

وسهلا

أهلا



الأستاذ الدكتور يوسف حسين

أستاذ التشريح وعلم الأجنة - كلية الطب - جامعة الزقازيق - مصر

رئيس قسم التشريح و الأنسجة و الأجنة - كلية الطب - جامعة مؤتة - الأردن

دكتورة من جامعة كولونيا المانيا

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جروب الفيس د. يوسف حسين (استاذ التشريح)

A 3D-style graphic with a red-to-orange gradient background and yellow text. The graphic is a rectangular prism with a green side face and a green bottom face. The text "Ovarian cycle" is written in a bold, yellow, sans-serif font across the center of the red-to-orange gradient face.

Ovarian cycle

❖ Ovarian cycle

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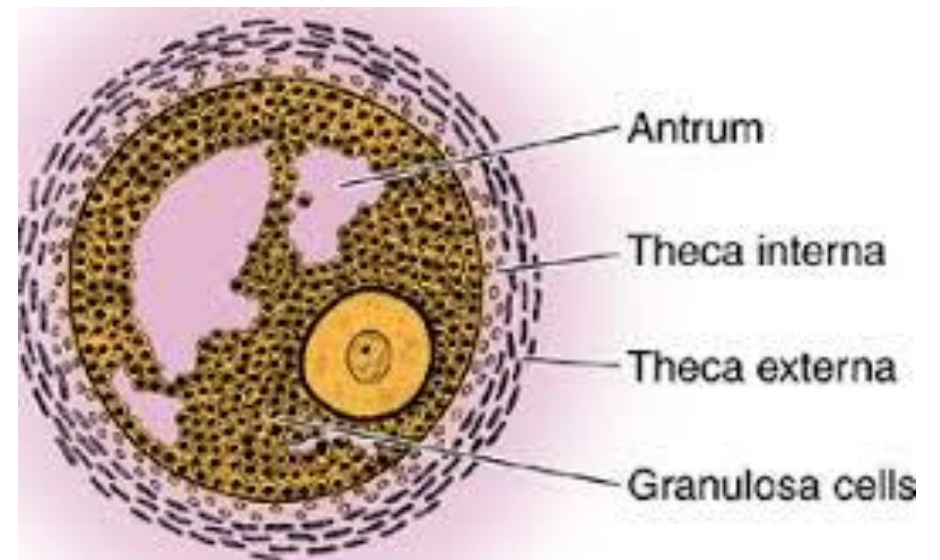
- It occurs in the **cortex of ovary** and started after puberty.
- Each ovary functions **alternatively** every other month.
- It is repeated every lunar month (**every 28 days**) till **menopause**.
- At birth, the ovary contains about **two million primary oocyte**. Thereafter most of them degenerate and, by puberty, when ovulation begins only about **300,000- 400,000 primary oocytes** are left in the ovary.
- During each cycle **15-20 primary follicles** developed but one or more continue and other atrophied.

- **Stages of the ovarian cycle**

- (I) Changes in the cortex of the ovary:**

- The cortical cells proliferated and differentiated into 2 layers.
 - a- Outer layer (theca externa):** is a fibrous layer and has protective function.
 - b- Inner layer (theca interna):** It is highly vascular, and secretes estrogen hormone.

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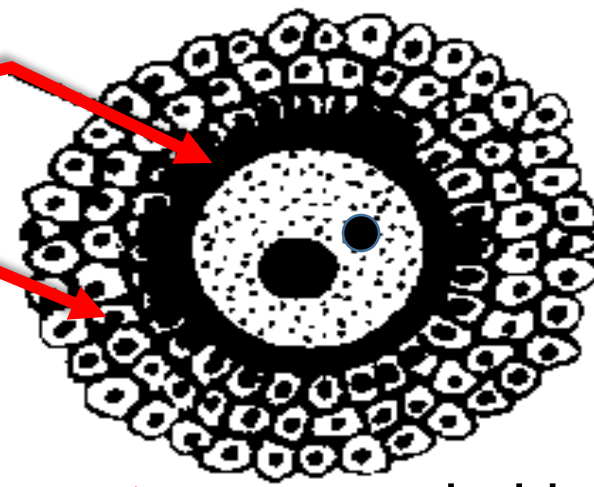


Primary follicle



Zona pellucida

Granulosa cells



Growing follicle

(II) Changes in the primary follicle;

- Each **primary follicle** consists of **one primary oocyte** surrounded by a single layer of flat cells called **follicular cells**.

