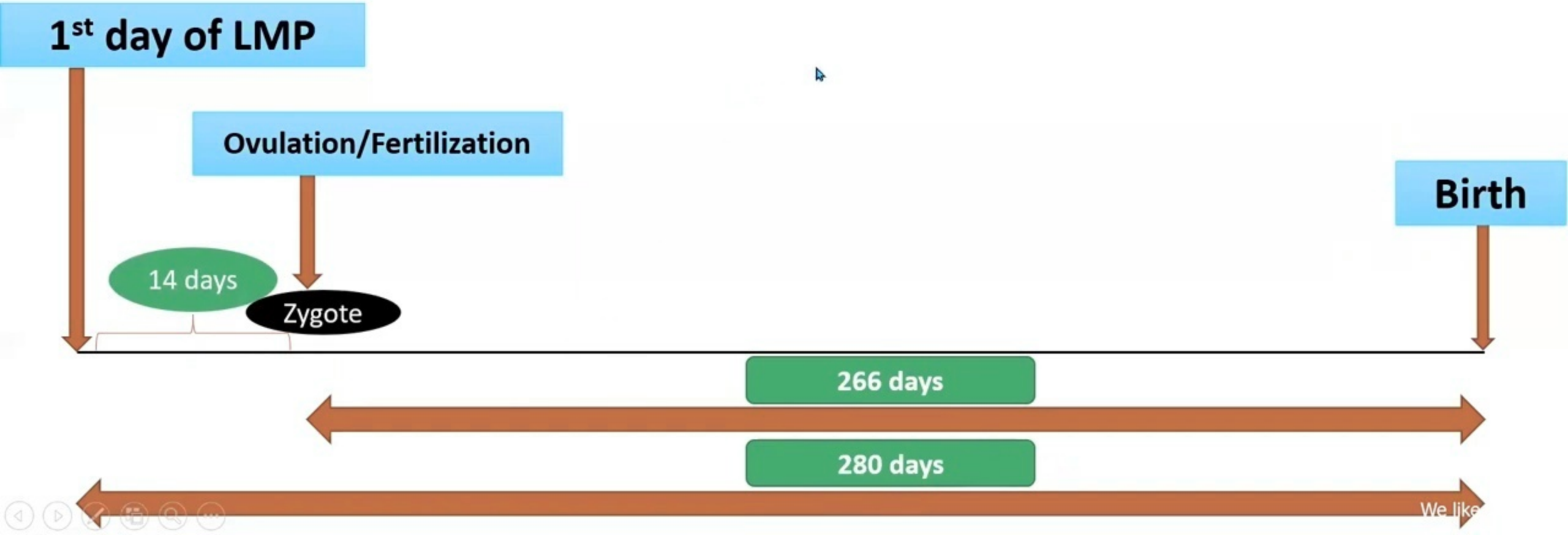
- **But actually** development continues even after birth, like:
  - Lung development continues through childhood.
  - Nervous system development completes 2-3 years after birth.

