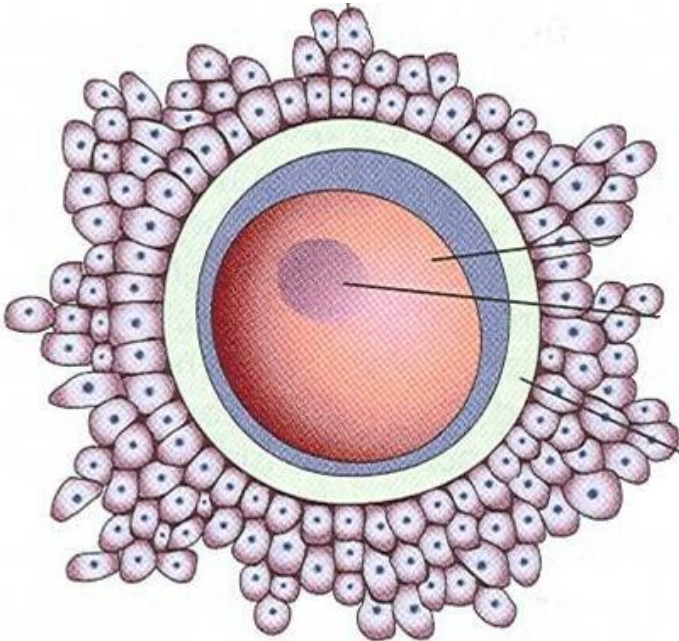


GENERAL EMBRYOLOGY

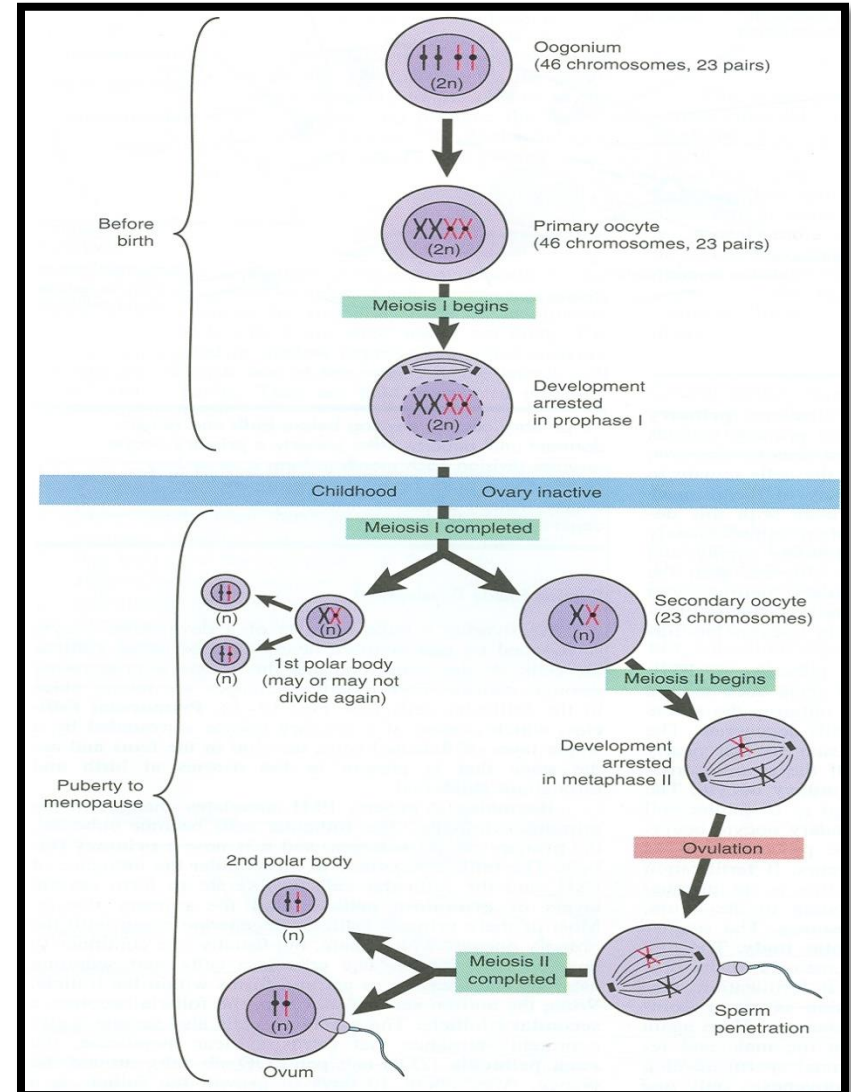
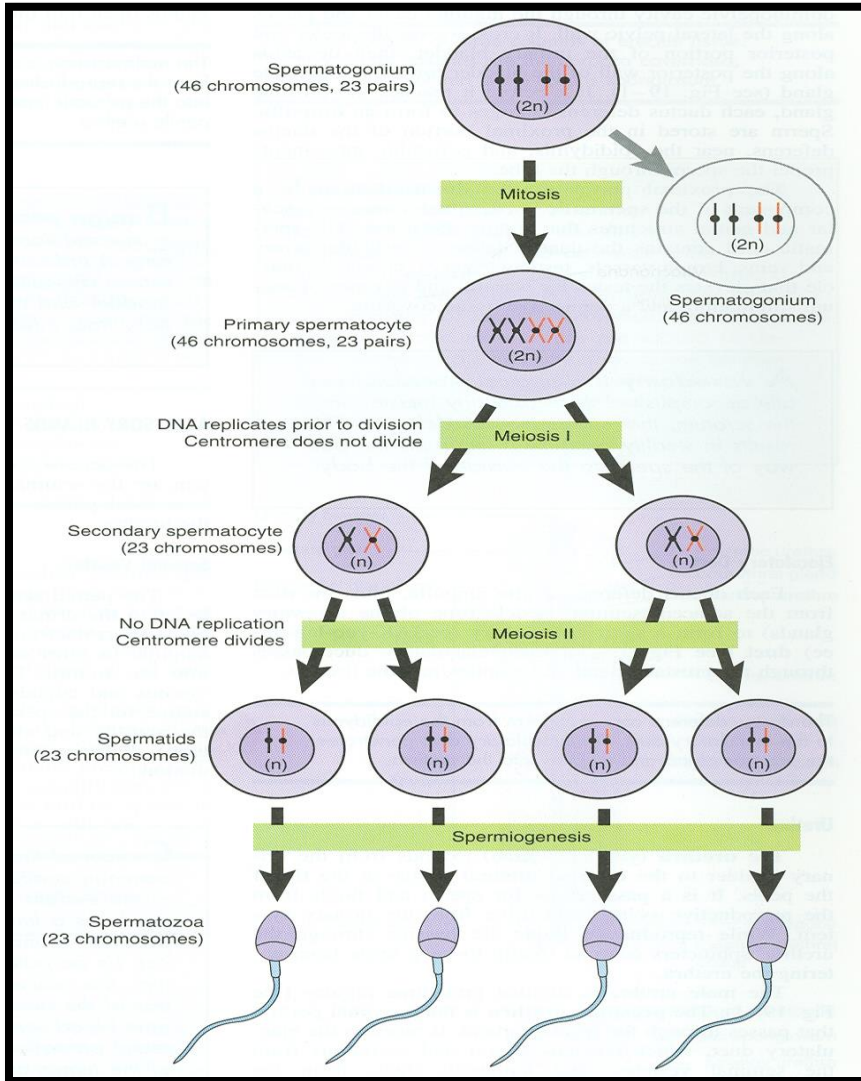
FROM

