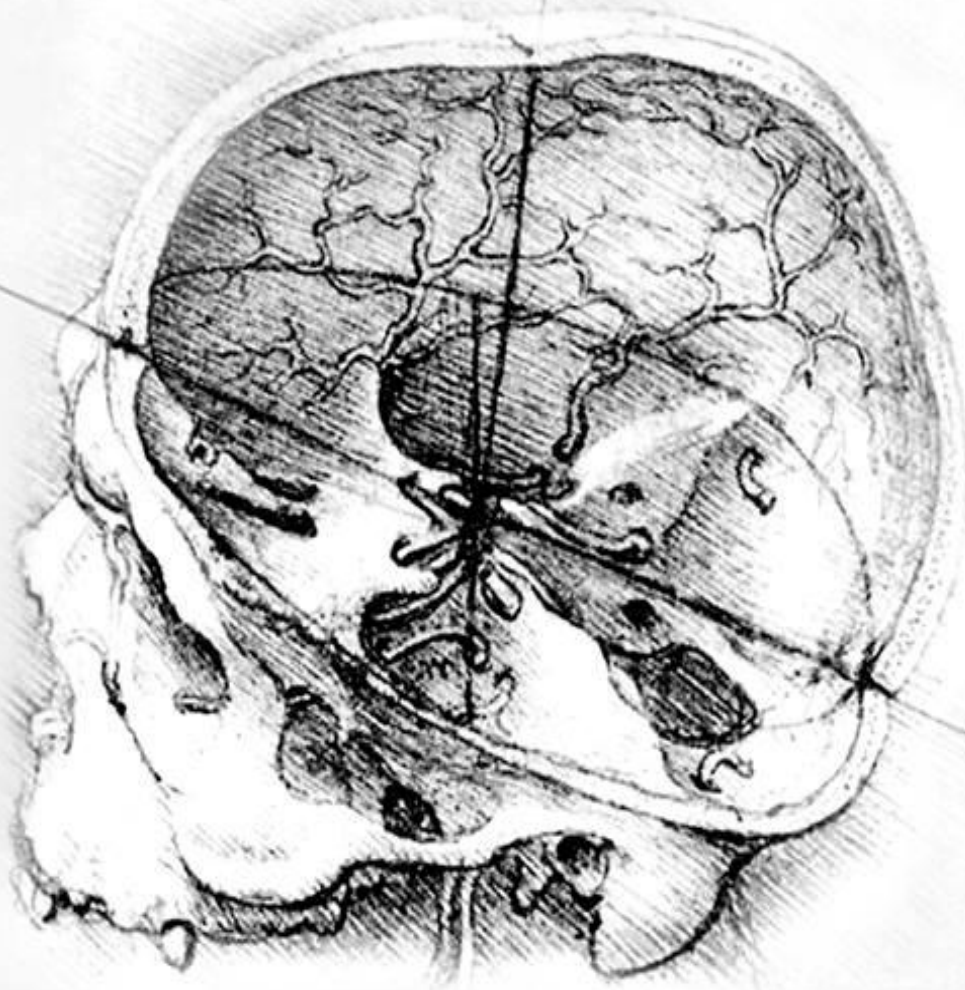




Medical Committee
The University Of Jordan

ANATOMY & EMBRYOLOGY



4

LECTURE #: (embryo 1)

DONE BY Qusai Sharief

DOCTOR: Mohammad Al-Mohtasib

SHEET ☒

SLIDES ☐

Introduction to Embryology

in this subject we will study the improvements and the abnormalities that occur to the embryo from fertilization to the bilaminar disk of embryo.

The science of embryology is divided to:

1- General embryology: This is specialized in the formation of the embryo from the first week to the last week of pregnancy (this is the section we are interested in learning in this course).

2- Special embryology: This is specialized in the development of the system such as the formation of the cardio vascular system, respiratory system, GI systemETC (We will take it later on through our study of the body systems individually).

Before we start it is so important to have an Embryology text book because you will refer to it even after you finish studying medicine (the formation of the heart for example). Try to bring clinical embryology because it is the book the Dr refers to through this course.

Important definitions :

1-Embryology: the study of development of the embryo from fertilization (zygot:forms in the ambulla of fallopian tube) through the eight weeks in uterus.

Note: the age of the embryo starts from the moment of fertilization.

2-Zygot (fertilized egg): mature ovum (Egg) connected with one sperm only (the fusion of the nuclei of an ovum with the nucleus of one sperm only).

3- Developmental anatomy: is the development of the fertilized egg to reach the adult form.