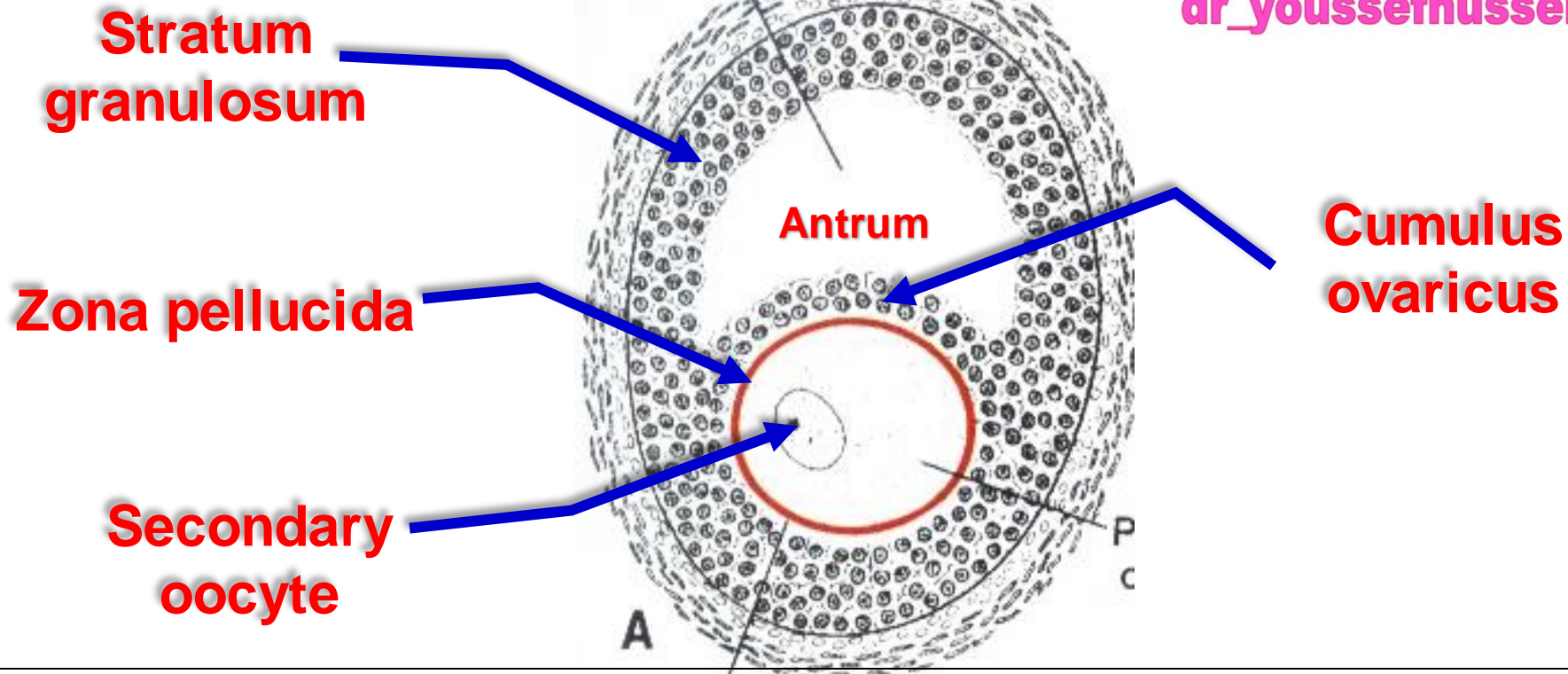
1- Formation of the growing follicle:

A- The primary oocyte completes the 1st meiotic division to form **secondary oocyte** (23 chromosomes 22+x) and 1st polar body (23 chromosomes 22+x).

B- Changes in the follicular cells:

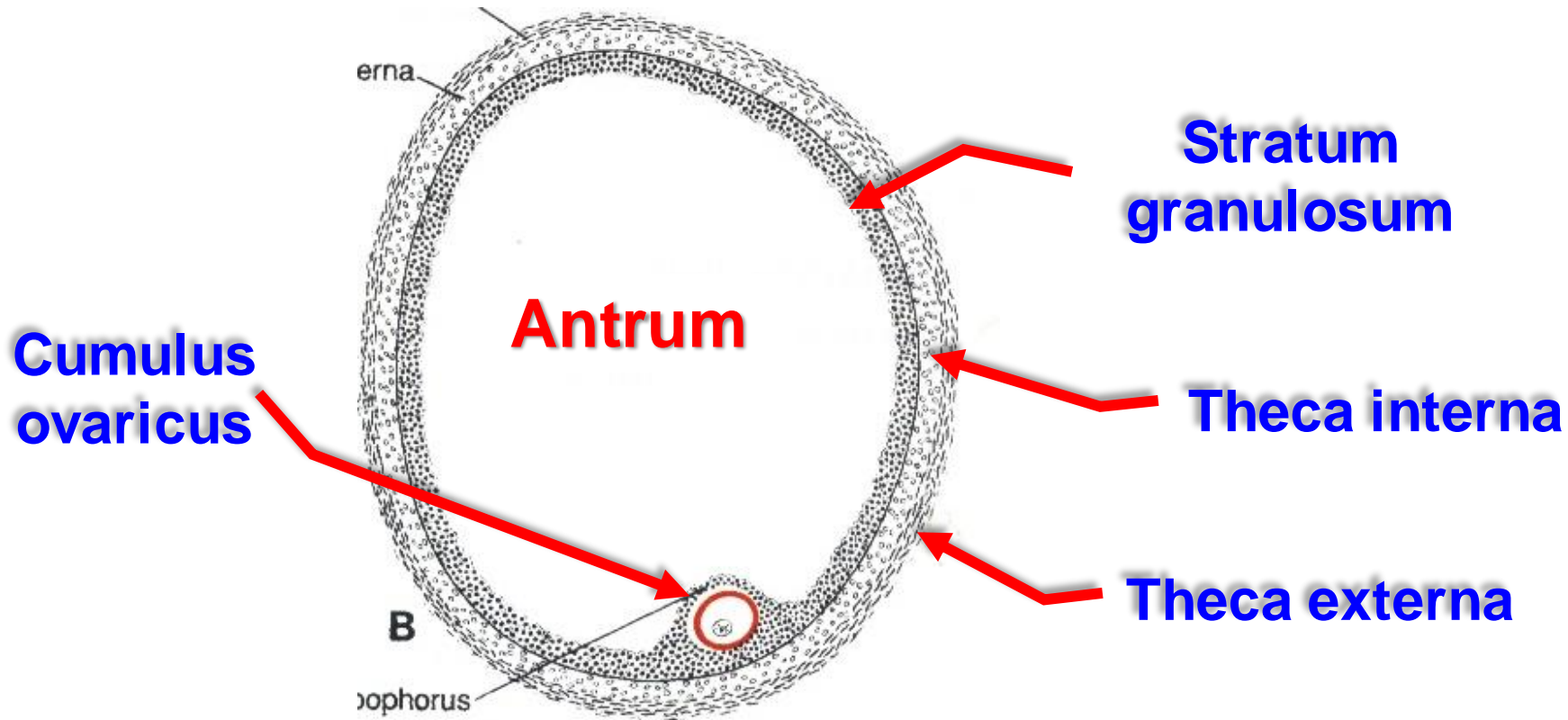
- The follicular cells are changed from flat cells to **cuboidal cells**. مكعب
- The cells proliferate forming many layers of cells called **granulosa cells**.
- These cells form a transparent membrane around the secondary oocyte called **zona pellucida** المنطقة الشفافة.

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2- Formation of the Graafian follicle:

- A sickle-shaped cavity develops between the granulosa cells called **antrum** غار.
- This antrum divides the **granulosa cells** into 2 groups;
 - a- An outer layer called **stratum granulosum** الطبقة الحبيبية.
 - b- An inner layer called **cumulus ovaricus** الركام المبيضي.
- **The secondary oocyte is surrounded by zona pellucida**