TO



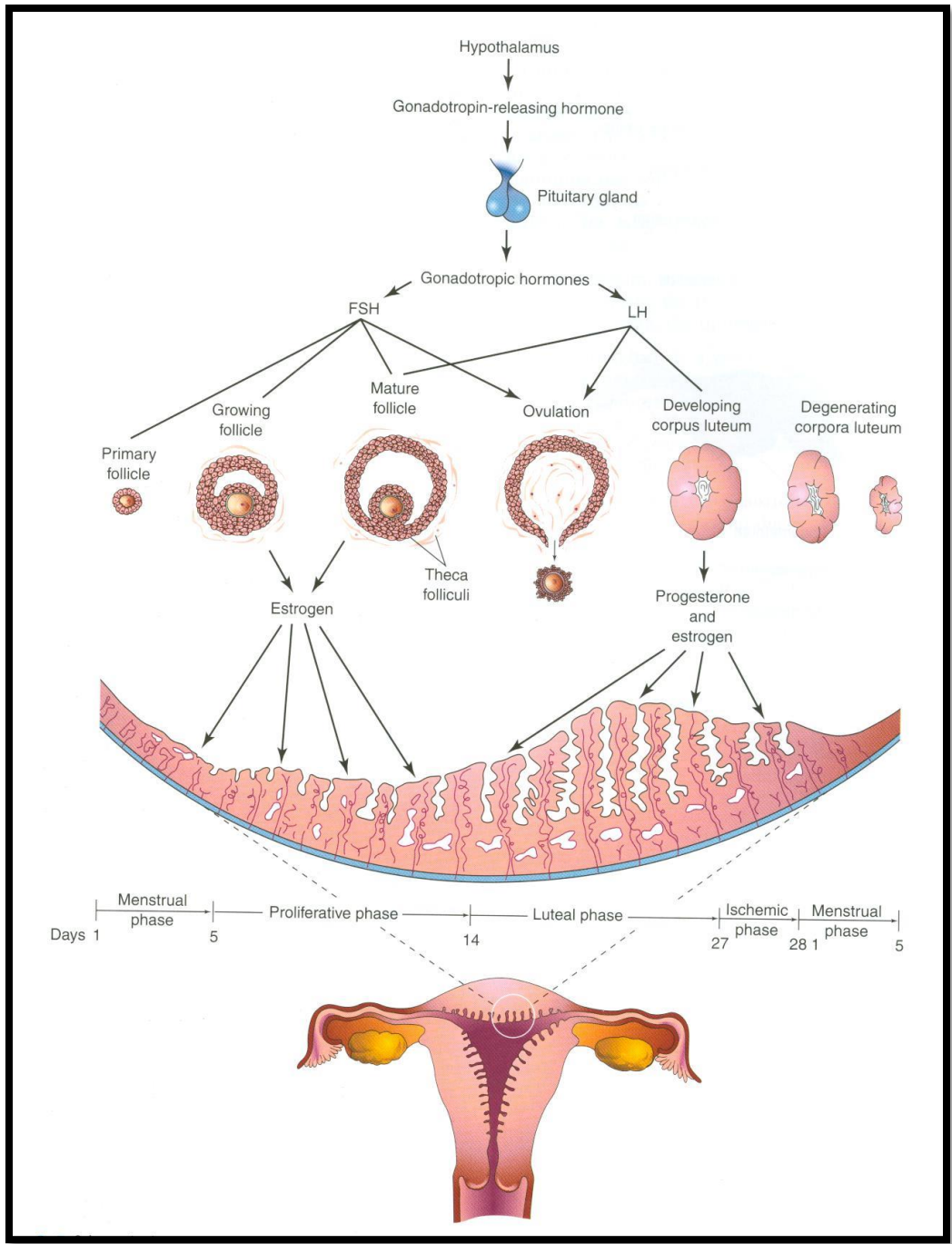
PROF. AHMED FATHALLA

SPERMATOGENESIS VS OOGENESIS

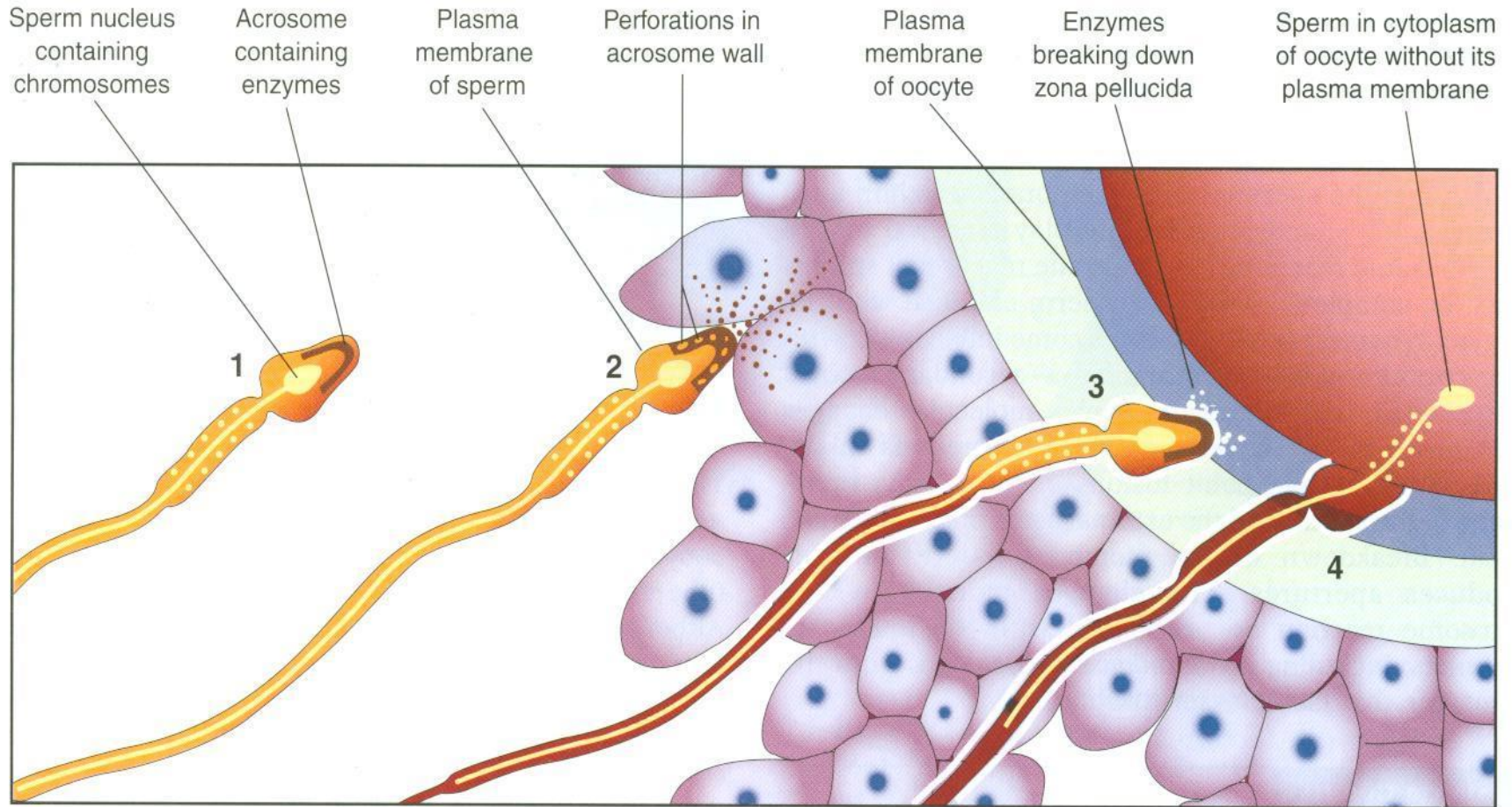


OVARIAN CYCLE

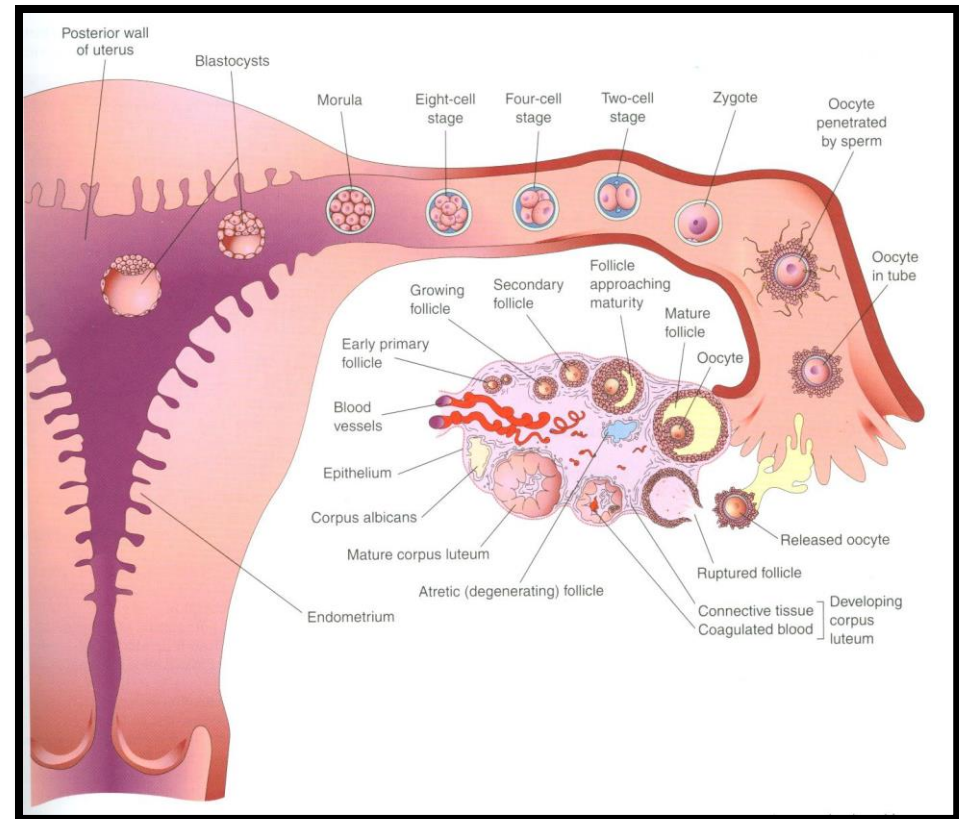
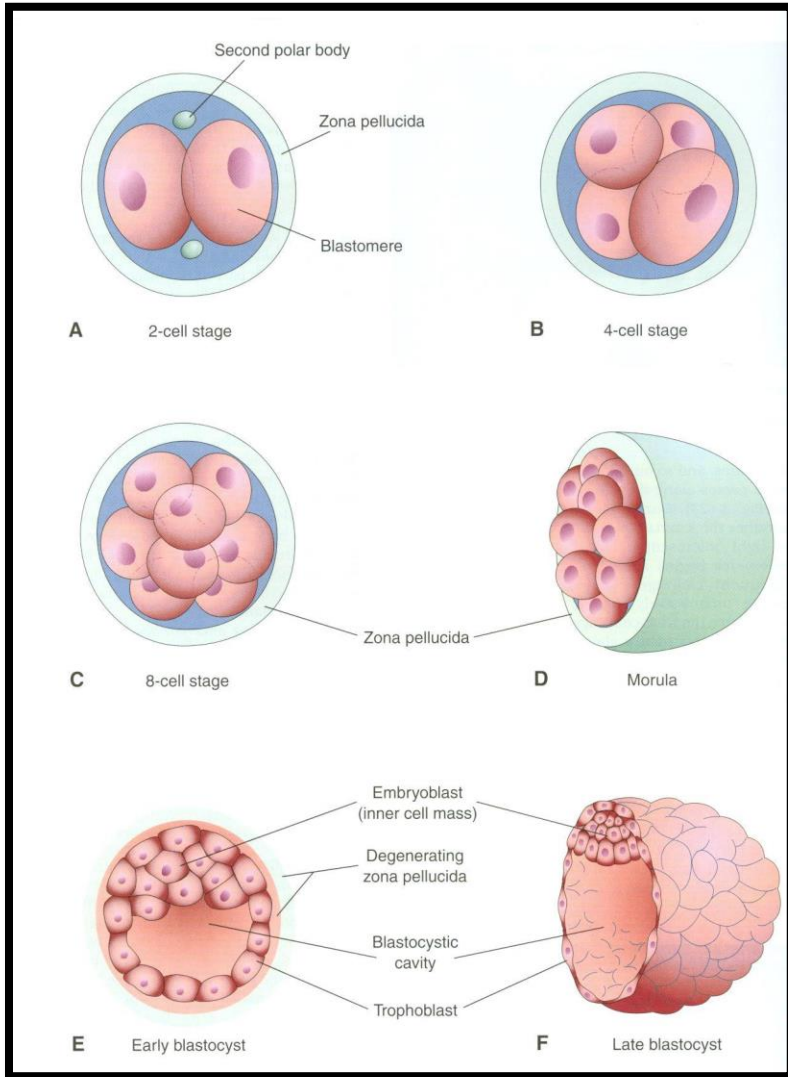
UTERINE CYCLE



FERTILIZATION – DAY 0

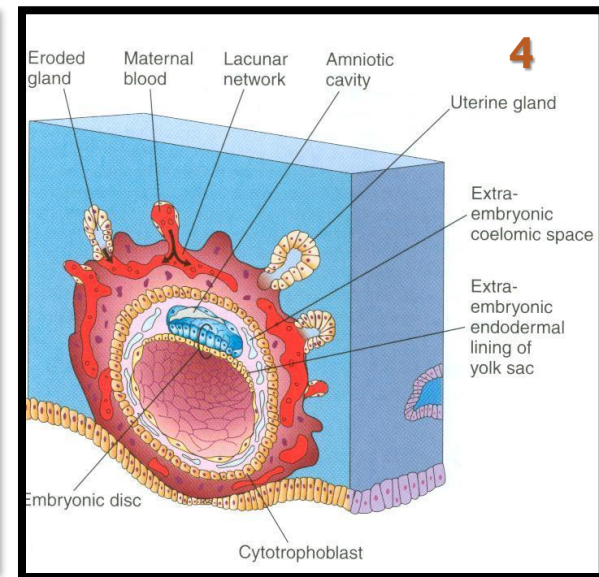
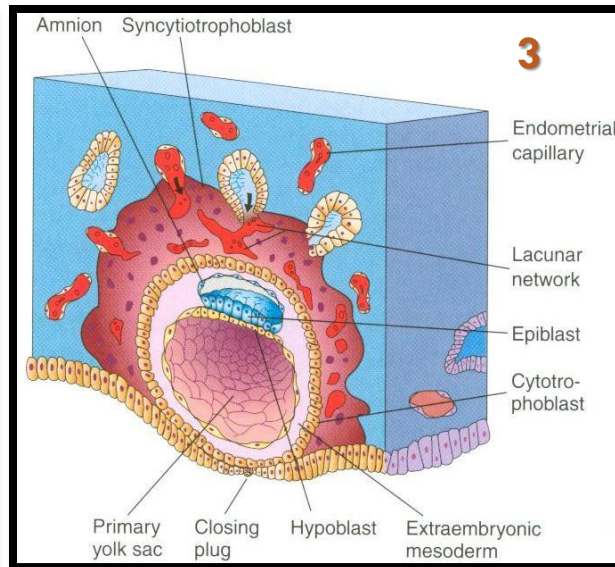
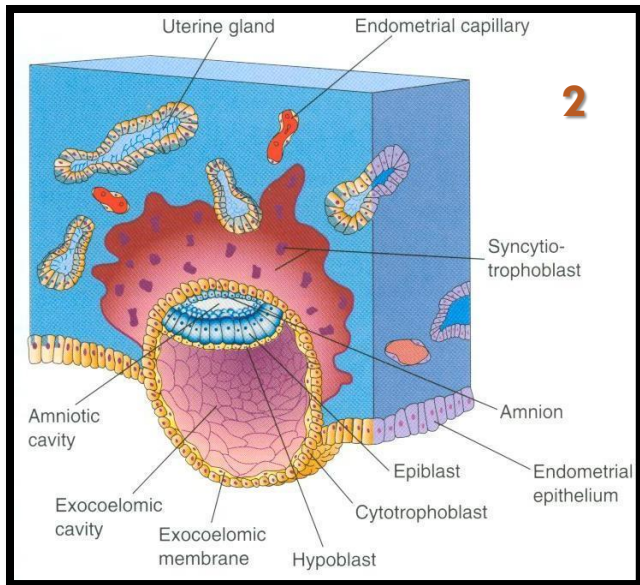
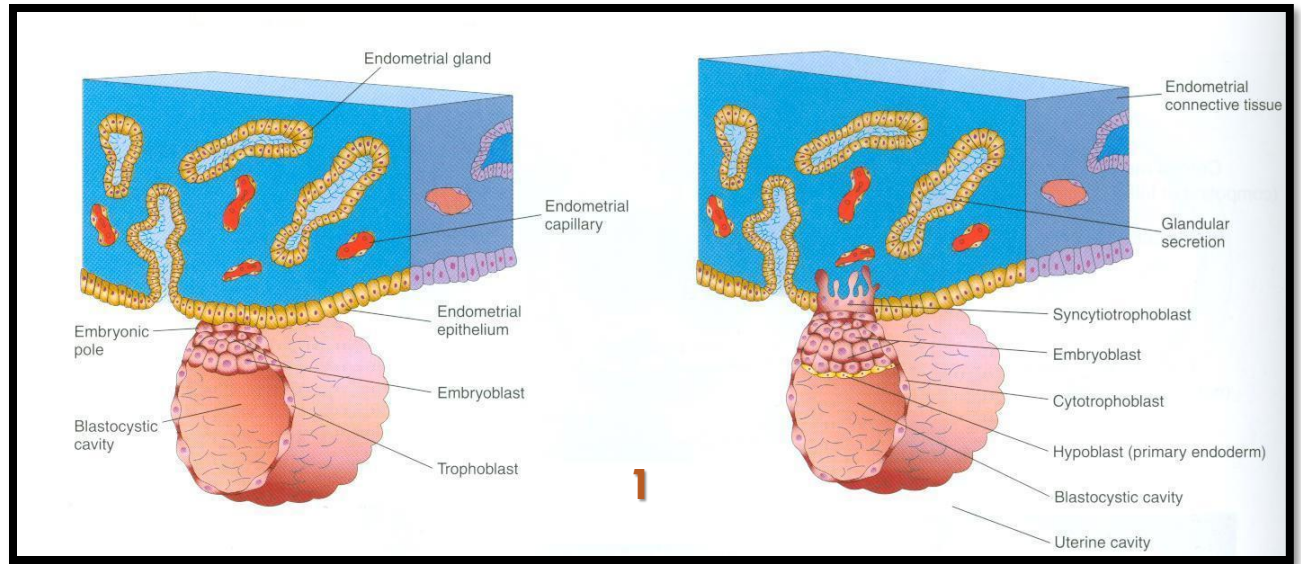