Better term

DEVELOPMENTAL ANATOMY

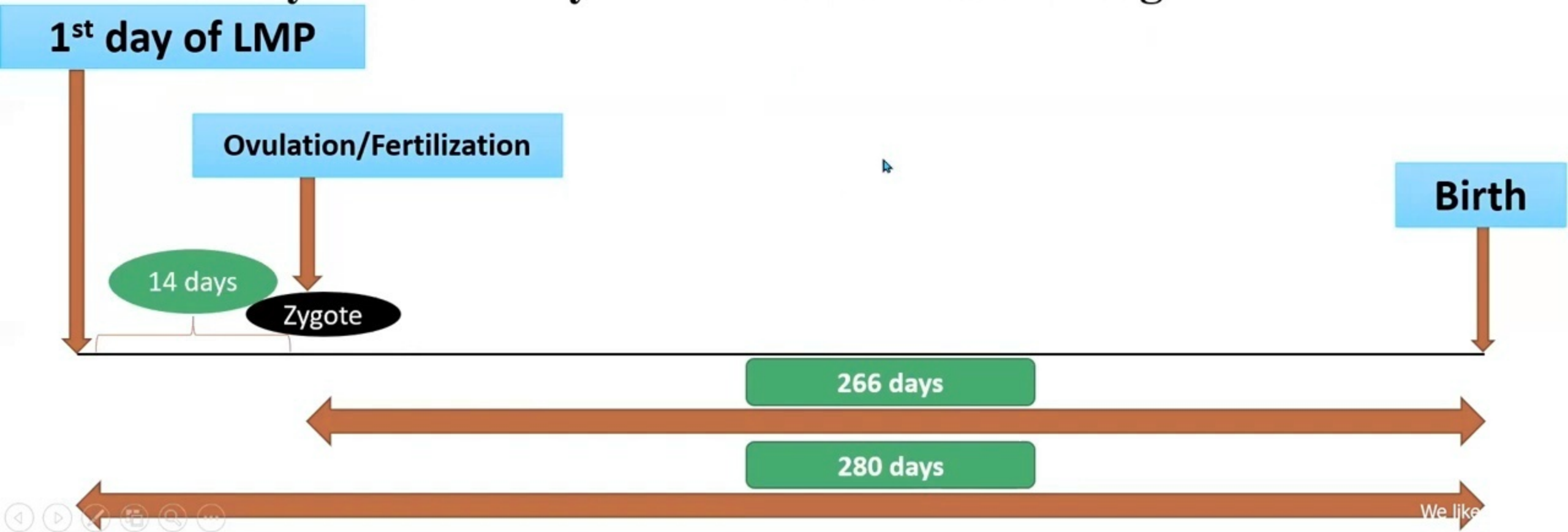
Gestation/prenatal period

- Fetal development period from the time of conception until birth.



Gestation/prenatal period

- Fetal development period from the time of conception until birth.
- **266 days from day of fertilization-OVULATORY Age**
- **280 days from 1st day of LMP-MENSTRUAL Age**



Phases of gestation period

Germinal/ Pre-embryonic period	Embryonic period	Fetal period
1st & 2nd weeks	3rd-8th week	9th-Birth
Implantation	Organ formation	Organ maturation

