

EMBRYOLOGY III – handouts

1. Important events in the first week of embryonic development

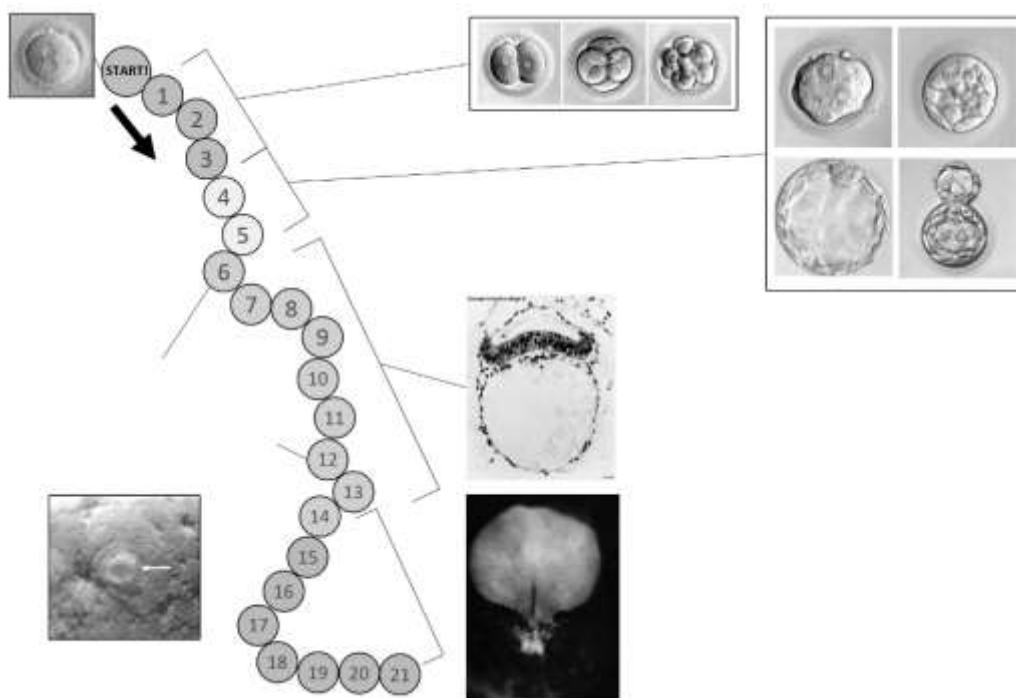
- fertilization
- cleavage, blastomers
- blastogenesis
- implantation and changes in trophoblast
- embryogenesis

2. Important events in the second week of embryonic development

- differentiation of embryoblast
- bilaminar germ disc, epiblast and hypoblast
- development of amniotic cavity
- primary yolk sac
- extraembryonic coelom
- extraembryonic mesoderm