SEGMENTATION (CLEAVAGE)

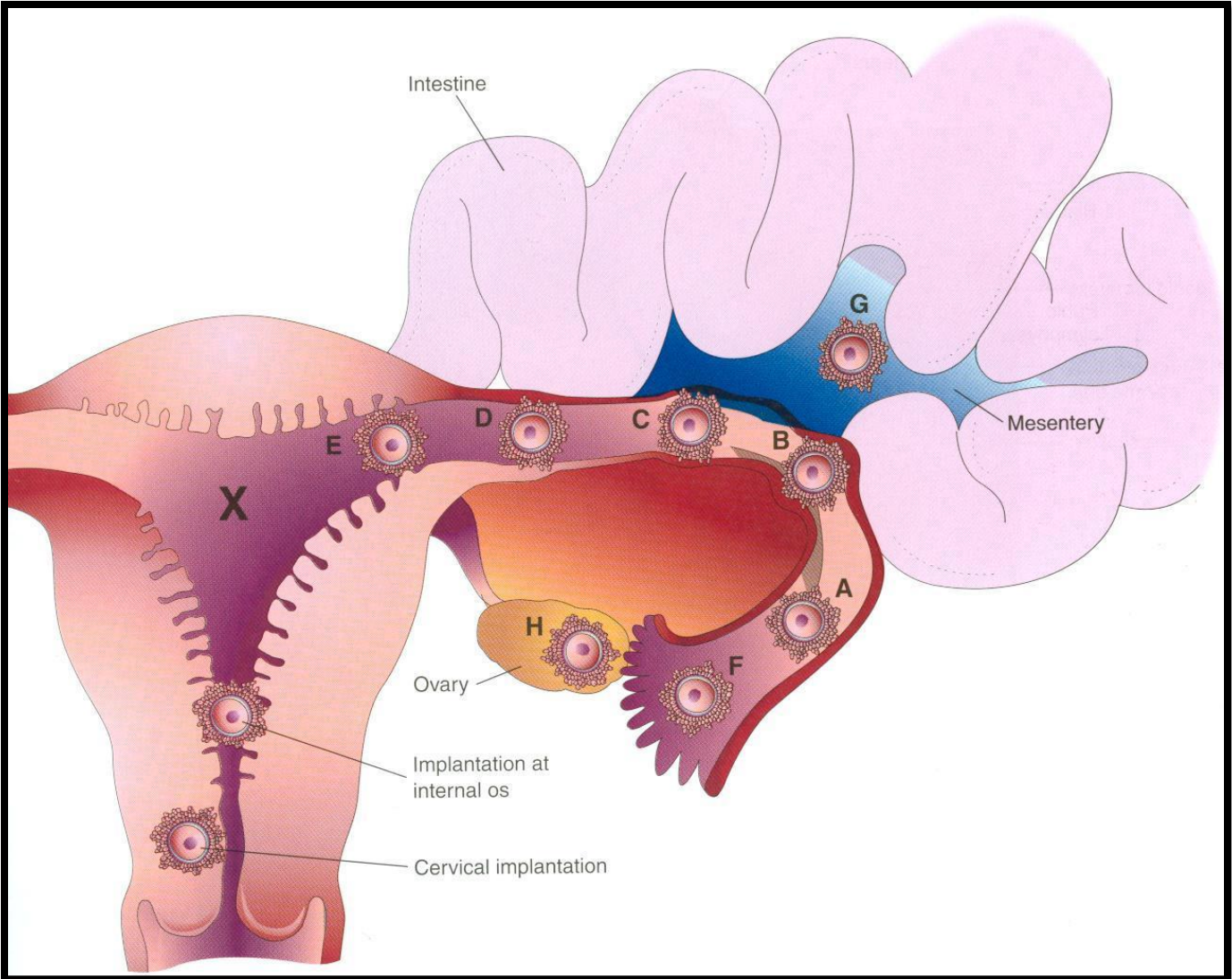


Embryoblast → **Embryo**
Trophoblast → **Fetal membranes**

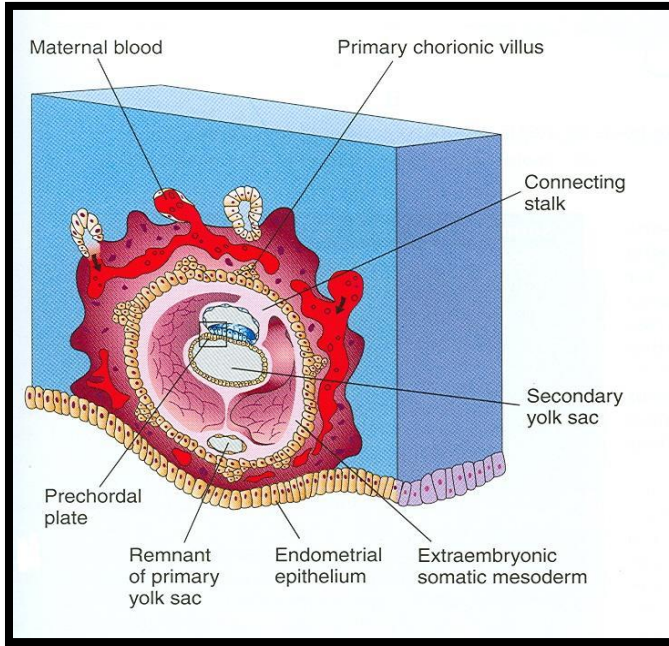
IMPLANTATION DAY 6 – DAY 10



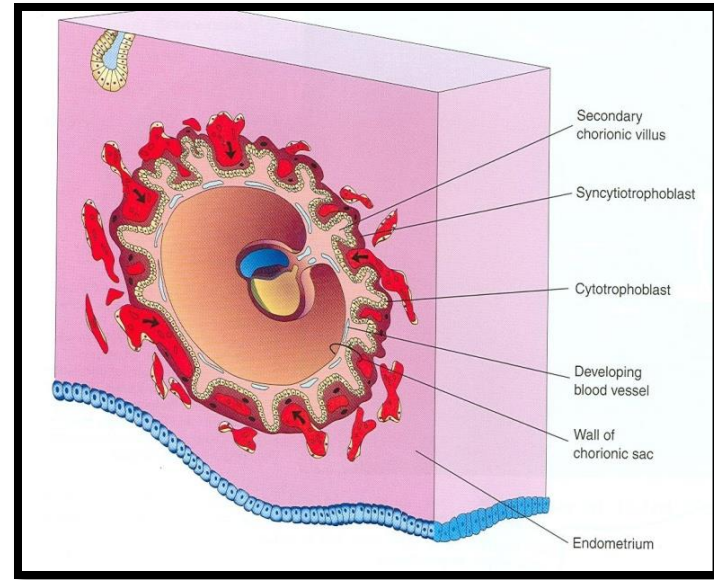
NORMAL & ABNORMAL IMPLANTATION



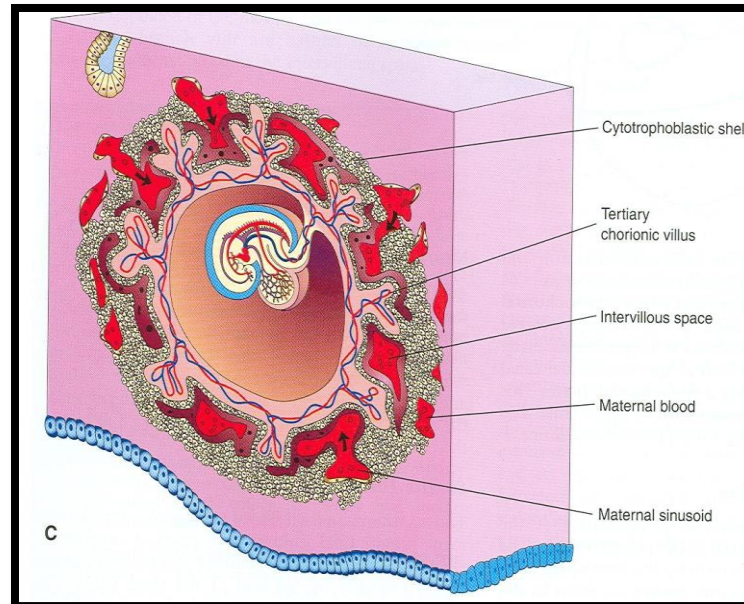
Primary chorionic villi: only trophoblast



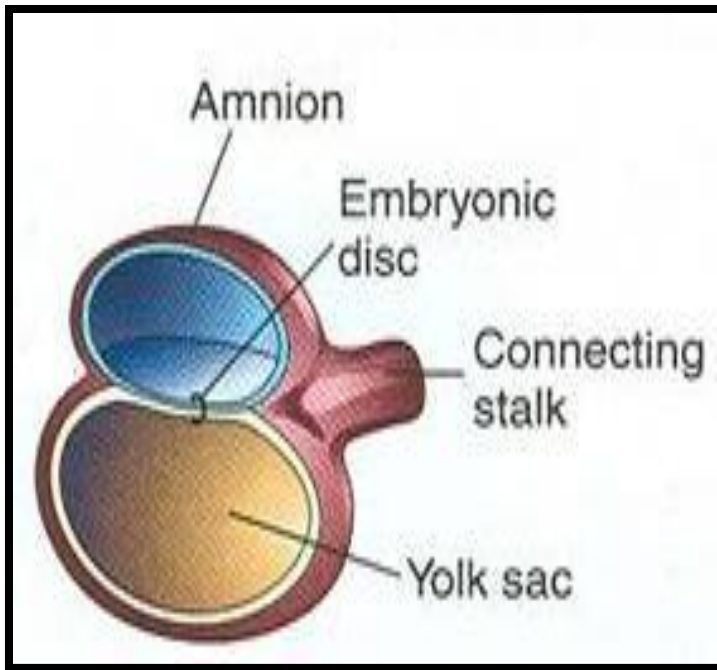
Secondary chorionic villi: trophoblast + mesoderm



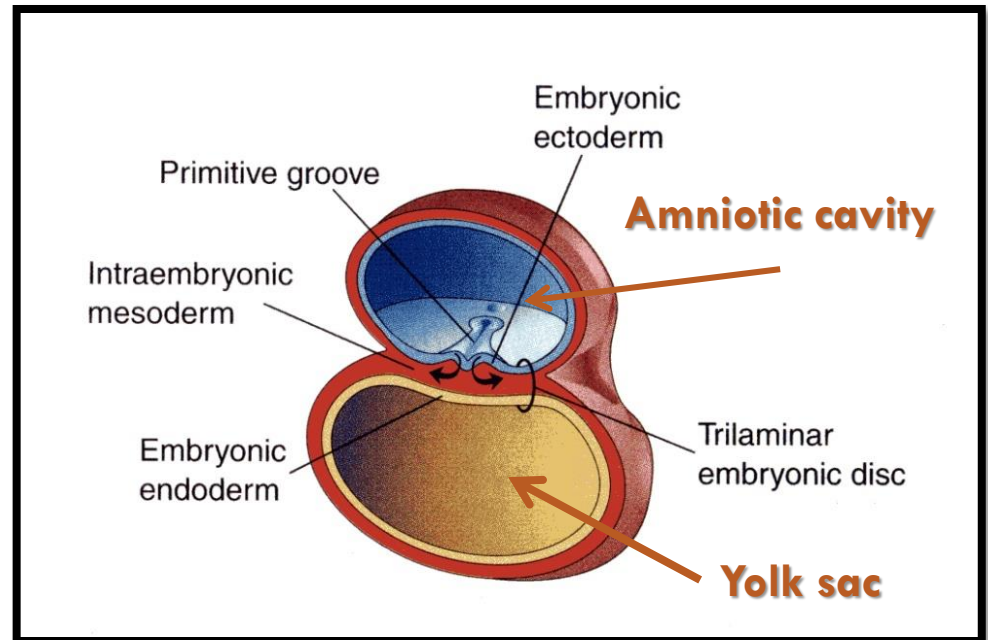
Tertiary chorionic villi: trophoblast + mesoderm + fetal blood vessels