*The ovaries usually produce 4, 5 or 6 ovums , all of them of them disintegrate except for one that becomes ovulated (released from the ovaries).

Introduction to Embryology

4-ovulation: the release of a **mature** ovum from the ovary to fallopian tube. then this mature ovum migrates to ampulla (where the ovum gets fertilized) and stays there for 48 hours (if it didn't fertilize in that time it will be disintegrated and the body starts preparing for menstrual cycle).

*If the egg were fertilized there will be no menstrual cycle (The first sign of pregnancy)

5-Teratology: the science that studies the abnormalities in the development of the embryo (congenital) that causes diseases to the embryo (eg inter ventricular septal defect, renal agenesis (absence in kidney)).

Due to the essential developments in the embryo during the first three months it is vital for the pregnant women to ask the physician before taking any medication.

6-Pre-embryonic period: is first three weeks after fertilization(Zero time).

7-Embryonic period: starts after the fourth week of fertilization.

8-Fetal period: is from 9th week until birth

It takes (40 ± 2) weeks from the fertilization to the birth of the baby (9 months).

9-Oocyte: cell of the ovary.

10-Cyte: cell.

One of both ovaries produces one ovum every cycle but some abnormalities may occur:

1-both ovaries don't produce ovum.

2-both ovaries produce ova which when fertilized result in the formation of non-identical twins.

Note: identical twins form when the fertilized egg goes over mitotic process resulting in two identical embryos (Identical in everything except the fingerprints).

Introduction to Embryology

Cleavage: mitotic division of the zygote.

Morula : solid ball of cells (16 or more blastomers) which moves th

Morula turns into Blastocyst in the uterus then it implanted in the posterior wall of the body of the uterus (sometimes on the anterior wall), then it implants in the endometrium (3'asha2 moba6en lera7em) where it gets the blood supply and the embryo in larges.

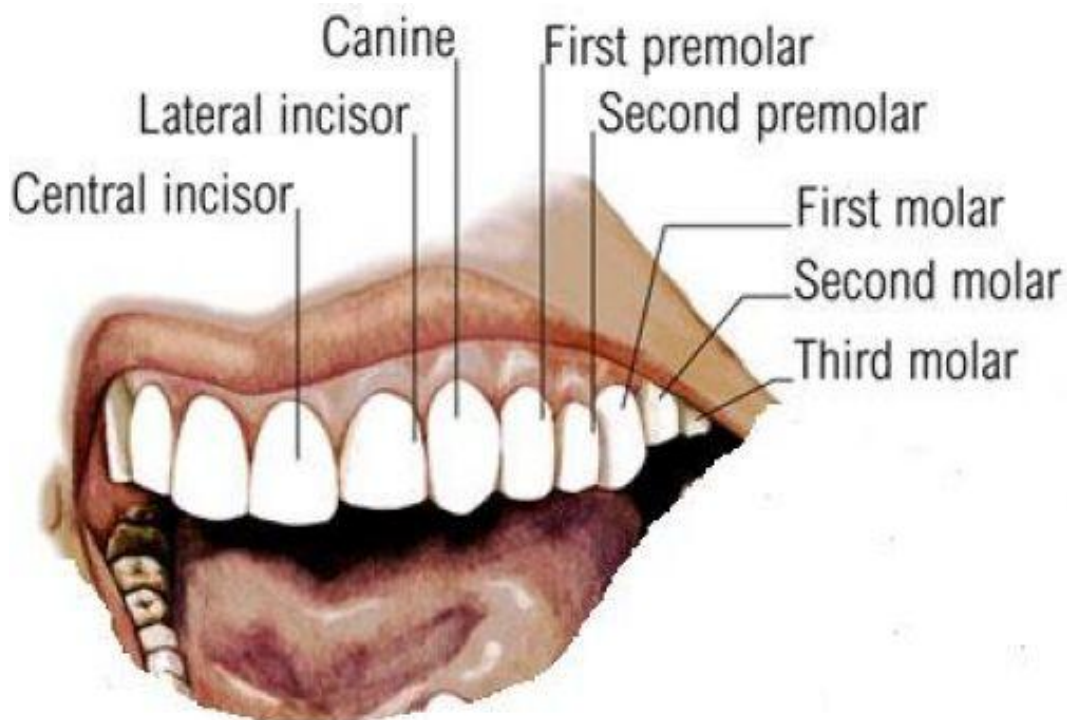
Biometrium: (3adalet erra7em)

At the beginning the embryo have two layers Ectoderm and Endoderm, but after the development it will have **Ectoderm, Endoderm and Mesoderm.**

Refer to prenatal and postal stages in the slide.