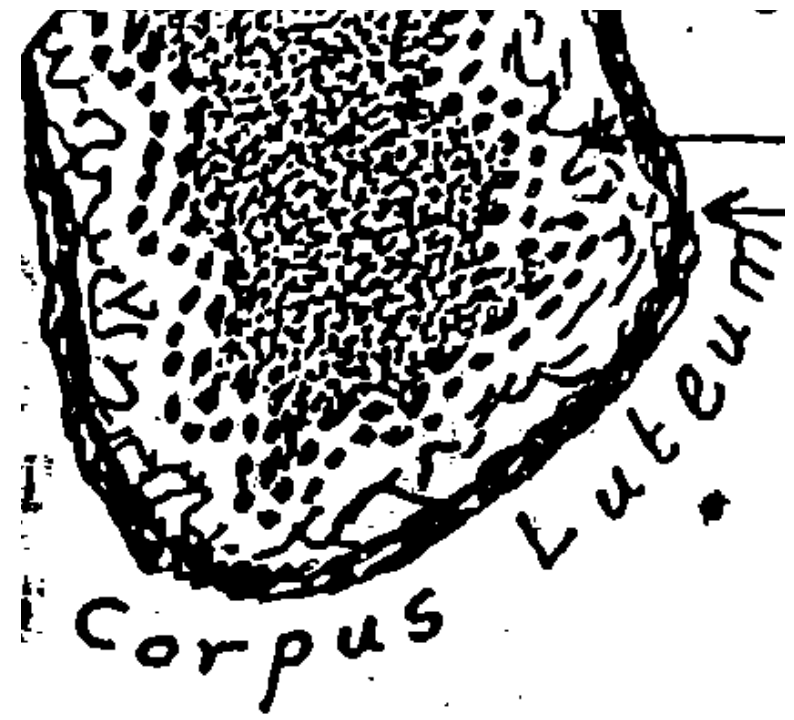
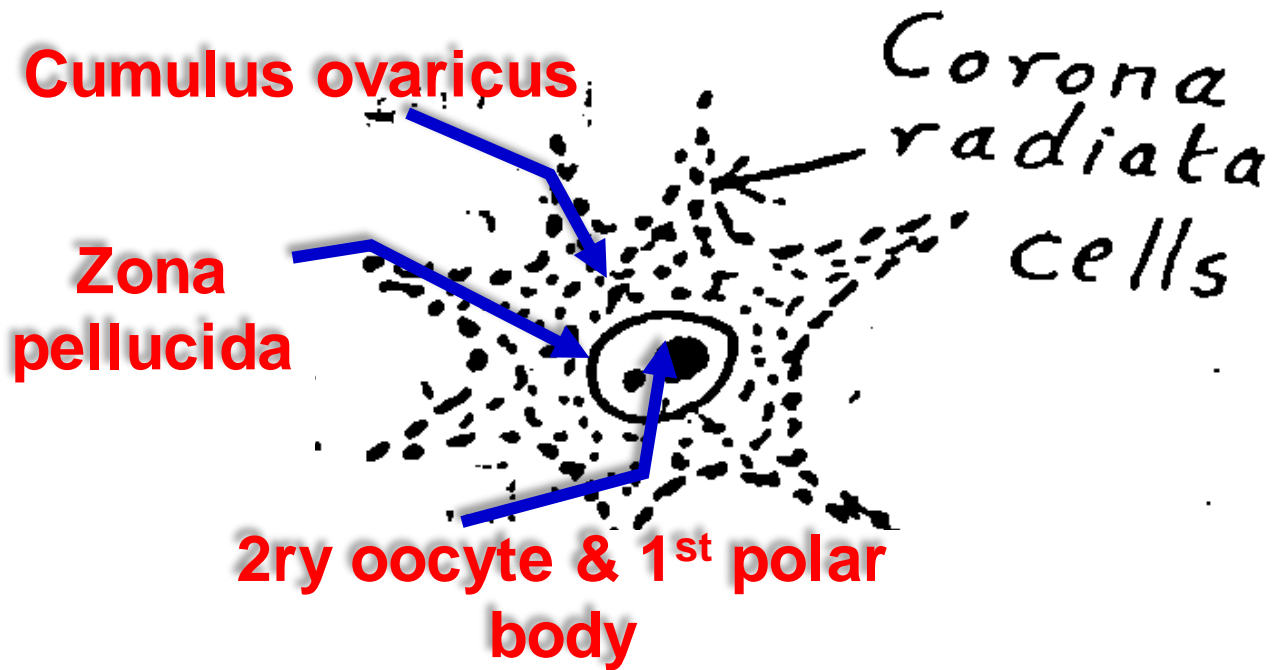
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3- Stage of ovulation: under LH (luteinizing hormone)

- **Ruptures of the Graafian follicle** and ovulation occurs **due to:**

a- Excessive accumulation of fluid in the antrum leading to increase of the pressure inside the follicle

b- The stratum granulosum, theca interna, externa, and capsule of the ovary is elevated, thinned and become a vascular and rupture.



** Results of ovulation:

A- Discharge of secondary oocyte and 1st polar body, surrounded by zona pellucida and cumulus ovaricus which now called **corona radiata cells** التاج المشع .

- B- The cavity of rupture Graafian follicle is filled by blood and is called **corpus hemorrhagicum**.
- **Later on iron** deposited in the follicular cells that become yellow and called **corpus luteum** الجسم الأصفر. The corpus luteum **secrets estrogen and progesterone**.