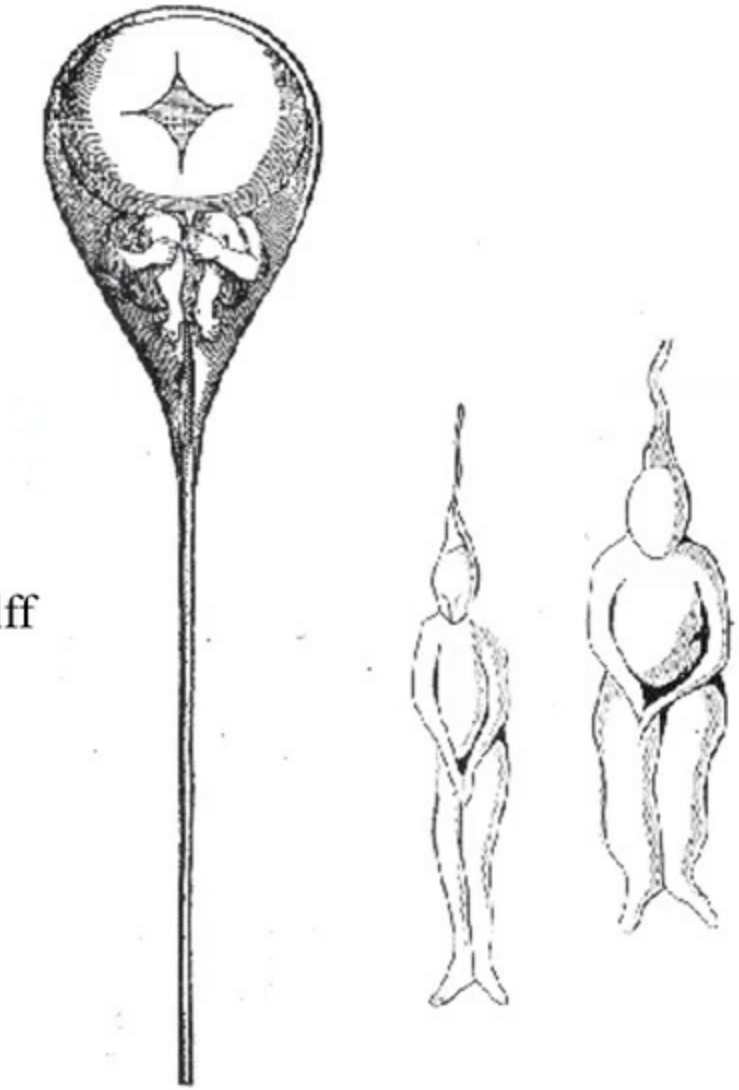
Development

Theories of Embryology

Preformation theory

Epigenesis theory

Aristotle, William Harvey, Kaspar Friedrich Wolff



Development

Single celled zygote → **Multicellular complex body**

2 processes are involved in development

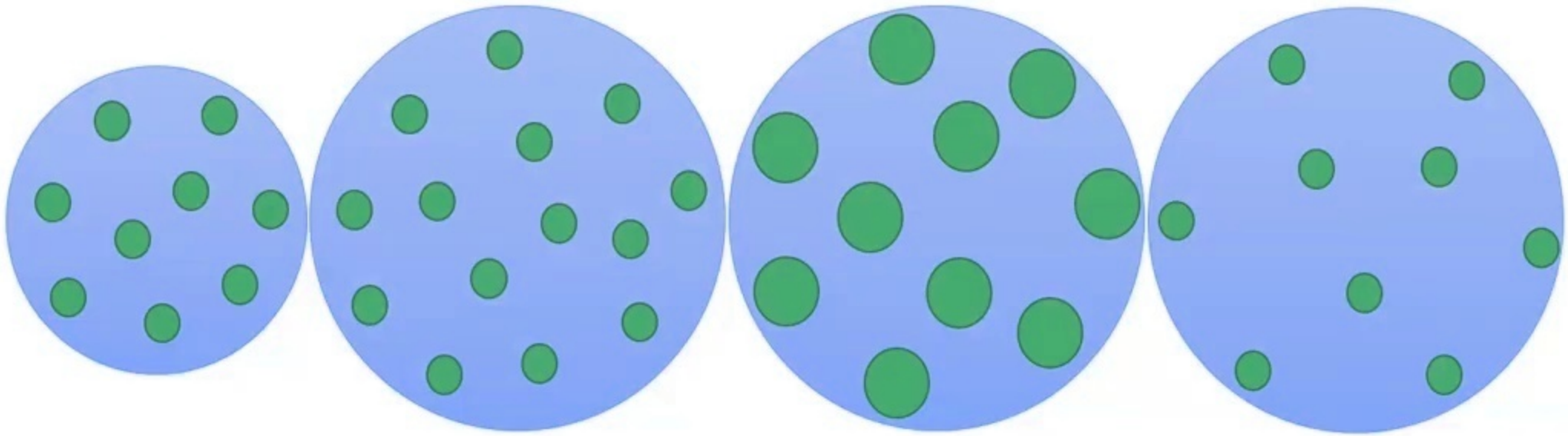
Growth	Differentiation

Growth

Increase in bulk

Cells

ICM



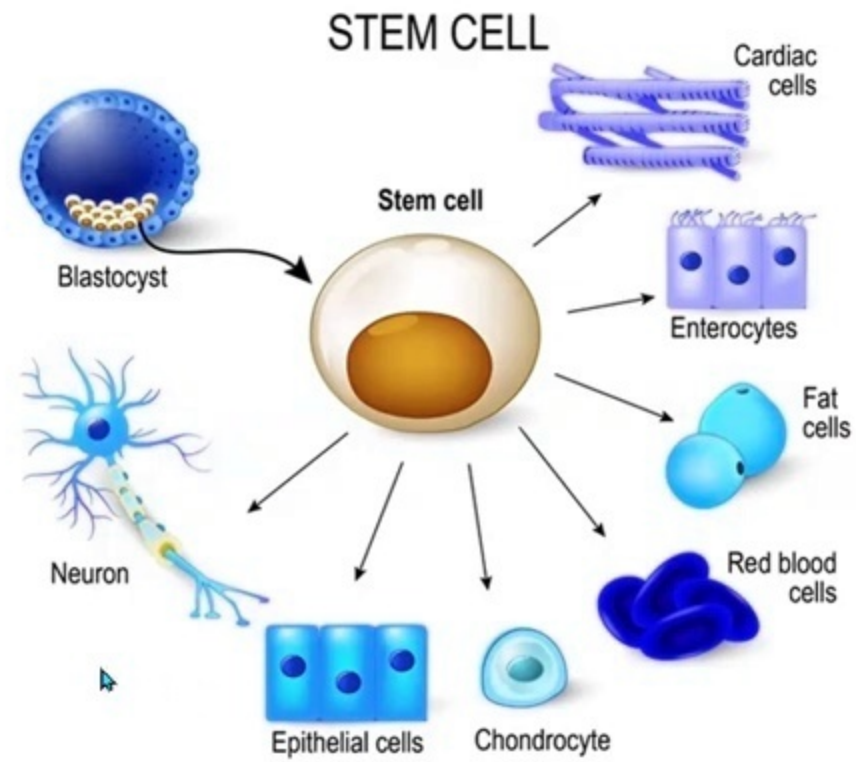
Multiplicative (hyperplasia)
Most cells in prenatal stage

Auxetic (hypertrophy)
Neuron
Skeletal muscle
Cardiac muscle

Interstitial (accretionary)
Bone
Cartilage

Differentiation

- The process by which groups of cells
  - assume special characteristics