The changes in the fetus are very rapid during infancy(tall increase 15%,weight increase 3 times)

In the beginning of the childhood stage the child will have milk teeth (disiduas teeth), there are 20 Teeth during this period and they begin to grow at the age of 6 months to the age of 6 years and begin to change from the age of 6 years to the age of 12 years (noting that the number of permanent teeth is 32, 16 upper,



16 lower).

Introduction to Embryology

Ossification of bones: if we captured the bone of a less than 18 years old human we may find that the ends of the bone don't have ossification but have **ossified blade** (disc) in which the growing bone looks like cartilage and having a space between head of proximal end and shaft giving an indication that there is no ossification, while if we captured the bone of a grown man we will surely have ossification (ta3athom).

The puberty: occurs under the effect of sexual hormones

In girls between 12-15 (pituitary gland generates a stimulus that stimulates the ovaries to secrete progesterone and estrogen).

In boys between 13-16 (pituitary gland generates a stimulus that stimulates the testes to secrete testosterone Hormone which causes the sperm to be manufactured in the body).

Secondary sexual characteristics develop (hair in males for example)

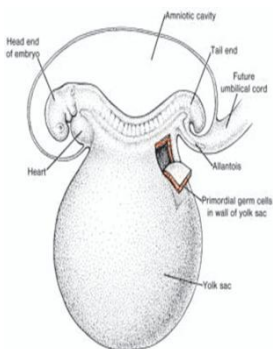
noting that the age of puberty changes depending on the weather (Human matures faster in hot weather).

Review adolescence from the slides (a woman cannot be given leadership because she has so many emotions caused by hormones, me being racist :p).

In the adulthood the bones are completely ossified and the body stops growing because the growing center is no longer active.

Development and fertilization:

The embryo in the picture is 3-4 weeks



Introduction to Embryology

The sperm comes from the seminiferous tubule of the testes where Oocytes come from ovaries.

All human cells are somatic cells (divide by mitosis) except the ovaries and the testes (divide by meiosis forming gametes).

Both somatic and reproductive cells have 46 chromosomes going any farther in division.

Mitosis: division of somatic cells to give two identical cells with the same number of chromosomes

Meiosis: division of reproductive cells to form gametes with half the number of chromosomes.

Primordial germ cells: are cells present in the testes and ovaries that will give sperm or mature ovum and present in the wall of the yolk sac then it migrate to their site of action (testes and ovaries).

The testes and ovaries form at the beginning in the Posterior abdominal wall at the level of L1 lumbar vertebrae.

The ovaries then gradually migrate to the iliac fossa of the pelvis where the testes migrates (in the 8th month) to the scrotum.

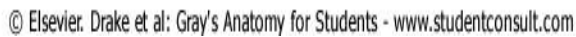
When the baby is in his 9th month, his testes are in the scrotum then it goes through mitotic division to increase their number and to protect them from disintegration.

The testes prepare itself in the fourth week to receive the primordial cell from the wall of the yolk sac.

Spermatogenesis and oogenesis are the meiosis divisions.

Male reproductive system (med sagittal section).

B



Prostate present in males only
testes are in scrotum.

Vas deference forms 2 seminal vesicle

The sperm gets out from seminal vesicle and then through the urethra. the male reproductive system present in the abdomen, pelvis and perineum(between the upper two thy) .

Ductus difference is 45 cm long

Ejaculatory duct opens in the prostatic urethra

Urethra in male is long and begins deep to the urinary bladder and penetrates the prostate then the penis (penile urethra).

Accessory glands in male reproductive system:

Introduction to Embryology

1-prostate: secretions added to sperms

2-seminal vesicle

3-Bulbo urethral gland (clearing and evacuation of the urethra from urin).

Every testes has from 400-600 seminiferous tubule.

Each cell of spermatogonia will give 4 sperms

The number of cells that work in the seminiferous tube is large number to produce about 100 million sperms.

Epididymis: membranous tube has a head, body and tail.