4- Post-ovulation changes

If the fertilization occurs	If the fertilization does not occur
<ul style="list-style-type: none"> Formation of the zygote 	<ul style="list-style-type: none"> The secondary oocyte has a 24-hour lifespan, in some cases can be extended up to 48h then degenerated
<ul style="list-style-type: none"> Enlarged of corpus luteum and continues to secrete estrogen and progesterone hormones till the 4th–6th month of pregnancy. After 6 months, it degenerates and its function being carried by placenta. 	<ul style="list-style-type: none"> The corpus luteum continues to secrete estrogen and progesterone for 10 days then degenerated and called corpus albicans الجسم الابيض
<ul style="list-style-type: none"> Inhibition of further ovulation due to inhibition of FSH from pituitary gland by estrogen and progesterone hormones secreted from the corpus luteum. 	<ul style="list-style-type: none"> Another ovarian cycle begins (decrease of estrogen & progesterone stimulates production of FSH).
<ul style="list-style-type: none"> The endometrium of the uterus becomes more vascular, thickened and its gland are filled by secretion and now called decidua 	<ul style="list-style-type: none"> Spasm of spiral arteries of the endometrium of the uterus resulting in shedding of the endometrium يتساقط and menstruation occurs.

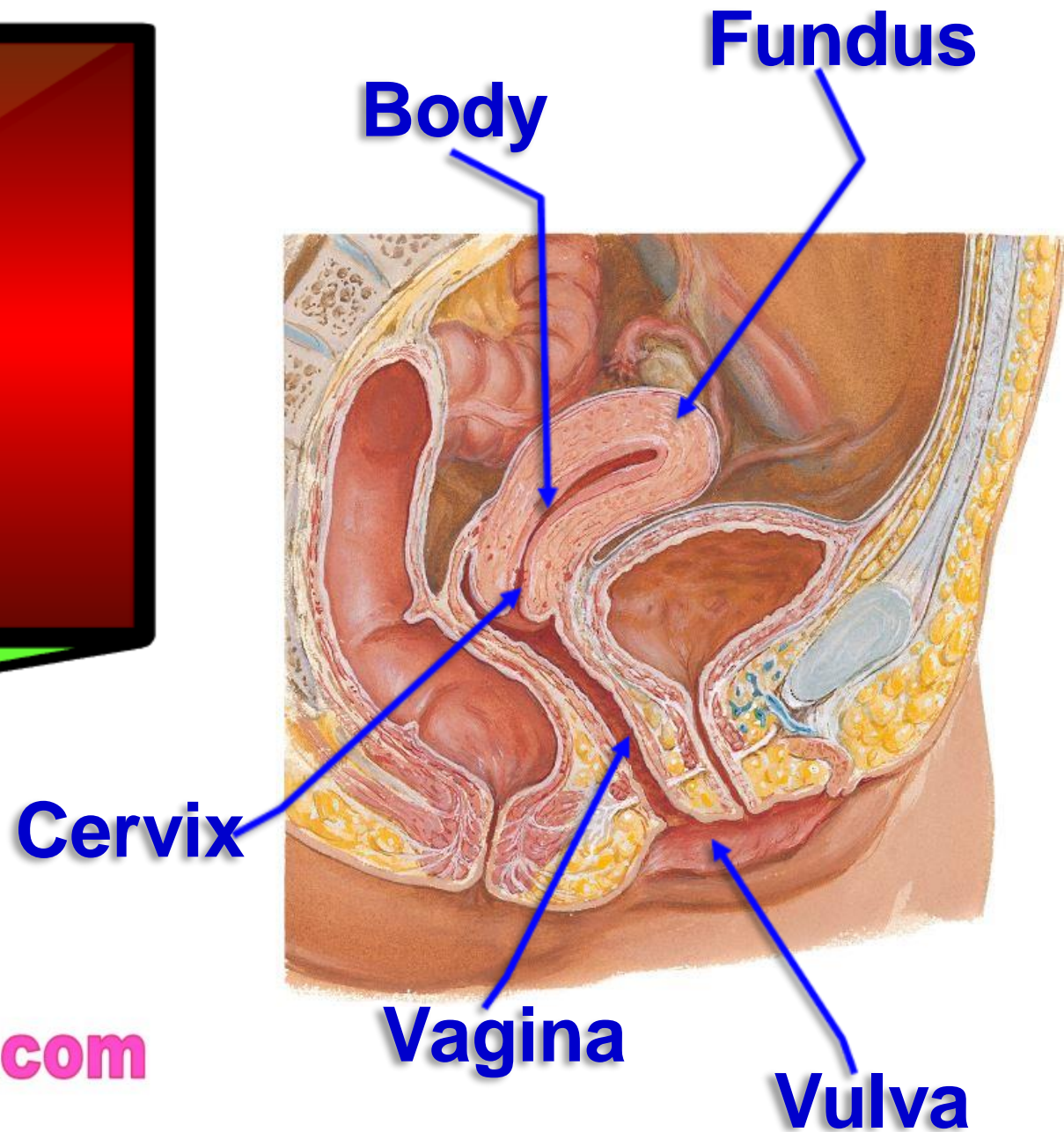
❖ The time of ovulation

- It is about **14th day** of the cycle
- **The ovulation is characterized by:**
 - 1. Increased the basal body temperature (36.5-37) of the female by 1/2 - 1 Celsius.**