  - are assigned with specific functions



Phases of differentiation

1. Totipotent phase
2. Pluripotent phase (plastic phase)
3. Chemodifferentiation
4. Histodifferentiation
5. Organogenesis
6. Functional differentiation

Some terms

1. **Totipotent**=Total potency-zygote, Blastomeres
2. **Pluripotent**=Many potency-Embryonic stem cells

Some terms

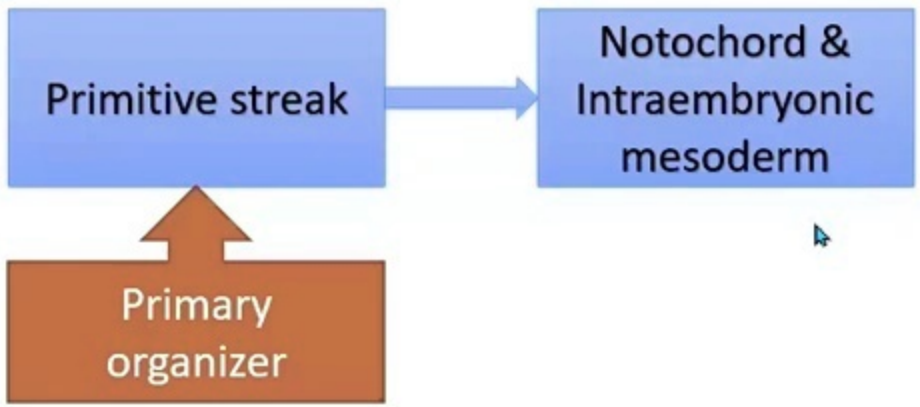
1. **Totipotent**=Total potency-zygote, Blastomeres
2. **Pluripotent**=Many potency-Embryonic stem cells
3. **Multipotent**=Multiple potency-Adult stem cells, Cord blood stem cells
4. **Oligopotent**=Reduced potency-Myeloid/lymphoid stem cells
5. **Unipotent**=Single potency