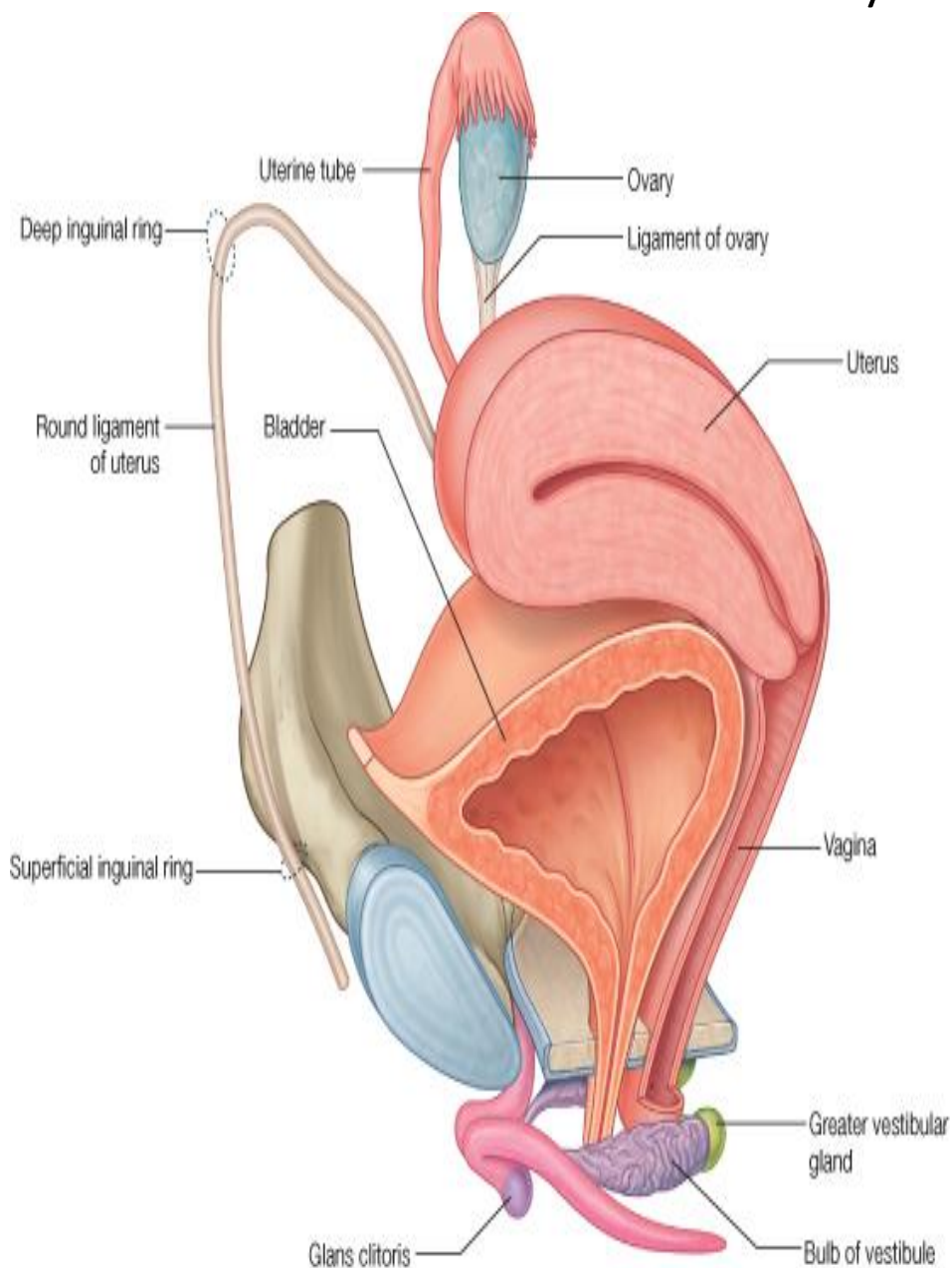
Sperm must remain 10-14 days in the epididymis to mature then it goes to the seminal vesicle through the vas deferens

Ductus deferens is 45 cm long and passes through the inguinal canal then enters the pelvis .

Urethra is (20 ± 2) cm long

Women reproductive system (midsagittal section)

Introduction to Embryology



© Elsevier. Drake et al: Gray's Anatomy for Students - www.studentconsult.com

Uterus is above the urinary bladder and makes an angle with the vagina.

Ovaries have two functions:

1-Secrets hormones (which has effect on the uterus endometrium which changes every month)

2-produces mature ovum.

Introduction to Embryology

Endometrium

It is the inner layer of the uterus

Composed of

1-Compact layer

2-Thick spongy layer

3-Basal layer (has its own blood supply)

The compact and spongy layers are the functional ones and are shed during .menses

(Menarche : it is the first time menses occurs (age of puberty

Menopause : is a variable period in which the cyclic changes become irregular and disappear , the age of menopause is around (45-55 years)

Done by: Qusai sharief 😊😊😊