 - 2. Increase of the vaginal mucus secretion like egg white, stretch between your fingers (the amount varies from woman to woman).**
 - 3. A more sensitive sense of smell**
 - 4. Tender of the breast**
 - 5. Lower abdominal pain in the side of the active ovulation.**
 - 6. Some woman notice that their sex drive increases during ovulation (woman is more attracted to the male)**
 - 7. The cervix becomes more higher, softer and more opened**
 - 8. Elevation of luteinizing hormone (detected in urine) and estrogen hormone**
- **It can differ from woman to woman (If you do not notice any signs, do not worry (most woman have no clue)**

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Uterine cycle

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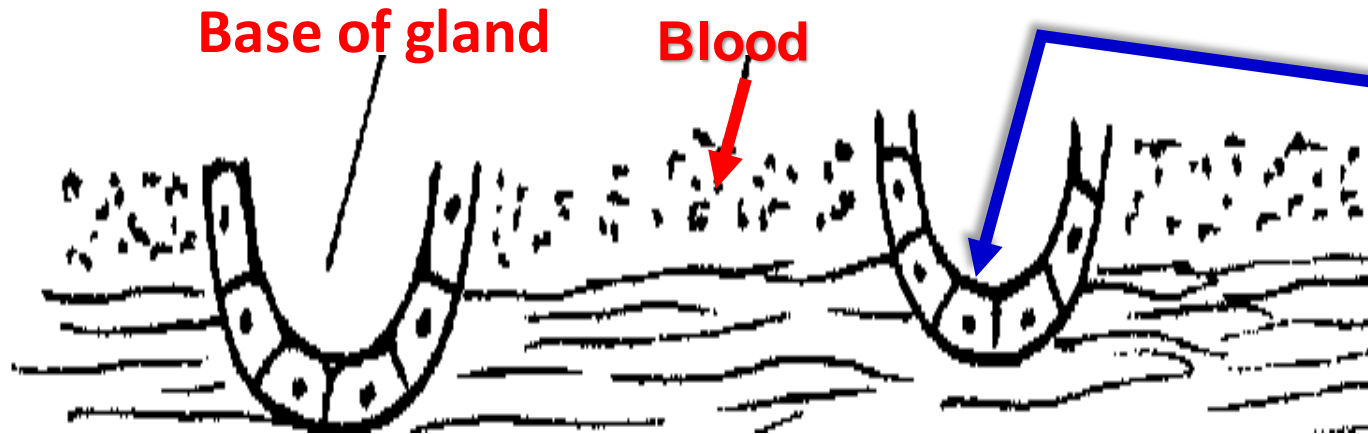


• Uterine (menstrual) cycle

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- The uterus is a hollow thick-walled muscular organ.
- The wall of the uterus is formed of three layers from innermost to outermost (**endometrium, myometrium and perimetrium**)
- **During each ovarian cycle, the endometrium of the fundus and body of the uterus also undergoes cyclic changes that end in hemorrhage (menstruation).**
- **The duration of the menstrual cycle is about 28 days**
- **Starting from the first day of hemorrhage.**
- **The first cycle at puberty is called menarche (about 11-14 years).**
- **The cycle end at menopause age (about 45-55 years).**

❖ Stages of the uterine (menstrual) cycle



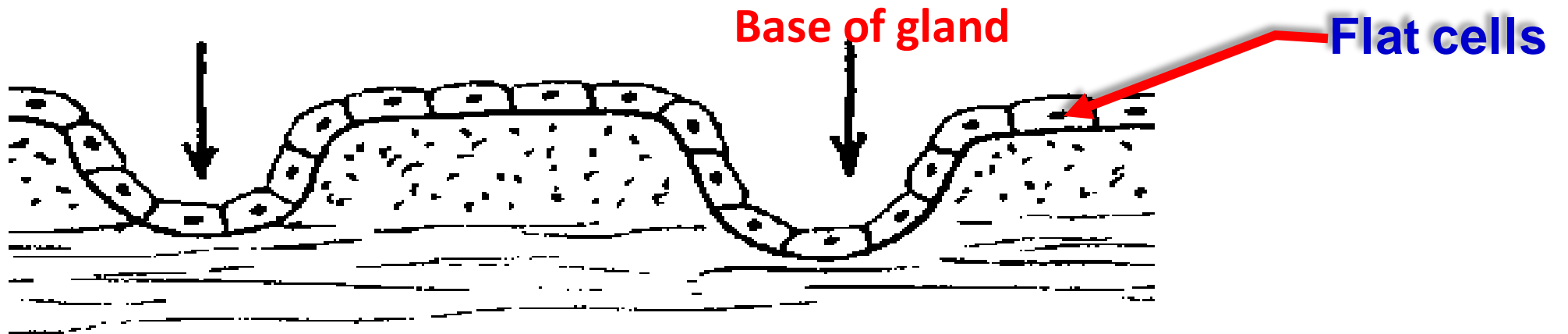
Basal part of
uterine gland

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(I) Stage of menstruation (bleeding):