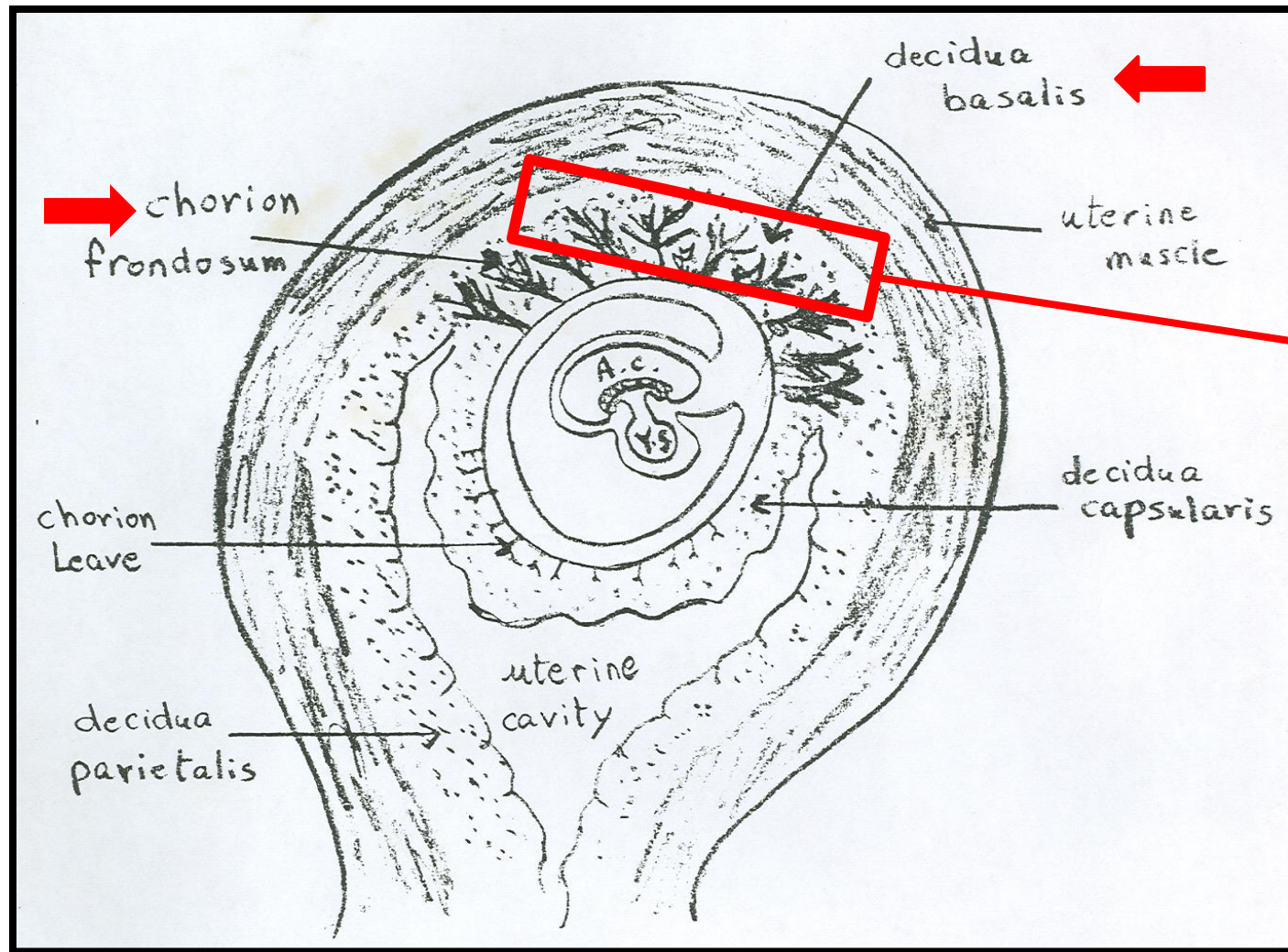
Bilaminar disc
Ectoderm & Endoderm
(End of 2nd Week)



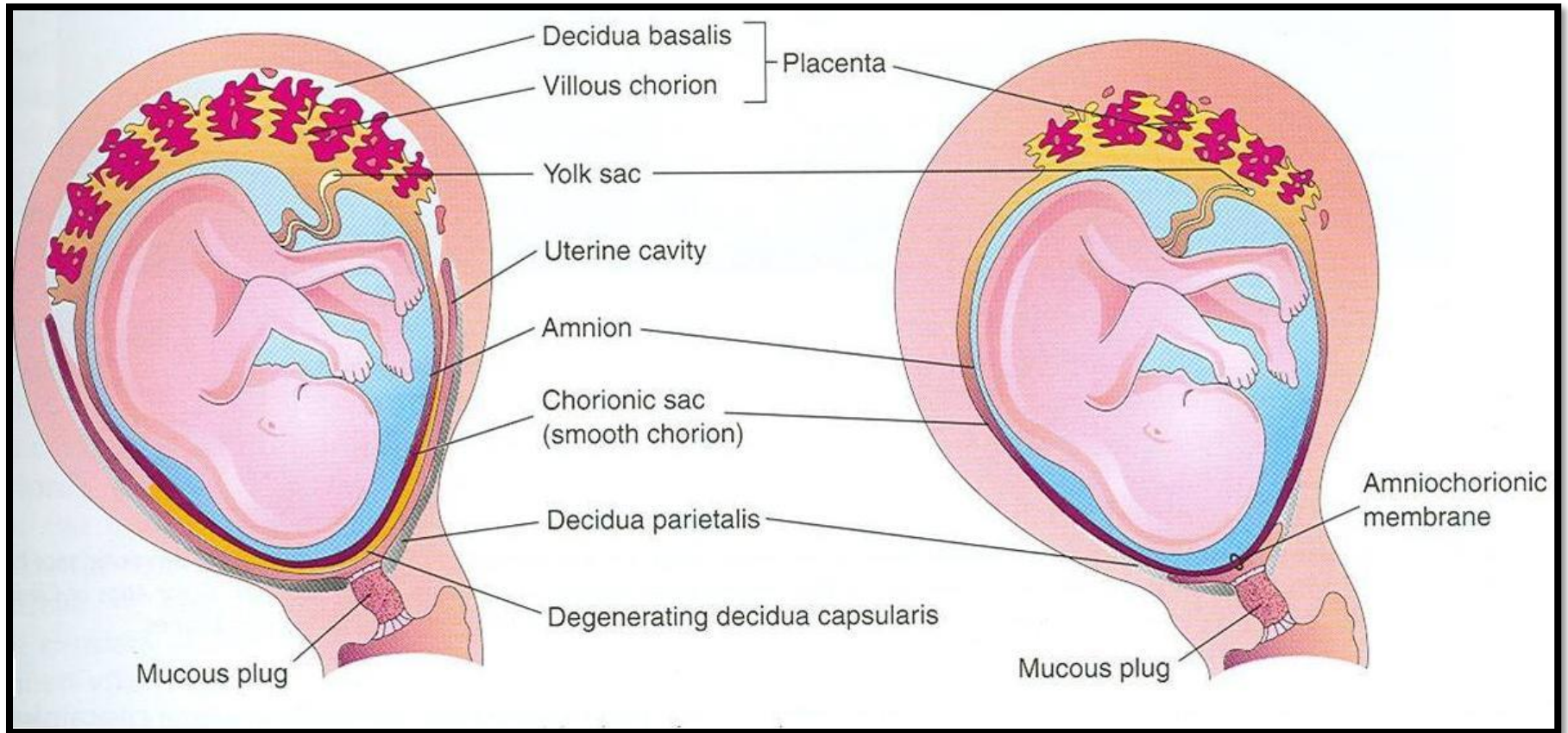
Trilaminar disc
Ectoderm, Mesoderm & Endoderm
(End of 3rd Week)



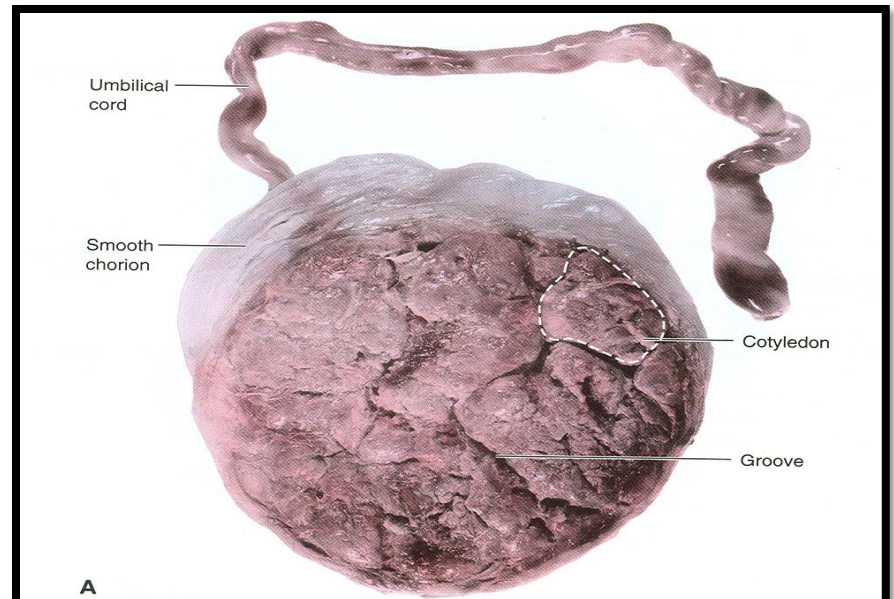
Decidua = functional layer of endometrium (uterine mucosa) in a pregnant women



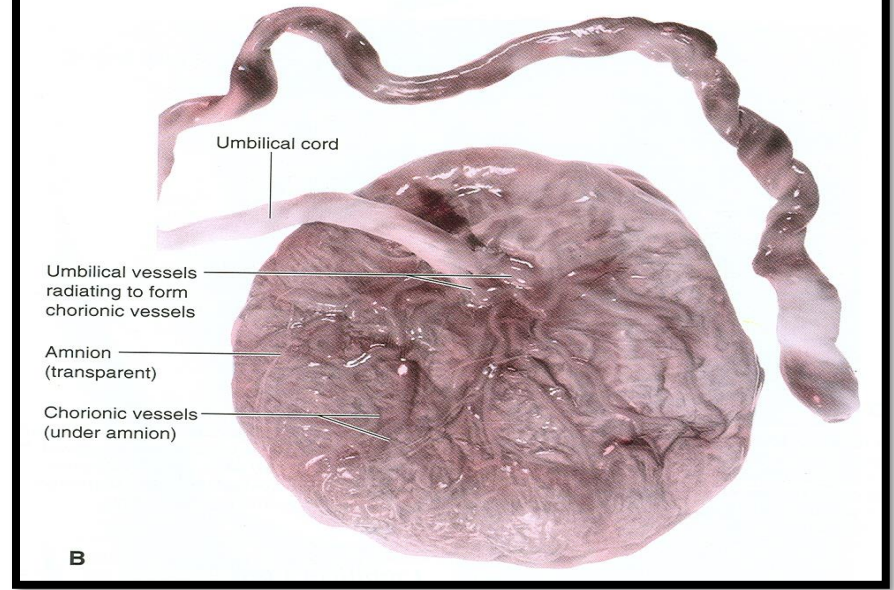
PLACENTA = DECIDUA BASALIS + VILLOUS CHORION (CHORION FRONDOSUM)