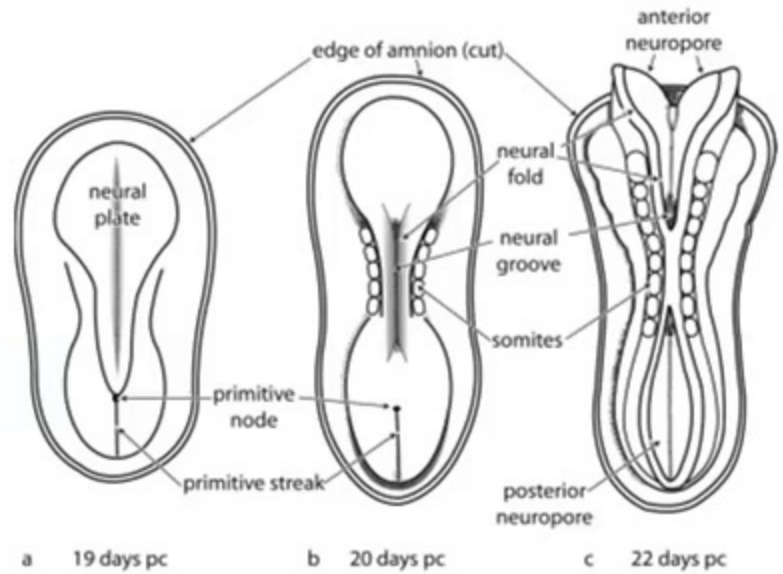
Organizer/Inducer

- **The localized areas of embryo directly inducing (influencing) tissue differentiation by liberating some chemical substances.**
  - Evocation
  - Individuation

Primary organizer

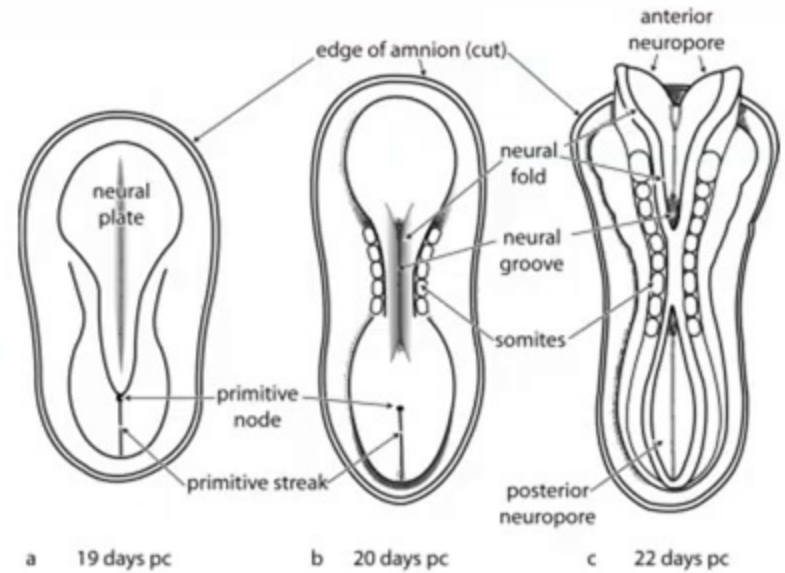
- **Primitive streak**
- Appearing on 15th day after fertilization
- Induces development of notochord and intraembryonic mesoderm