- ** **Duration:** Most women bleed for 3-5 days, but 2-7 days is still considered normal.
- ** **Causes:** Sudden drop of the estrogen and progesterone levels in the blood due to **degeneration of corpus luteum** leading to spasm of the spiral arteries.
- ** It consists of **blood** about 30-60 ml/ time and **pieces of endometrium** (superficial compact layer and middle spongy layer)
- ** **Blood does not clot** due to its high contents of **fibrinolytic** enzymes.
- ** **Structure of the endometrium:**
 - It is formed of **deep basal layer** of endometrium that contains bases of uterine glands.
 - Its thickness is about **0.5 mm**.

❖ Stages of the uterine (menstrual) cycle

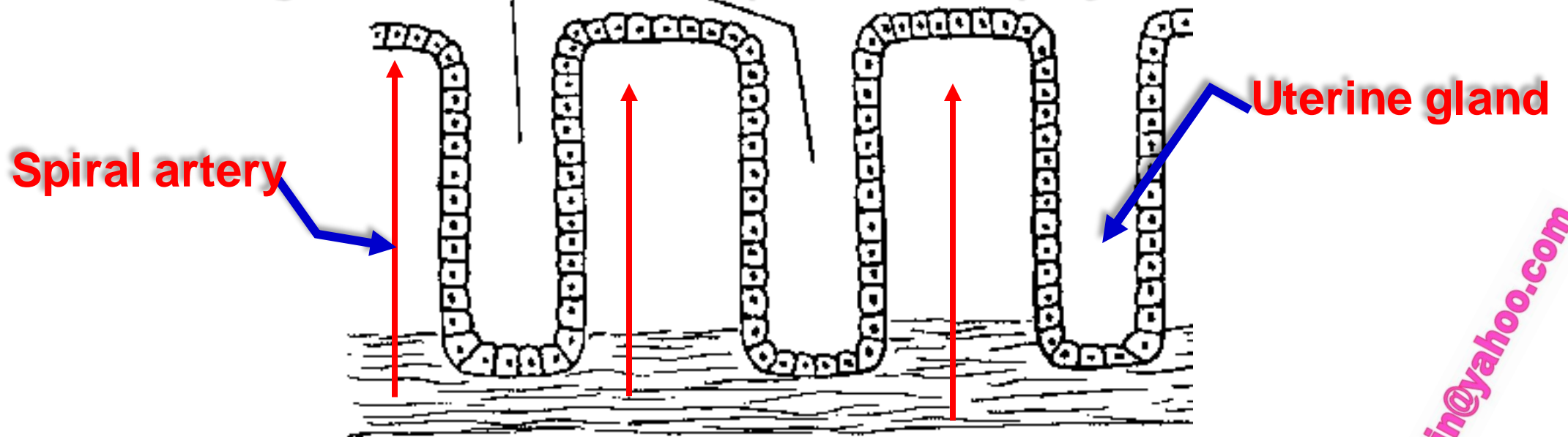


(II) Stage of repair إصلاح:

- Duration about **3-4** days
- The cells of the basal part of the uterine glands proliferate and migrate to cover the raw surface of the endometrium by **flat cells**.

** **Causes:** the effect of **estrogen** hormone secreted from the ovary.

❖ Stages of the uterine (menstrual) cycle



(III) Stage of proliferation:

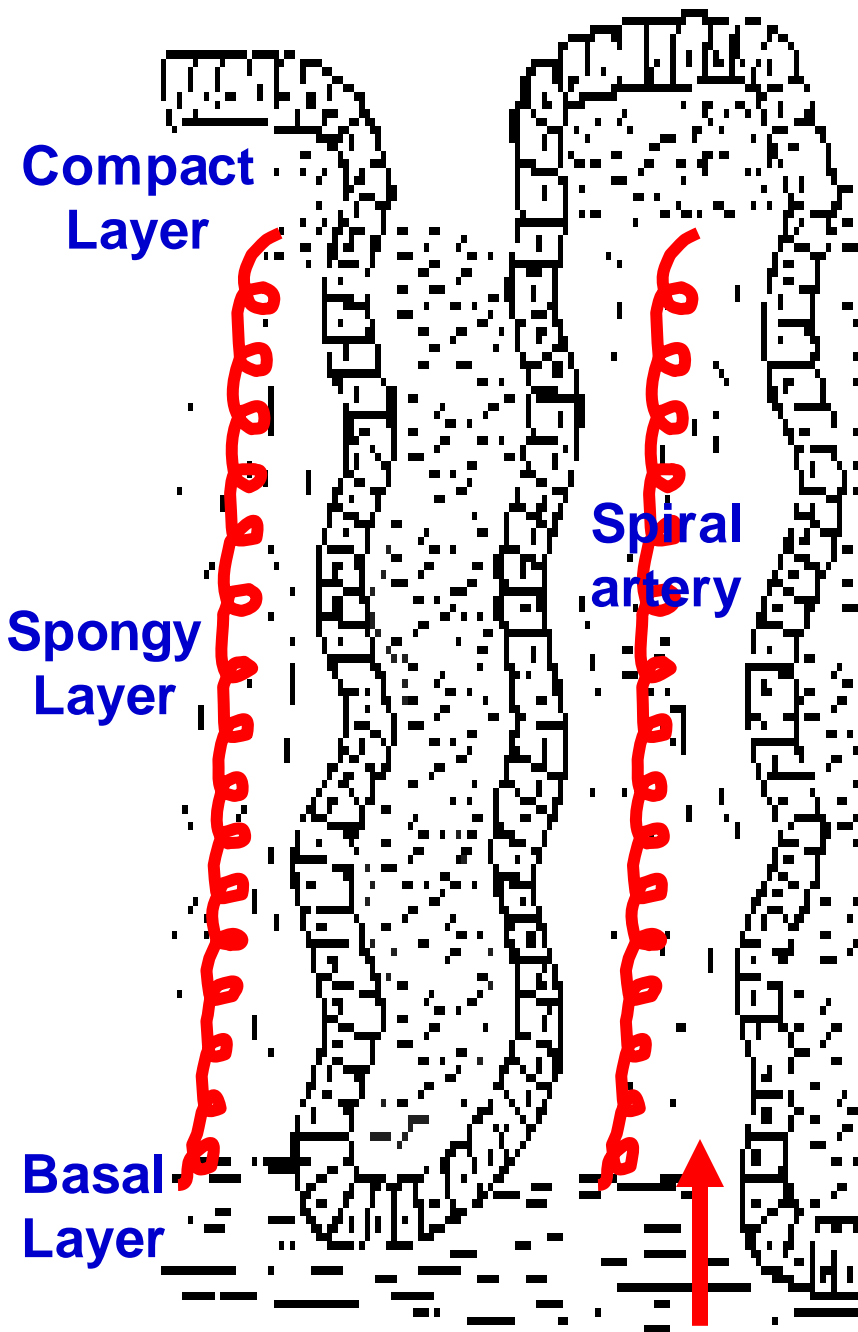
** **Duration:** about 5-6 days.

** **The endometrium shows the following changes:**

- 1- The endometrial **cells** become **cuboidal**.
- 2- The endometrial **glands** are longer and straight **about 4 mm**.
- 3- The **spiral arteries** become longer and straight.

** **Causes:** the effect of **estrogen** hormone secreted from the ovary.

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(IV) Stage of secretion:

** **Duration:** about 10-14 days.

** **Causes:** it is under the control of **progesterone** hormone secreted by the **corpus luteum** الجسم الاصفر.

** **The endometrium shows the following changes:**

1- The **endometrial cells** become highly columnar.

2- The **endometrial glands** become highly tortuous and filled with mucus and glycogen (**uterine milk**).

3- The **spiral arteries** become more dilated and tortuous.

4- The thickness is increased **about 5-7 mm**.

5- The endometrium is formed by 3 layers

i) **Superficial compact layer:** contains apices of the glands.

ii) **Middle spongy layer:** contains the main part of the glands.

- The above 2 layers are supplied by **spiral arteries** that are estrogen **dependent**. These layers are only lost with spasm of these arteries.

i) **Deep basal layer:** containing the basal part of the uterine glands.

- This layer is supplied by the **basal (straight) arteries**.

❖ What are some of the symptoms of a normal menstruation?

- **Abdominal cramps, lower back pain**
- **Bowel issues**, Food cravings
- **Headache and Fluid retention**
- **Trouble sleeping, mood swings , fatigue**, and irritability.
- **Acne**
- **Tender breast**

2. **Dysmenorrhea (painful).**

3. **Menorrhagia: severe bleeding.**

4. **Amenorrhea: no period.**

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