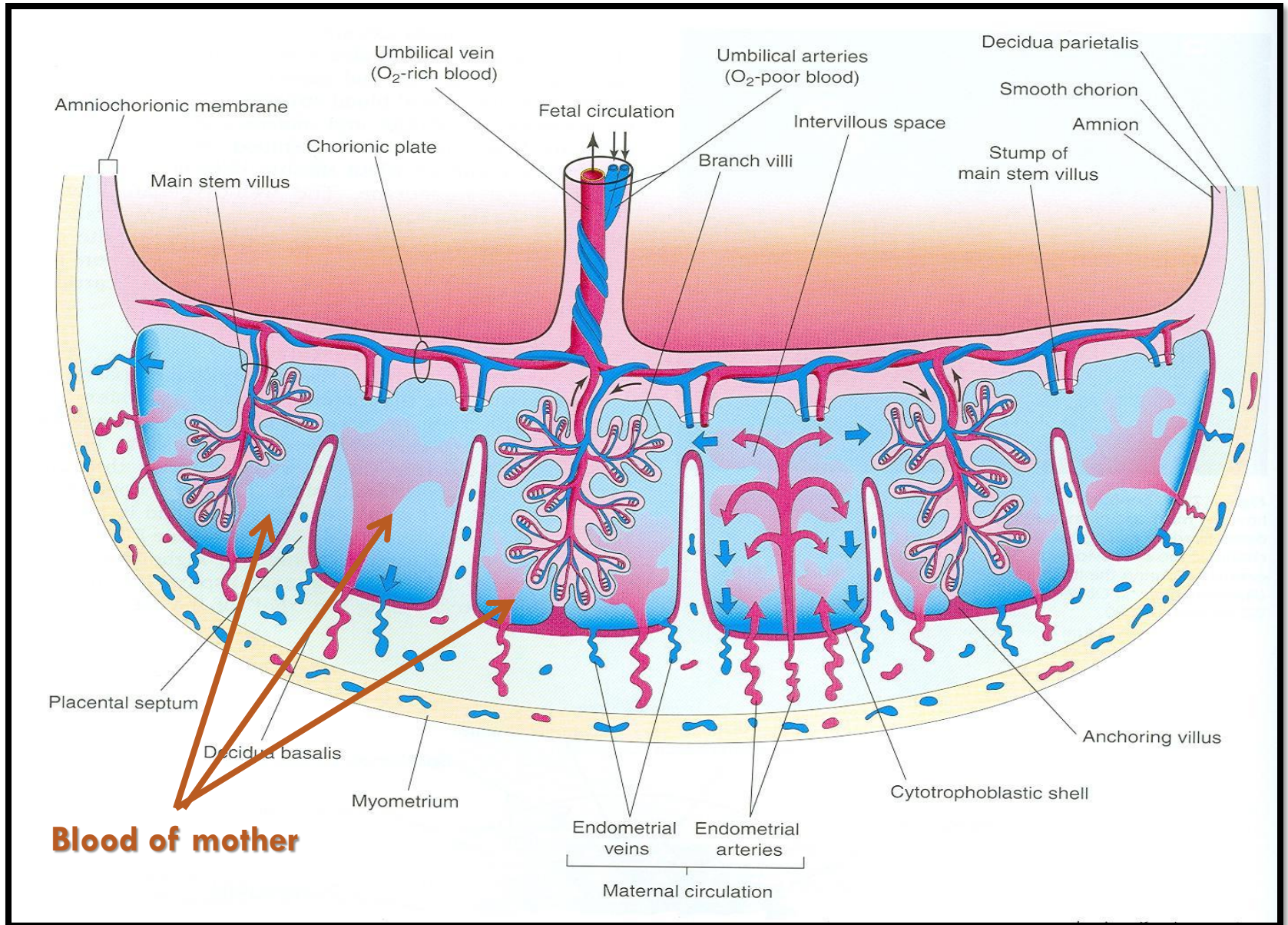
A- MATERNAL SURFACE OF PLACENTA



B- FETAL SURFACE OF PLACENTA



PLACENTAL CIRCULATION



FUNCTION OF PLACENTA

□ TRANSFER:

- 1. Gases: oxygen, carbon dioxide**
- 2. Nutritional substances: glucose, aminoacids, vitamins**
- 3. Electrolytes: Na⁺, K⁺, Cl⁻**
- 4. Maternal antibodies: antibodies against diphtheria, smallpox, measles**

FUNCTION OF PLACENTA

□ SECRETION OF HORMONES:

Protein hormones:

- 1. Human chorionic gonadotropin (early pregnancy tests)**
- 2. Human placental lactogen**
- 3. Human chorionic thyrotropin**
- 4. Human chorionic corticotropin**
- 5. Relaxin**

Steroid hormones:

- 1. Progesterone**
- 2. Estrogen**

FOLDING (FROM 3RD TO 4TH WEEK)

*The sequence of events after which the flat trilaminar embryonic disc is transformed into a cylindrical embryo

*It occurs in 2 planes:

A- Median plane

B- Horizontal plane

*Its general results are:

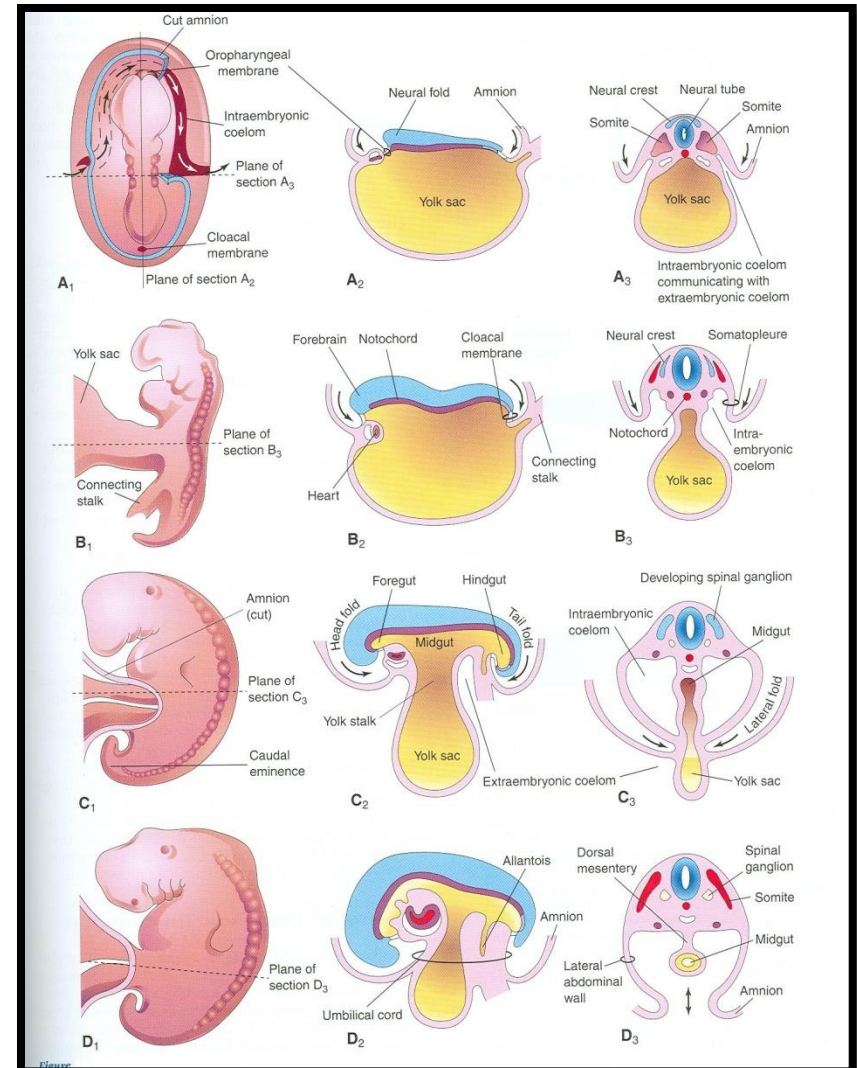
1. Ectoderm covers embryo from outside

2. Amniotic cavity surrounds embryo

3. Yolk sac becomes divided into:

A- Gut: part enclosed inside embryo (forms GIT)

B- Definitive yolk sac: part outside embryo



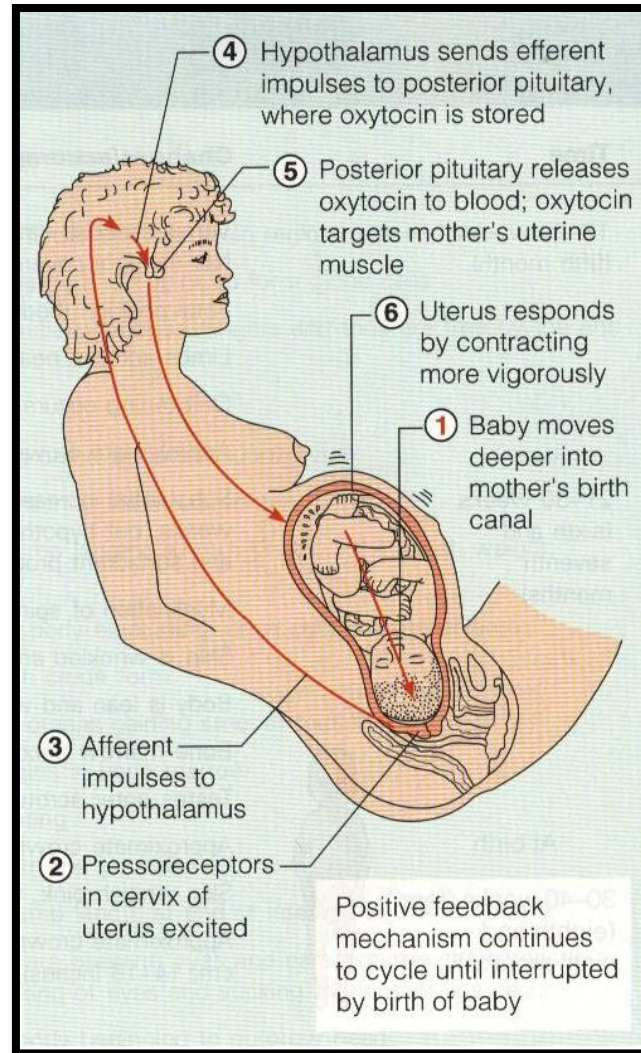
PERIODS OF DEVELOPMENT

- **GERMINAL PERIOD (FIRST 3 WEEKS):** Formation of the 3 germ layers.
- **EMBRYONIC PERIOD (4TH TO 8TH WEEK):** Organogenetic period, the main organ systems begin to develop.
- **FETAL PERIOD (9TH WEEK TO BIRTH):** concerned with rapid body growth & differentiation of tissues, organs & systems.

IMPORTANT DERIVATIVES OF GERM LAYERS

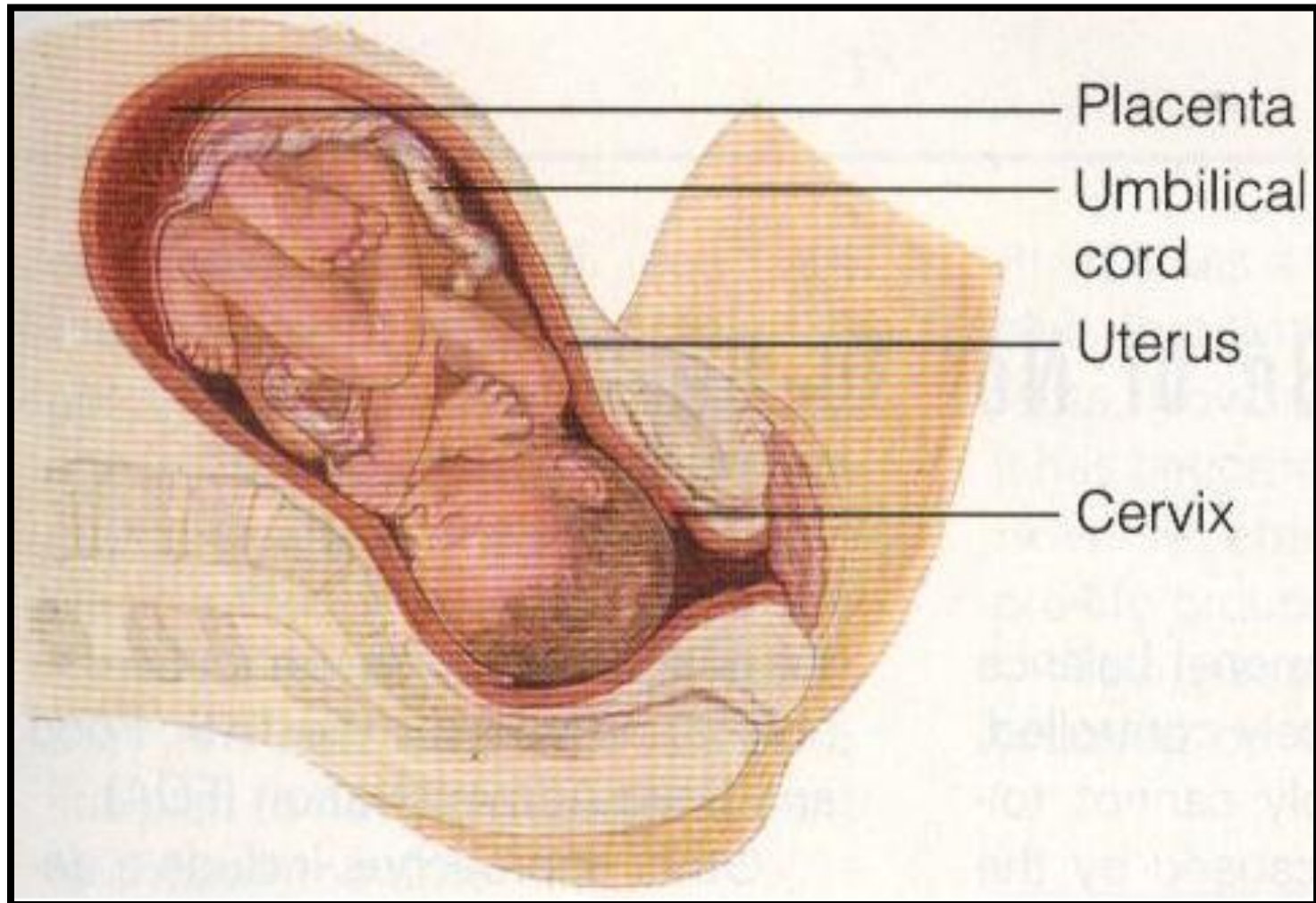
- **ECTODERM:** Nervous tissue, Skin & its appendages.
- **MESODERM:** Connective tissue (including blood, cartilage, & bone), Muscles, Urogenital organs.
- **ENDODERM:** Mucous membrane of GIT & Respiratory tracts, mucous membrane of Urinary bladder.

