



# Human Embryology-5

- ✓ External Features during 4<sup>th</sup>-8<sup>th</sup> Weeks
- ✓ Development of Fetus (9<sup>th</sup>-36<sup>th</sup> Weeks)
  - ✓ Birth (Delivery)

Prof. Alp CAN

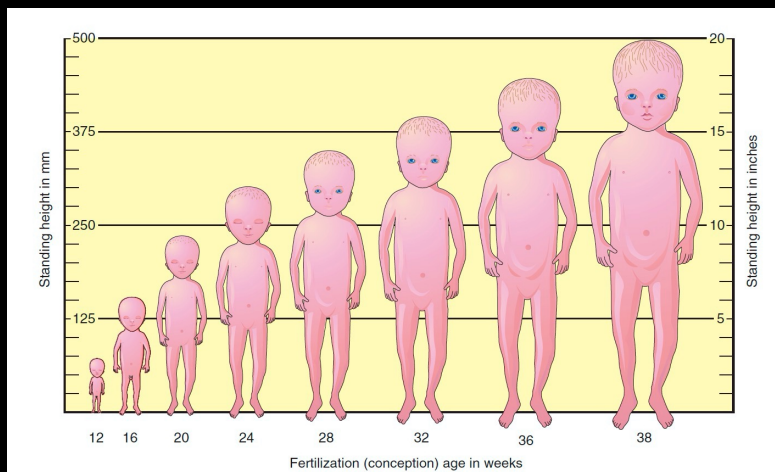
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# Fetus Development (9<sup>th</sup> week to birth)

## Prenatal Development Scores

	Embryonic Period	Fetal Period
<b>Weeks</b>	0-8	9-38
<b>Weight</b>	1.65 $\mu$ g - 4.5 g	4.5 g - 3500 g
<b>Development Rate</b>	x 1000/mo	x 100/mo
<b>CRL (crown-rump length)</b>	140 $\mu$ m - 30 mm	3 cm - 36 cm



Head / Body decrease as the development weeks progress

# Main External Features in Fetus Development

Age (weeks)	CLR (mm)	Fetus weight (g)	Main External Characteristics
9	50	8	Eyelids closing or closed. Head large and more rounded. External genitalia are not distinguishable as male or female. Some of the small intestines are in the proximal part of umbilical cord. The ears are low set.
10	61	14	Intestines in abdomen. Early fingernail development.
12	87	45	Sex distinguishable externally. Well-defined neck.
14	120	110	Head erect. Eyes face anteriorly. Ears are close to their definitive position. Lower limbs well developed. Early toenail development.
16	140	200	External ears stand out from head.
18	160	320	Vernix caseosa covers skin. Quickening (first movements) felt by mother.
20	190	460	Head and body hair (lanugo) visible.
22	210	630	Skin wrinkled, translucent, and pink to red.
24	230	820	Fingernails present. Lean body.
26	250	1000	Eyelids partially open. Eyelashes present. <b>Viab</b>
28	270	1300	Eyes wide open. Scalp hair sometimes present. Skin slightly wrinkled.
30	280	1700	Toenails present. Body filling out. Testes descending.
32	300	2100	Fingernails reach fingertips. Skin smooth.
36	340	2900	Body usually plump. Lanugo (hairs) almost absent. Toenails reach toe tips. Flexed limbs; firm grasp.
38	360	3400	Prominent chest; breasts protrude. Testes in scrotum or palpable in inguinal canals. Fingernails extend beyond fingertips.

\*These measurements are averages and so may not apply to specific cases; dimensional variations increase with age.

†These weights refer to fetuses that have been fixed for approximately 2 weeks in 10% formalin. Fresh specimens usually weigh approximately 5% less.

‡There is no sharp limit of development, age, or weight at which a fetus automatically becomes viable or beyond which survival is ensured, but experience has shown that it is rare for a baby to survive whose weight is less than 500 g or whose fertilization age is less than 22 weeks. Even fetuses born between 26 and 28 weeks have difficulty surviving, mainly because the respiratory system and the central nervous system are not completely differentiated.

