5th lecture

**Uterine cycle:**

* At the end of menstruation, all but the deep layers of the endometrium have sloughed.
* A new endometrium then regrows under the influence of estrogens from the developing follicle.
* The endometrium increases rapidly in thickness from the 5th to the 14th days of the menstrual cycle.
* As the thickness increases, the uterine glands are drawn out so that they lengthen, but they do not become convoluted or secrete to any degree.
* These endometrial changes are called proliferative, and this part of the menstrual cycle is sometimes called the **proliferative phase.**
* After ovulation, the endometrium becomes more highly vascularized and slightly edematous under the influence of estrogen and progesterone from the corpus luteum.
* The glands become coiled and tortuous and they begin to secrete a clear fluid. Consequently, this phase of the cycle is called the **secretory** or **luteal phase.**

**Ovarian hormones :**

Actions of the some female sex hormones:

1. **Estrogen, during the Follicular Phase of the Ovarian Cycle:**

A- Inhibits the secretion of GnRH, FSH, and LH.

B- Causes the endometrium to thicken.

C- Induces the production of progesterone receptors in the myometrium.

1. **Estrogen, during Pregnancy:**

A- Stimulates the growth of the myometrium and increases uterine strength which is necessary for parturition

B- Helps to prepare the mammary glands for lactation following parturition by Promoting the development of the ducts through which milk will be ejected

C- Inhibits the effects of prolactin during the last half of pregnancy and, thereby, prevents milk secretion prior to parturition

1. **Progesterone:**

A- Inhibits the secretion of GnRH, FSH, and LH during the luteal phase of the ovarian cycle

B- Elicits the secretory phase in the endometrium and provides a suitable, nurturing environment for an implanted embryo

C- Promotes the formation of a mucus plug in the cervix

D- Stimulates breast development during pregnancy D- Inhibits the effects of prolactin during pregnancy

During the *luteal phase*, hormonal secretion and actions include the following:

1. **LH:**

Promotes the production of locally acting prostaglandins, which cause the rupture of the follicle.

1. **The corpus luteum secretes:**

Abundant *progesterone* as well as some *estrogen*.

1. **Progesterone from the corpus luteum acts:**On the endometrium to produce vascular and secretory changes that will provide a suitable and nurturing environment for an implanted embryo. **4- Specifically, progesterone:**

A- Stimulates blood vessel growth in the connective tissue layer.

B- Elicits endometrial gland growth and coiling.

C- Stimulates endometrial cells to accumulate lipids and glycogen within their cytoplasm.

D-Causes cervical mucus to thicken, forming a plug that blocks the opening of the uterus and prevents the admission of bacteria and sperm.

E- Degeneration of the corpus luteum causes *progesterone* and *estrogen*.



**Fertilization:**

Fertilization involves:

1- chemo attraction of the sperm to the ovum by substances produced by the ovum.

**2**-adherence to the zona pellucida, the membranous structure surrounding the ovum.

(**3**)- Penetration of the zona pellucida and the acrosome reaction.

**4** - adherence of the sperm head to the cell membrane of the ovum,with breakdown of the area of fusion and release of the spermnucleusin to the cytoplasm of the ovum .

 In the vagina during intercourse, Millions of sperm are deposited Eventually, sperm reach the ovum, and many of them contact the zona pellucida.

 Sperm bind to a receptor in the zona, and this is Followed by the acrosome reaction, that is, the breakdown of the acrosome ,the lysosome-like organelle on the head of the sperm .When one sperm reaches the membrane of the vum, fusion to the ovum membrane is mediated by fertilin, a protein on the surface of the sperm head that resembles the viral fusion proteins that permit some viruses to attack cells. The fusion provides the signal that initiates development. In addition, the fusion sets off a reduction in the embrane potential of the ovum that prevents polyspermy, the fertilization of the ovum by more than one sperm.