LABOR



FIRST STAGE OF LABOR

DILATATION OF CERVIX



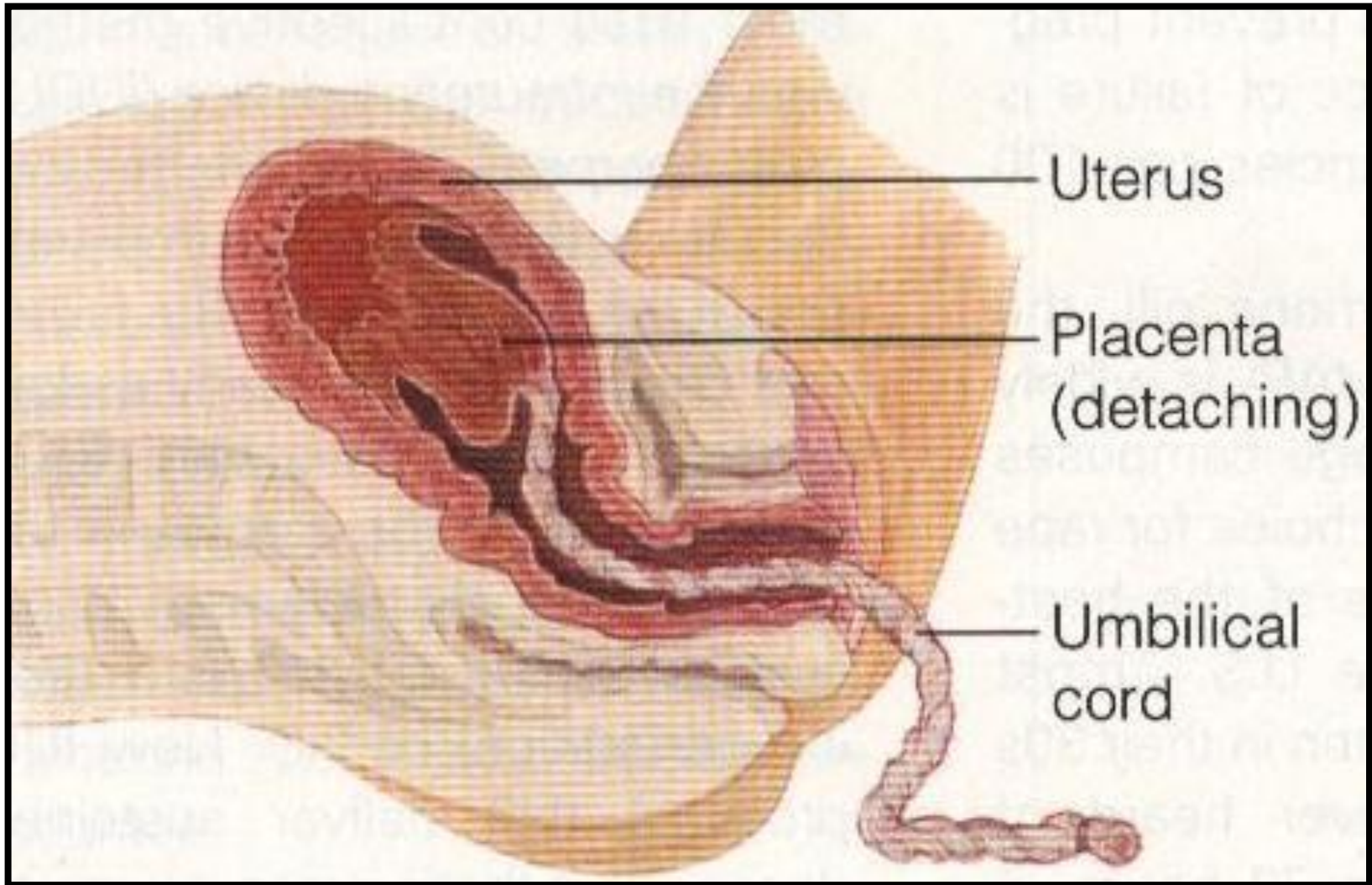
SECOND STAGE OF LABOR

EXPULSION STAGE

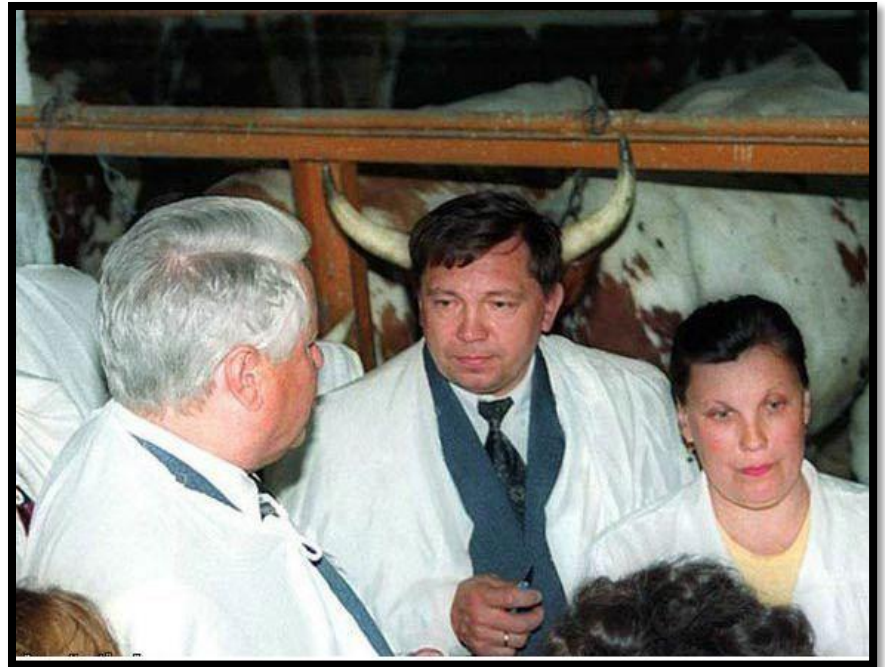


THIRD STAGE OF LABOR

PLACENTAL STAGE

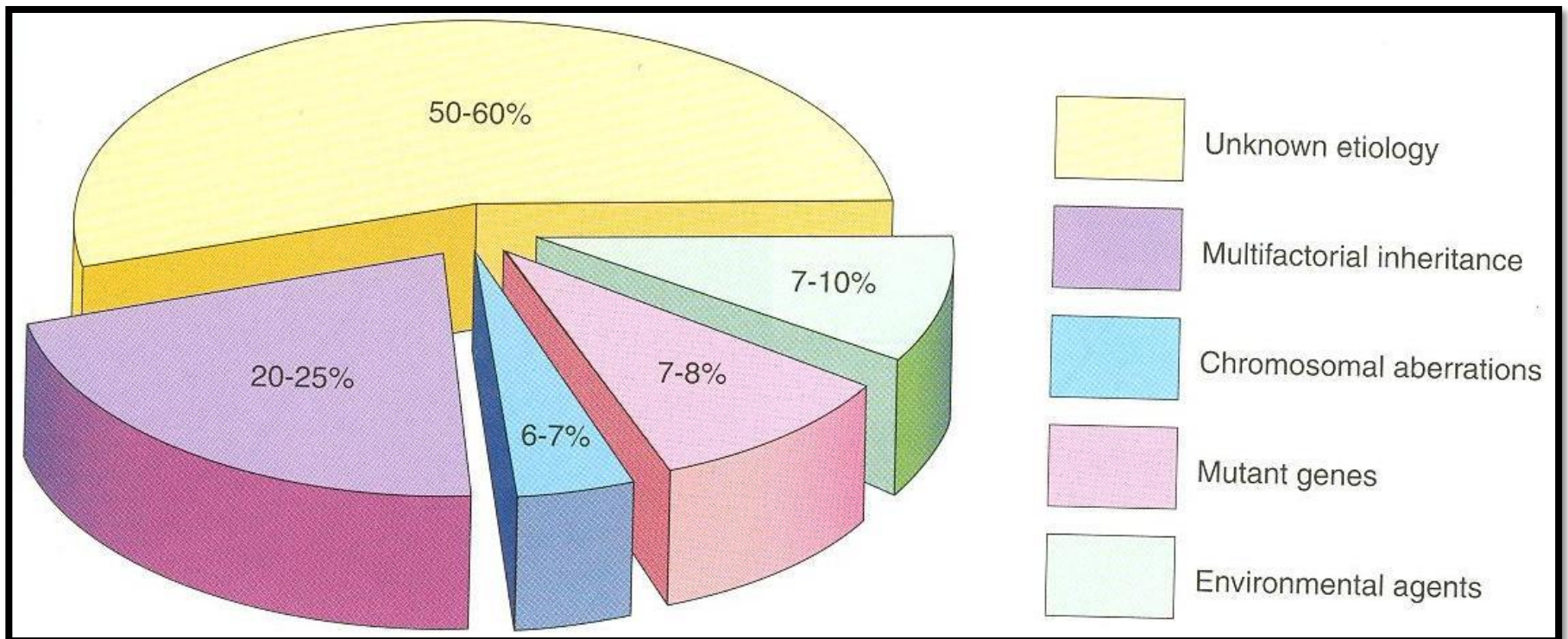


CONGENITAL ANOMALIES



TERATOLOGY

- *It is the branch of science that studies the causes, mechanisms & patterns of abnormal development.*



GENETIC FACTORS

CHROMOSOMAL ABBERRATIONS

- ❑ **Nondisjunction:** failure of a chromosomal pair to disjoin (detach): trisomy & monosomy.
- ❑ **Deletion:** a part of a chromosome is lost.
- ❑ **Duplication:** a part of a chromosome is duplicated.
- ❑ **Translocation:** a transfer of a part of one chromosome to a nonhomologous chromosome.

MUTANT GENES

- ❑ **A loss or change in the function of a gene due to a permanent, heritable change in the sequence of genomic DNA.**

ENVIRONMENTAL FACTORS

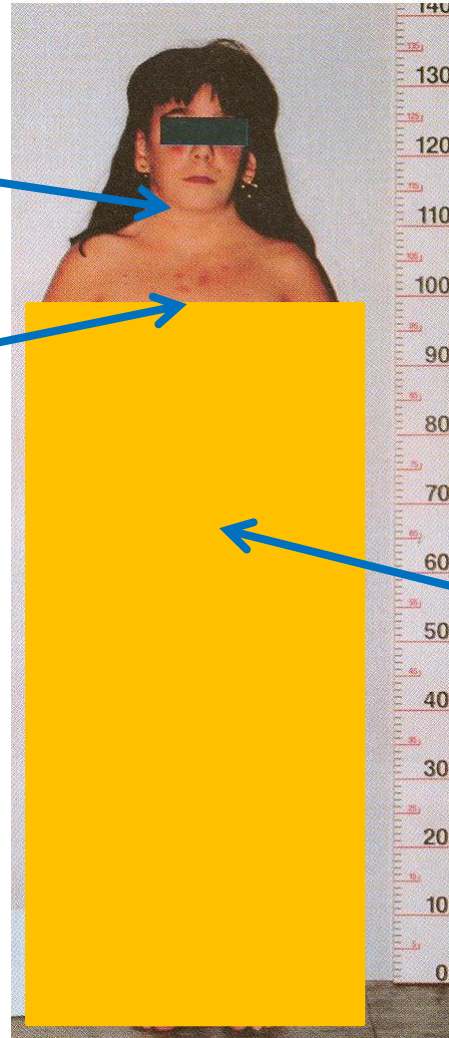
□ DRUGS:

1. Alcohol
2. Anticonvulsants (phenytoin or hydantoin)
3. Tranquilizers (thalidomide)
4. Antibiotics (tetracycline).

□ INFECTIONS:

1. Rubella virus (german measles)
2. Cytomegalovirus
3. Toxoplasma Gondii (a parasite causing toxoplasmosis)

MONOSOMY X FEMALE - TURNER SYNDROME (45X)