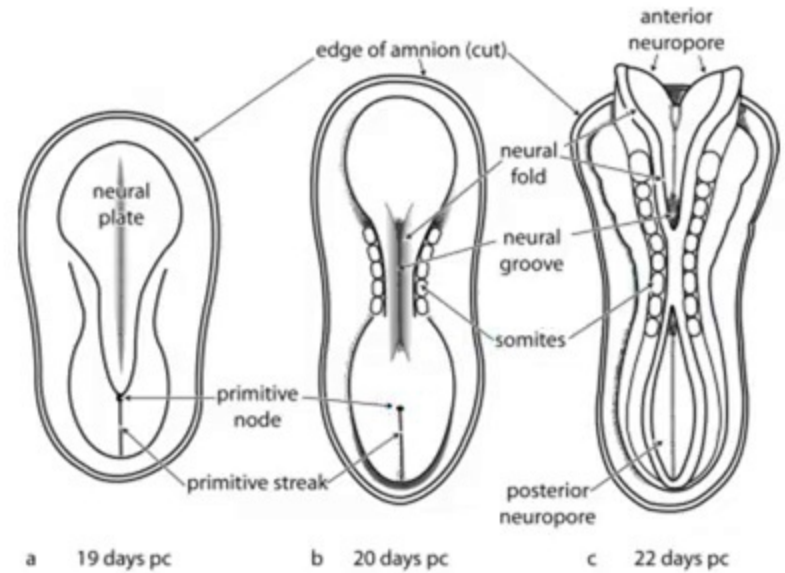
Secondary organizer

- **Notochord**
- Appearing on 16th day after fertilization



Secondary organizer

- **Notochord**
- Appearing on 16th day after fertilization
- Induces formation of neural tube from overlying neuroectoderm