3. Important events in the third week of embryonic development

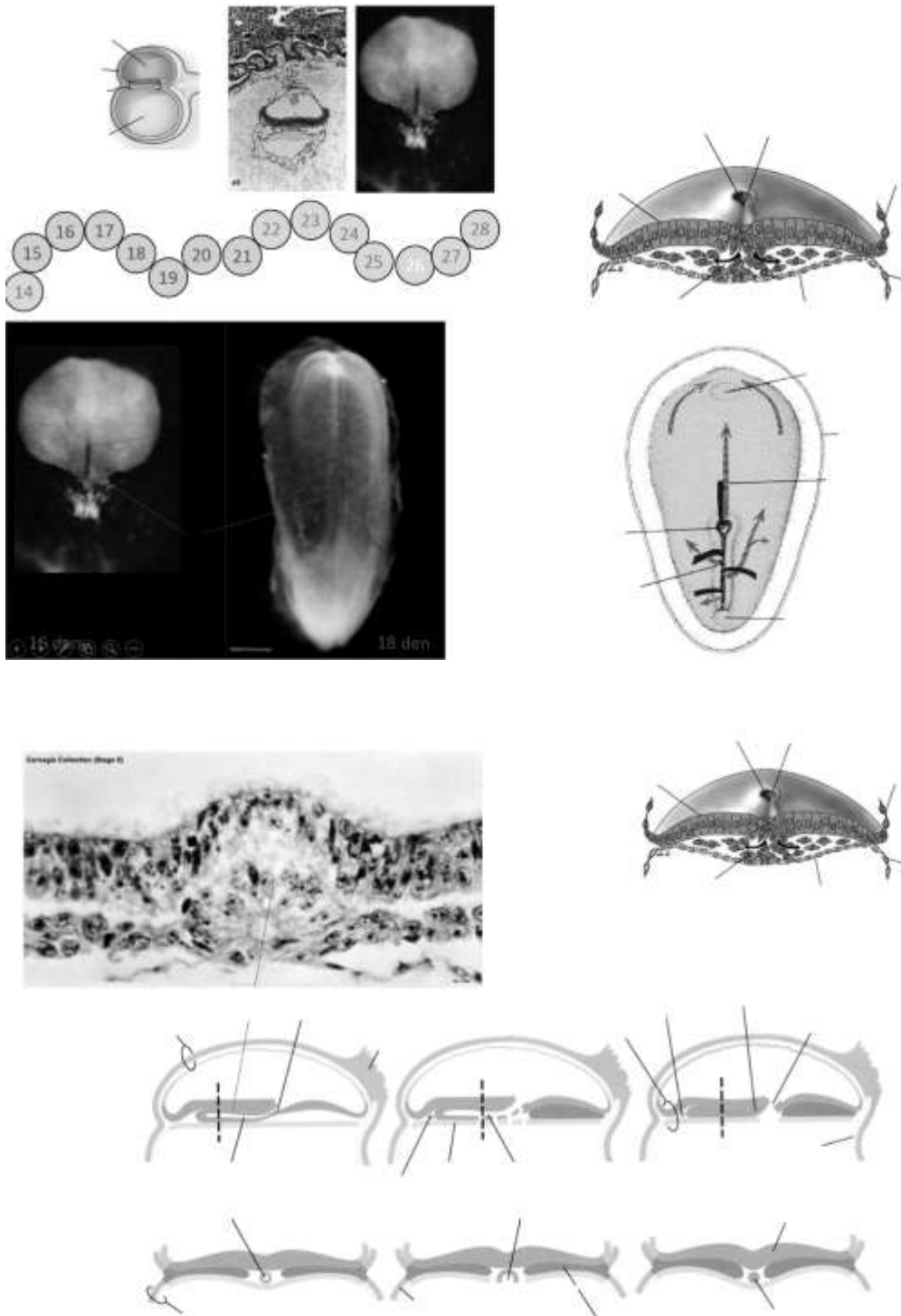
- trilaminar germ disc
- differentiation of epiblast
- primitive streak and primitive (Hensen's) node
- development of intraembryonic mesoderm
- differentiation of ectoderm and neuroectoderm
- differentiation of intraembryonic mesoderm and somitogenesis

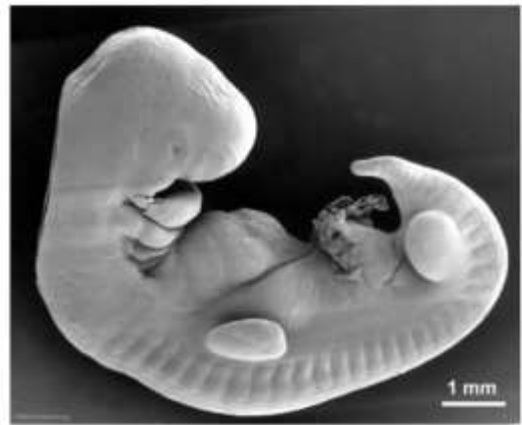
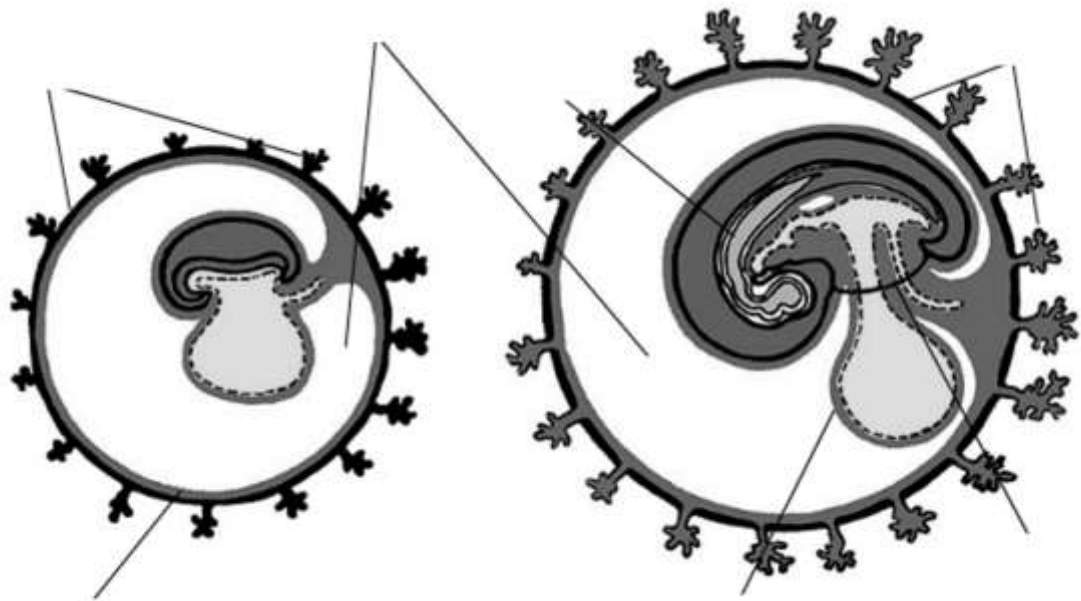