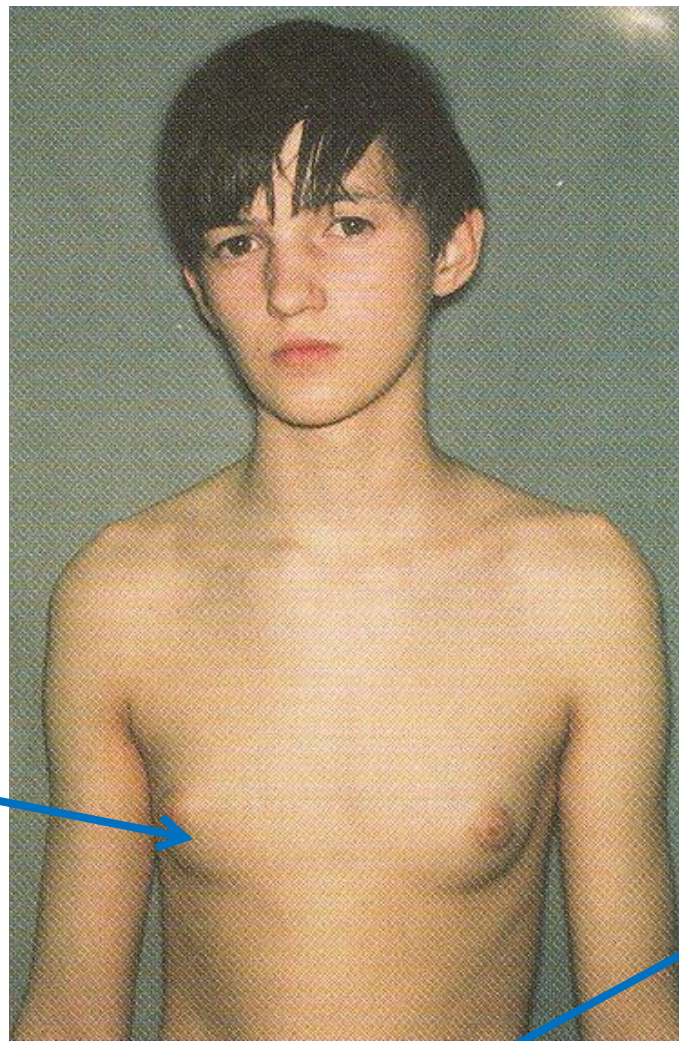
Webbed neck

Short stature

Broad chest with space nipples

Absence of sexual maturation

TRISOMY XXY – KLINEFELTER SYNDROME (47XXY)



**Gynecomastia
(enlarged breast)**

Small testes

TRISOMY 21 – DOWN SYNDROME

Mental deficiency



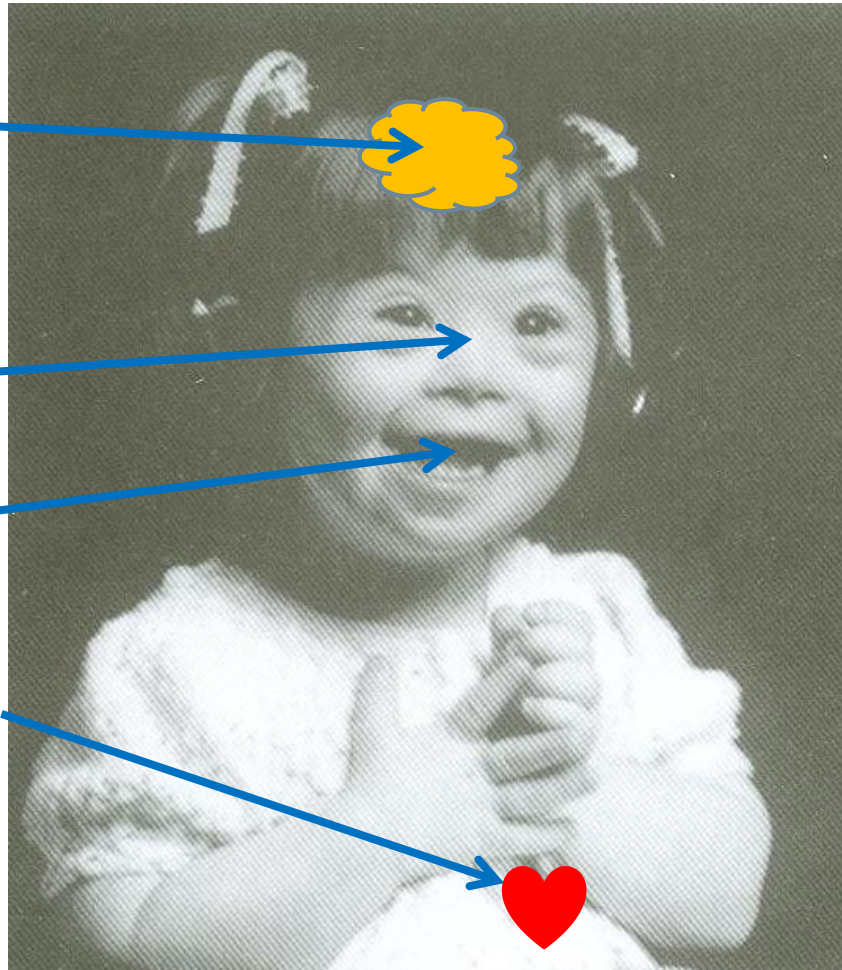
Flat nasal bridge



Protruding tongue



Congenital heart defect

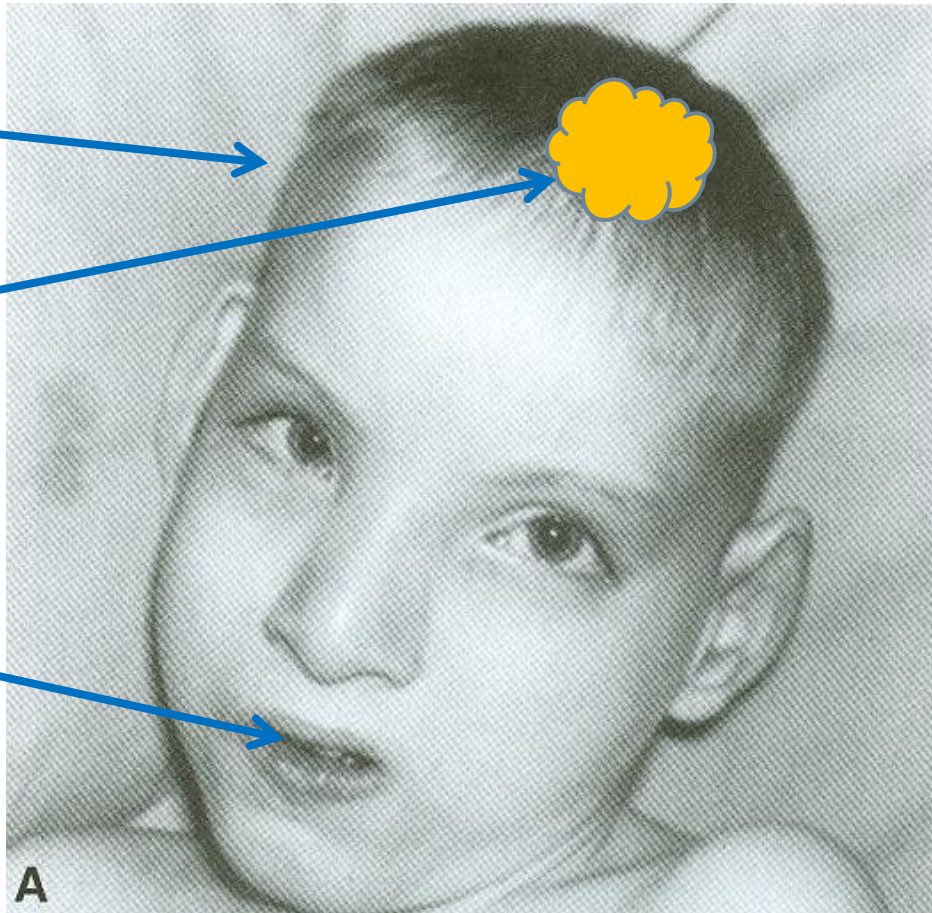


DELETION FROM CHROMOSOME 5 – CRIT DU CHAT

Microcephaly
(small head)