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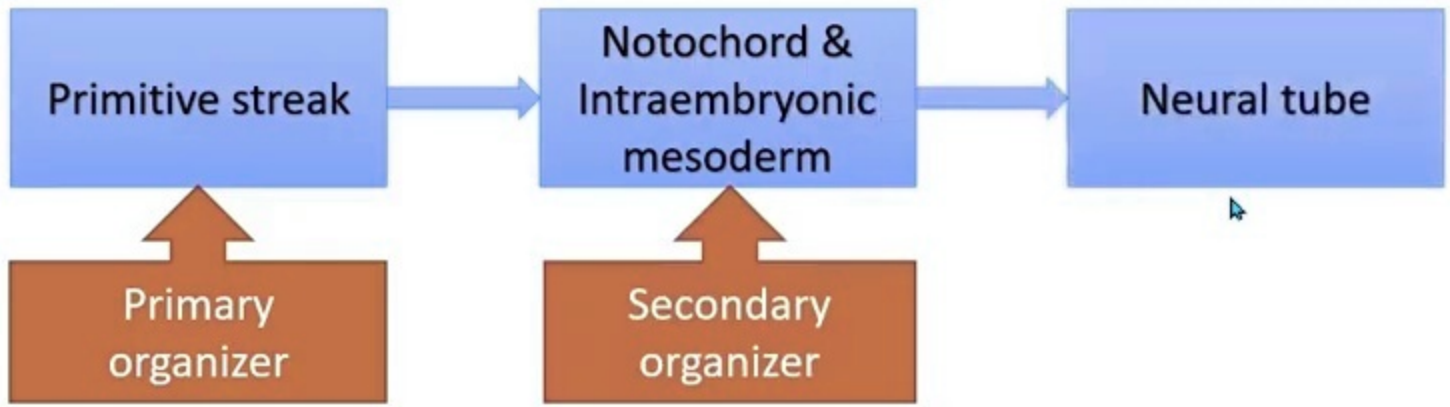
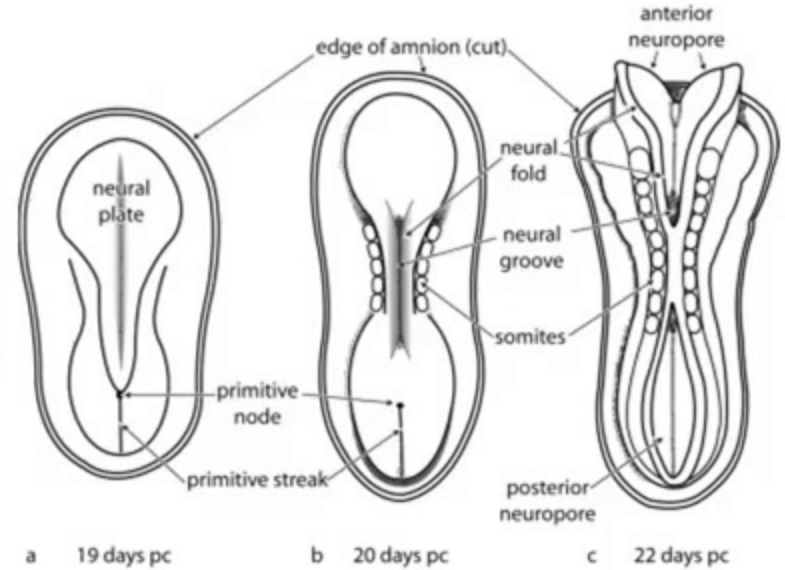
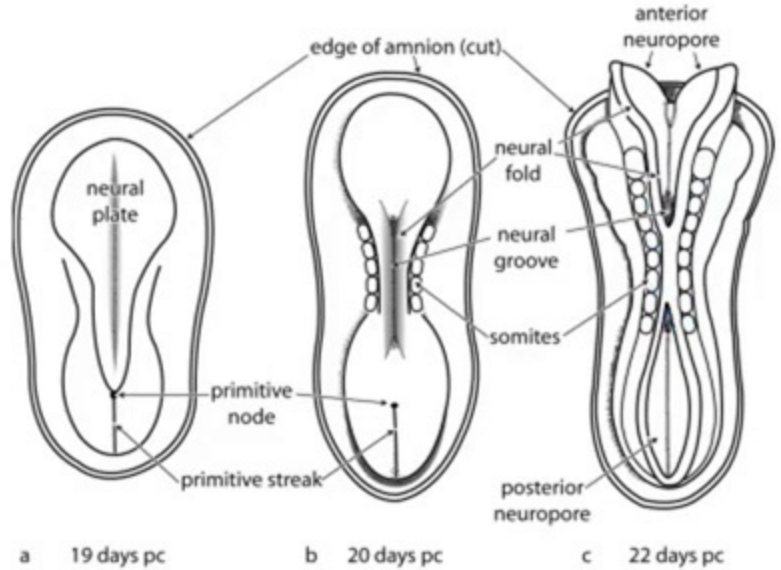
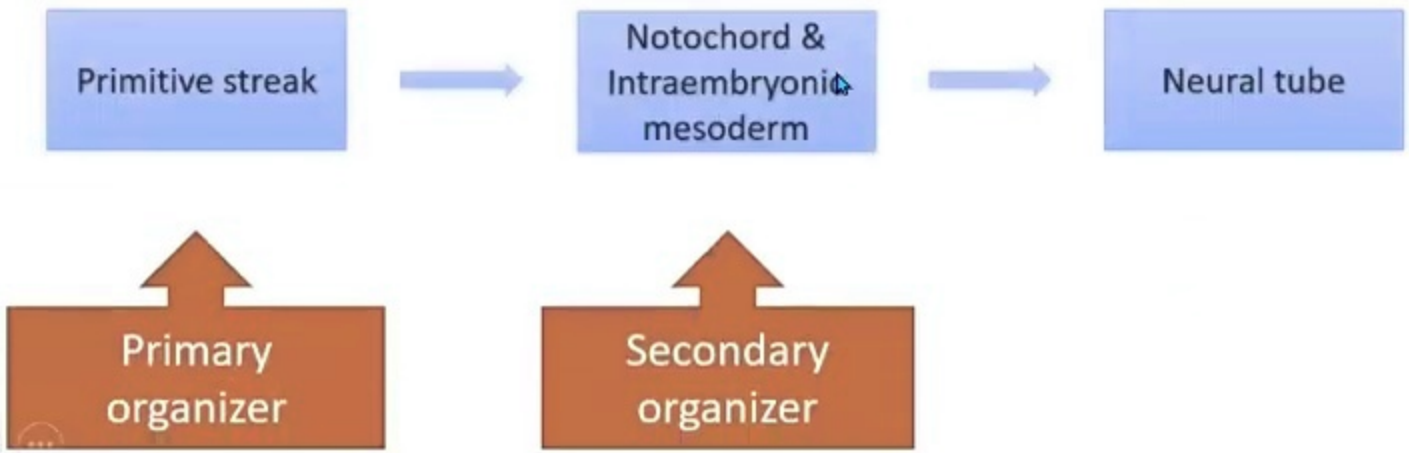