# Main Internal Features in Fetus Development

## Time

## Characteristics

9<sup>th</sup> week

First muscle movements

10<sup>th</sup> weeks

Intestines turns into the abdomen

11<sup>th</sup> weeks

Urine is produced and excrete to amniotic cavity

12<sup>th</sup> weeks

Ovaries descend to pelvis

Taste buds are almost fully developed.

Fetus recognizes the taste of amniotic fluid, which resembles mother's diet.

4<sup>th</sup> month

Hematopoiesis starts in bone marrow

Primordial follicle begin to appear in ovaries

5<sup>th</sup> month

Testicles descend to inguinal canal

6<sup>th</sup> month

Surfactant begin to synthesize and secreted (26-27<sup>th</sup> week)

Fetus may start hearing murmurs and intestinal sounds

Fetus' heart rate slows down when mother speaks

7<sup>th</sup> month

Testicles are about to reside in scrotums

Hematopoiesis in spleen is about to terminate

8<sup>th</sup> month

Testicles are in scrotums

Fetus displays about 50 movements a day



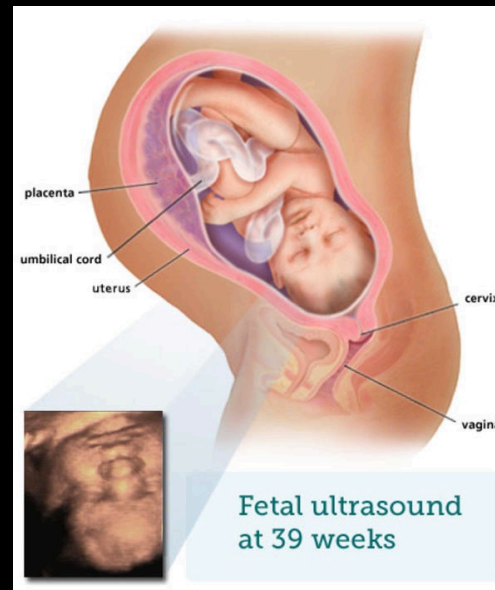
# 9<sup>th</sup> Month

## External

- Fingernails extend beyond the tip of fingers
- Toenails reach tip of the toes
- Most of lanugo are shed off
- Skin is covered with vernix caseosa
- Amnion fluid reaches 1 liter
- Placenta weighs around 500 grams

## Internal

- Surfactant is secreted in large amounts
- Myelination in brain starts
- Vision is the last sense to be gained. Fetus may sense the intense light, which may be harmful.



Italian artist Federico Clapis  
Crypto Connection at the  
Observation Point on Southbank  
London, UK

# Time of Birth

- 266 days after fertilization (38 weeks)
- 280 days after last menstrual period (LMP) (40 weeks)

Estimated date of delivery (ETD) or confinement (EDC)

$(\text{LMP} - 3 \text{ months}) + (1 \text{ year and } 7 \text{ days}) = \text{ETD} (\pm 10 \text{ days})$

## Example

LMP: 29 December 2020

ETD: ?

6-7 October 2021

# Parturition (Delivery, Labor)

- Parturition is the process during which the fetus, placenta, and fetal membranes are expelled from the mother's reproductive tract.
- Labor is a sequence of involuntary uterine contractions, which result in dilation of the cervix and expulsion of the fetus and placenta from the uterus.

- The factors that trigger labor;

## Oxytocin

(releases from neurohypophysis)

→ Peristaltic contraction of uterus

→ Stimulates release of prostaglandins (promoters of uterine contractions) from the decidua.

## Estrogens

→ increase myometrial contractile activity and stimulate the release of oxytocin and prostaglandins

# Parturition (Delivery, Labor)

The process of delivering the fetus and placenta from the uterus through the vagina to the outside world

Three phases;

1. Dilatation of cervix
2. Expulsion of fetus
3. Expulsion of placenta