Mental retardation

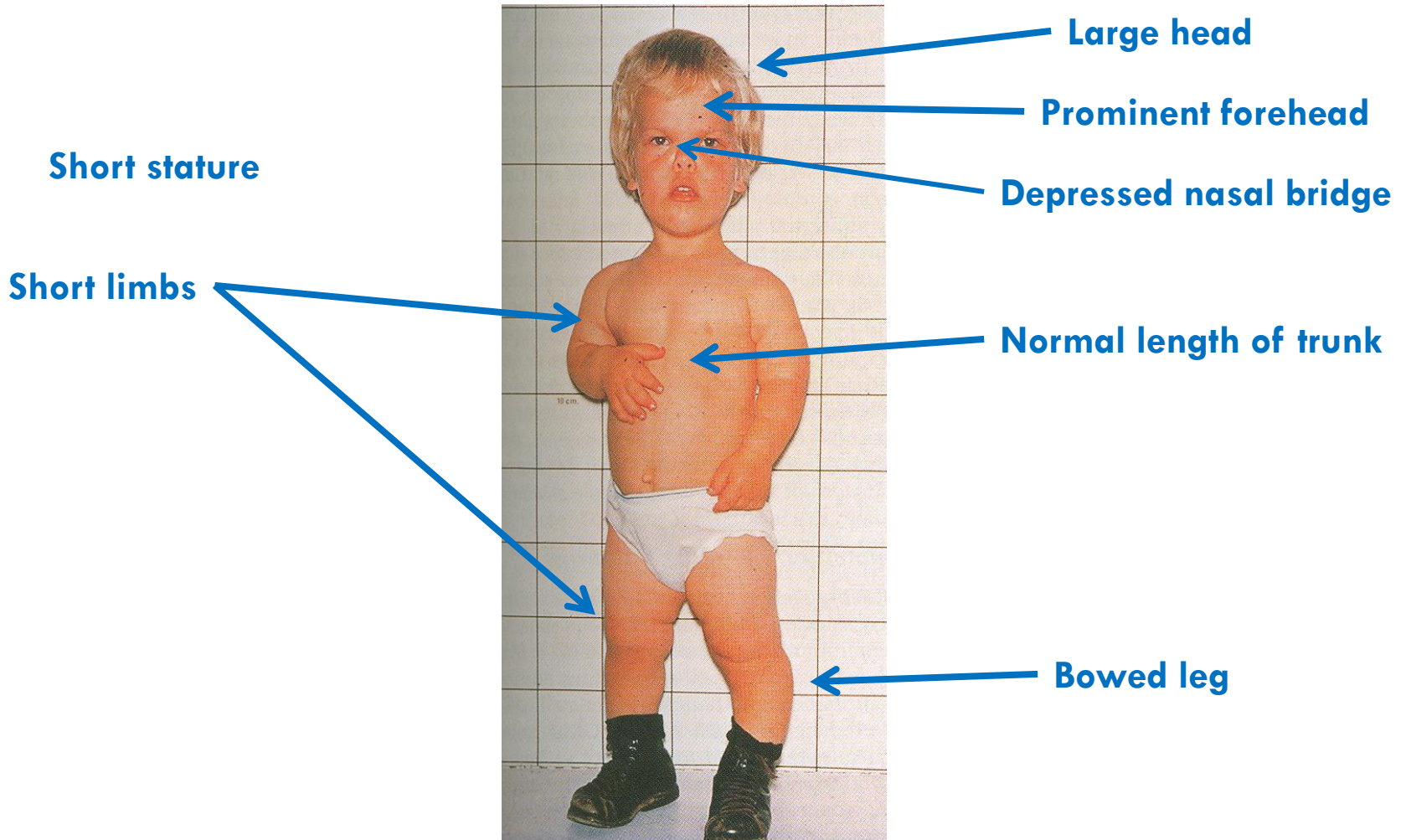
Weak cat-like cry



Congenital heart disease



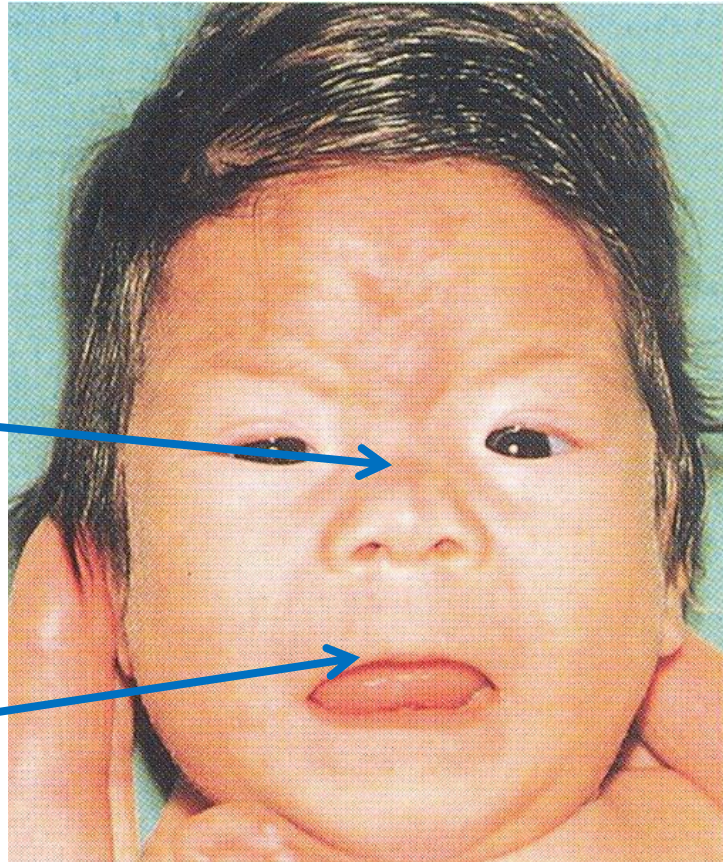
GENE MUTATION - ACHONDROPLASIA



FETAL ALCOHOL SYNDROME

Flat nasal bridge
& short nose

Thin upper lip



Congenital heart disease

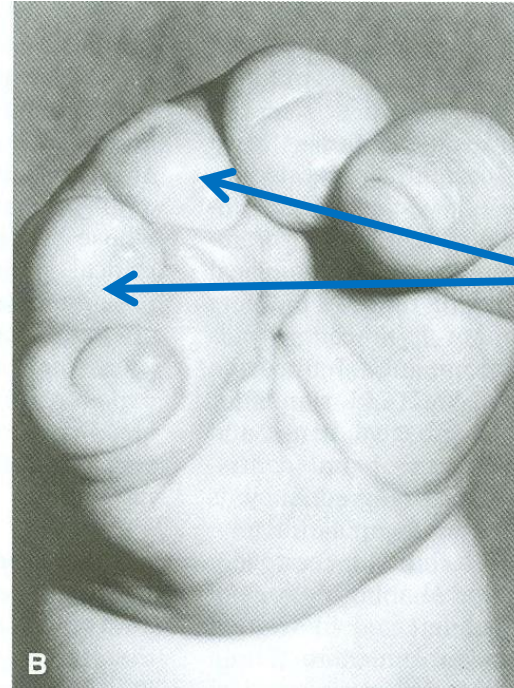
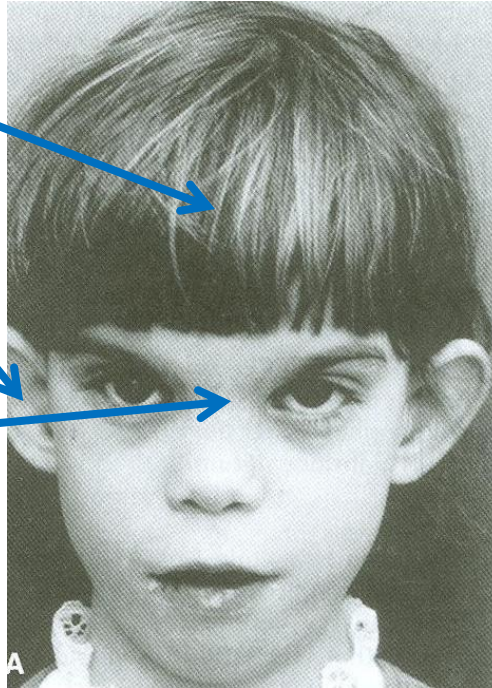


FETAL HYDANTOIN SYNDROME

Mental deficiency

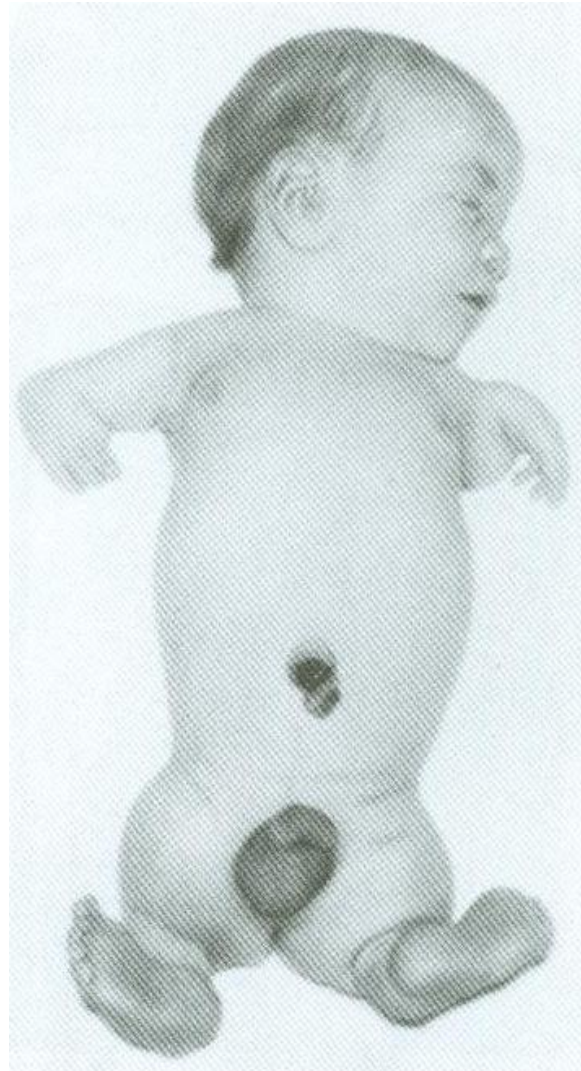
Unusual ears

Wide-spaced eyes

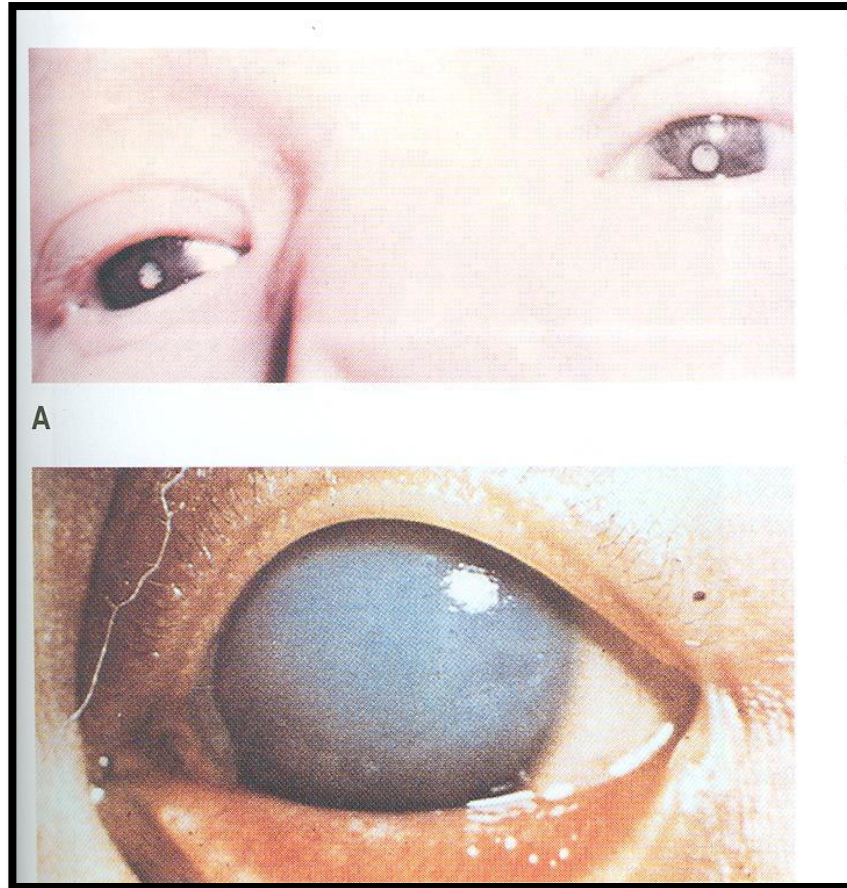


Short fingers

MEROMELIA (LIMB REDUCTION) CAUSED BY THALIDOMIDE



BILATERAL CONGENITAL CATARACT (CORNEAL OPACITY) CAUSED BY RUBELLA VIRUS



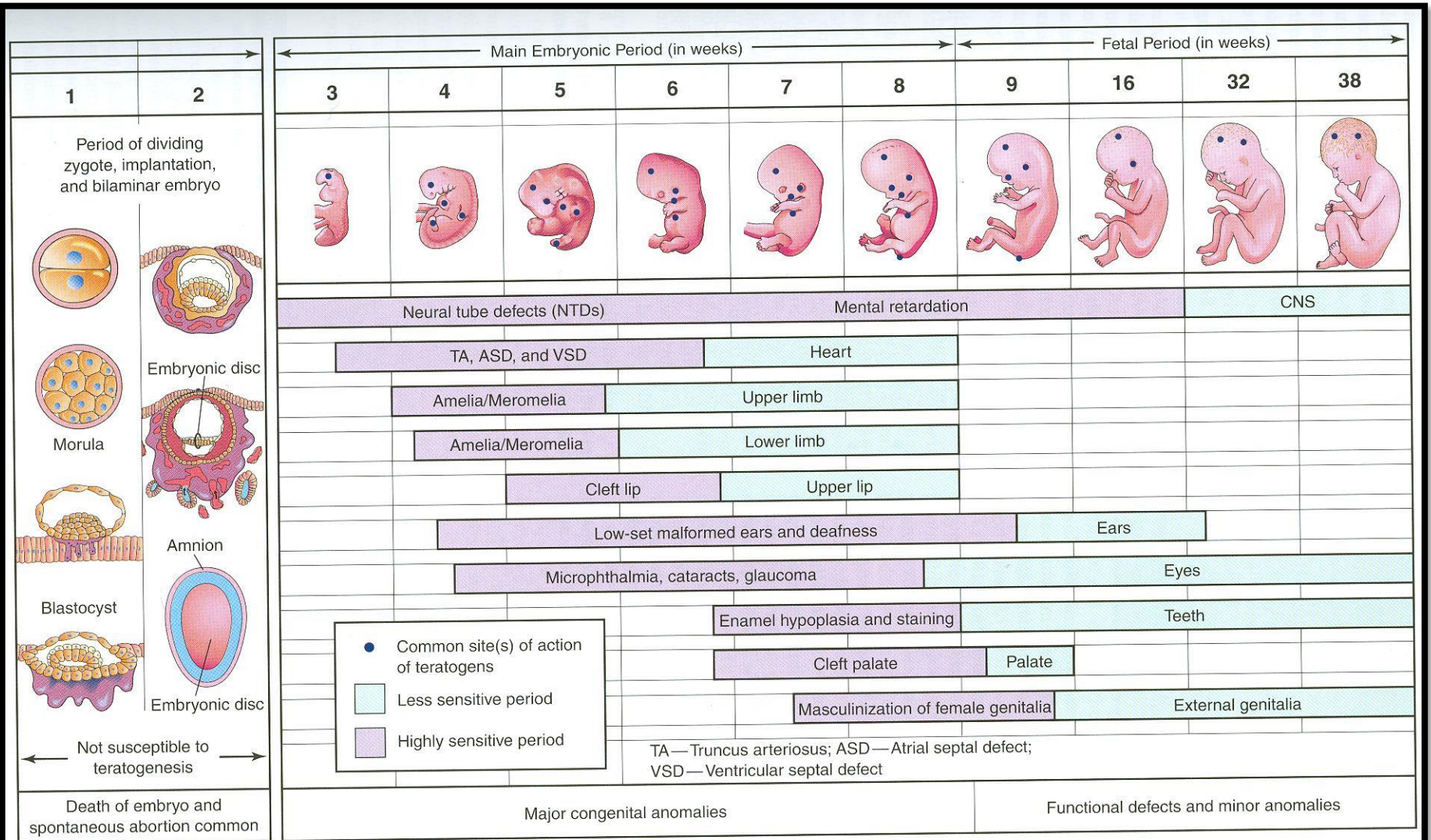


Figure 8-15. Schematic illustration of critical periods in human prenatal development. During the first 2 weeks of development, the embryo is usually not susceptible to teratogens; a teratogen either damages all or most of the cells, resulting in death of the embryo, or damages only a few cells, allowing the conceptus to recover and the embryo to develop without birth defects. *Mauve* denotes highly sensitive periods when major defects may be produced (e.g., amelia, absence of limbs). *Green* indicates stages that are less sensitive to teratogens when minor defects may be induced (e.g., hypoplastic thumbs).



”و في أنفسكم أفلا تبصرون“

صدق الله العظيم