Tertiary organizer

- **Neural tube**
- Induces formation of somites





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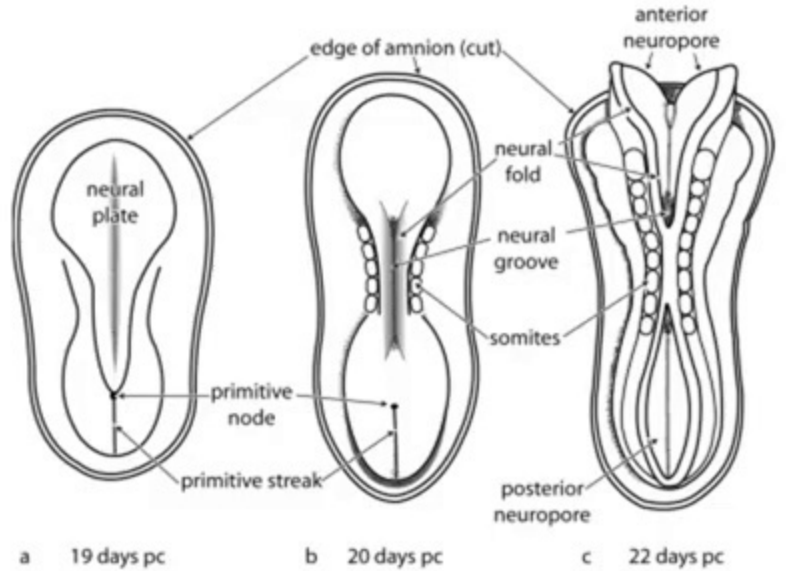

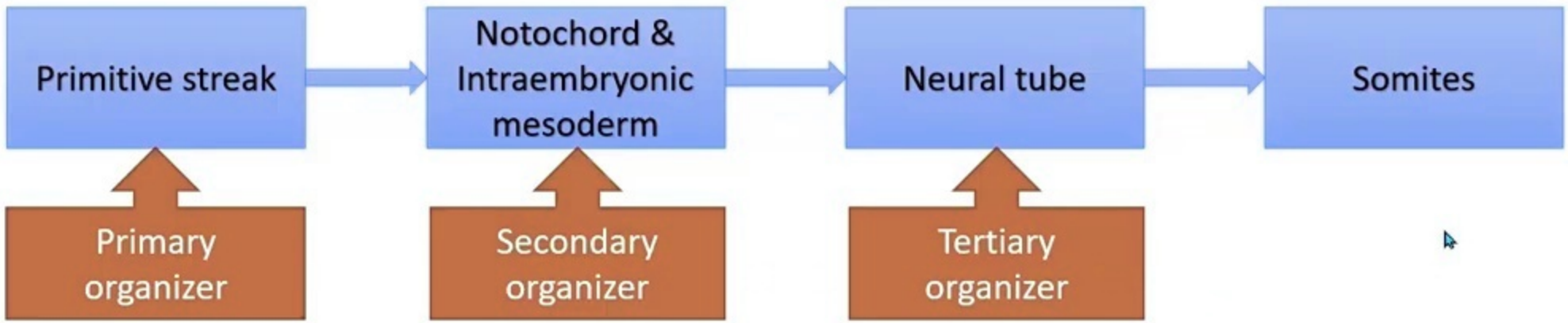

Other important organizer/inducer

Ureteric bud	Development of permanent kidney
Optic placode	Development of retina

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