4. Principles of embryonic induction and determination

- intraembryonic mesoderm
- notochord and induction of neurulation
- neural tube and neural crest (crista neuralis)

5. Gastrulation and embryonic flexion, derivatives of intraembryonic mesoderm





6. Overview of embryogenesis, from week 4 to week 8

- Mesoderm segmentation
 - Primitive gut
 - Esophagotracheal diverticulum
 - Heart (starts beating day 22-23)
 - Limb buds
 - Primary brain vesicles, closing of neuropores
 - Differentiation of neural crest
 - Origin of thyroid and anterior pituitary
 - Ectodermal placodes, optic vesicle
 - Liver diverticulum
 - Septum transversum
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- Secretion from endocrine pancreas
 - Growth of liver, growth and luminization of bile ducts
 - Ossification of limbs begin
 - Development of brain nuclei
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- Joints of upper and later lower limbs allow rotation
 - Fingers grow
 - Stratification of cerebellar cortex
 - Perforation of anal membrane
 - Herniation of intestinal loops
 - Testes produce testosterone
 - Nose, meatus, eyelids, developer, external ears start to grow
 - Backbone - 33-34 cartilaginous vertebrae
 - Embryonic tail diminished

6. Length of pregnancy

- Calculation, rule of Hasse

7. Overview of fetal development from week 8 to birth

- Fetus swallows amniotic fluid – necessary for GIT development
- Rapid growth of head (non-proportional to rest of body)
- Eyelids fuse
- Ossification centers visible by ultrasound examination
- Development of external genitalia
- Kidneys produce urine, other organs start to work
- Skeletal muscles innervated
- Physiological umbilical hernia, in 12th weeks reposition of intestinal loops

- Rapid growth of fetus
- Ossification of skeleton
- Face growths, mandible visible
- Apparent external genitalia
- Grey zone of viability (22-24 week)

- Limbs growth
- Mother feels fetal movements
- Vernix caseosa, lanugo
- Short hairs and eyelashes
- Fetus reacts to sound and later to light
- Lungs start to produce surfactant
- Limit of viability (full care provided)

- Eyelids open
- Wrinkled skin with visible capillaries
- Subcutaneous fat
- Hairs grow
- Maturing of organ systems

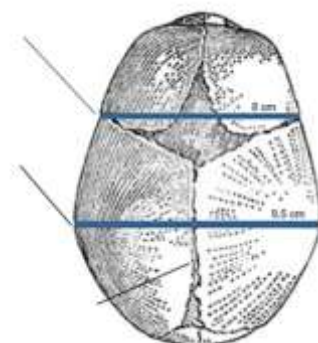
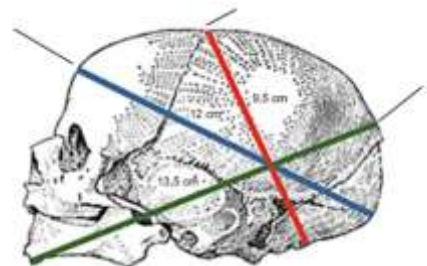
- Subcutaneous fat accumulates in limbs
- Smooth, red skin
- Hallmarks of full term fetus

8. Hallmarks of fetal maturity

- major and minor
- Rule of Hasse

9. Head size

- *diameter bitemporalis*
- *diameter biparietalis*
- *diameter frontooccipitalis*
- *circumferentia frontooccipitalis*
- *diameter suboccipitobregmatica*
- *circumferentia suboccipitobregmatica*
- *diameter mentooccipitalis*
- *circumferentia mentooccipitalis*
- *diameter biacromialis*
- *circumferentia biacromialis*



10. Fetus in uterus

- Situs
- Positio
- Habitus
- Praesentation

11. Introduction to teratology and prenatal diagnostics

- Teratogens
- Critical periods during development