This transient potential change is followed by a structural change in the zona pellucida that provides protection against poly spermy on a more long- term .basis**Pregnancy: ( gestation) :**

Is the time during which one or more [offspring](https://en.wikipedia.org/wiki/Offspring) develops inside a [woman's](https://en.wikipedia.org/wiki/Woman) [womb](https://en.wikipedia.org/wiki/Womb).

 Pregnancy usually occurs by [sexual intercourse](https://en.wikipedia.org/wiki/Sexual_intercourse), but can also occur through [assisted reproductive technology](https://en.wikipedia.org/wiki/Assisted_reproductive_technology) procedures.

 A pregnancy may end in a [live birth](https://en.wikipedia.org/wiki/Live_birth_%28human%29), a spontaneous [miscarriage](https://en.wikipedia.org/wiki/Miscarriage), an [induced abortion](https://en.wikipedia.org/wiki/Abortion#Induced), or a [stillbirth](https://en.wikipedia.org/wiki/Stillbirth).

 [Childbirth](https://en.wikipedia.org/wiki/Childbirth) typically occurs around 40 weeks from the start of the [last](https://en.wikipedia.org/wiki/Menstruation#Onset_and_frequency) [menstrual period](https://en.wikipedia.org/wiki/Menstruation#Onset_and_frequency) (LMP). This is just over nine months ([gestational age](https://en.wikipedia.org/wiki/Gestational_age)).

 When using [fertilization age](https://en.wikipedia.org/wiki/Human_fertilization#Fertilization_age), the length is about 38 weeks. An [*embryo*](https://en.wikipedia.org/wiki/Embryo)is the term for the developing offspring during the first eight weeks following fertilization (i.e. ten weeks' gestational age), after which the term [*fetus*](https://en.wikipedia.org/wiki/Fetus)is used until birth.

[**Signs and symptoms of early pregnancy**](https://en.wikipedia.org/wiki/Signs_and_symptoms_of_pregnancy) **may include;**

1. [Missed periods](https://en.wikipedia.org/wiki/Amenorrhea).
2. Tender breasts.
3. [Morning sickness](https://en.wikipedia.org/wiki/Morning_sickness) (nausea and vomiting).
4. Hunger, and frequent urination.

Pregnancy may be confirmed with a [pregnancy test](https://en.wikipedia.org/wiki/Pregnancy_test).

Methods of [birth control](https://en.wikipedia.org/wiki/Birth_control)—or, more accurately, *contraception*—are used to avoid pregnancy.

Pregnancy is divided into three trimesters of approximately 3 months each.

A- The [first trimester](https://en.wikipedia.org/wiki/First_trimester) includes conception, which is when the sperm fertilizes the egg.

B- The [fertilized egg](https://en.wikipedia.org/wiki/Fertilized_egg) then travels down the [Fallopian tube](https://en.wikipedia.org/wiki/Fallopian_tube) and attaches to the inside of the [uterus](https://en.wikipedia.org/wiki/Uterus), where it begins to form the [embryo](https://en.wikipedia.org/wiki/Embryo) and [placenta](https://en.wikipedia.org/wiki/Placenta).

 During the first trimester, the possibility of miscarriage (natural death of embryo or fetus) is at its highest.

 Around the middle of the second trimester, movement of the fetus may be felt.

 At 28 weeks, more than 90% of babies can [survive outside of the](https://en.wikipedia.org/wiki/Fetal_viability)

[uterus](https://en.wikipedia.org/wiki/Fetal_viability) if [provided with high-quality medical care](https://en.wikipedia.org/wiki/Neonatal_intensive_care_unit), though babies born at this time will likely experience serious health complications such as heart and respiratory problems and long-term intellectual and developmental disabilities.

 [Prenatal care](https://en.wikipedia.org/wiki/Prenatal_care) improves pregnancy outcomes.

 Prenatal care may include taking extra [folic acid](https://en.wikipedia.org/wiki/Folic_acid), avoiding [drugs](https://en.wikipedia.org/wiki/Recreational_drug), [tobacco](https://en.wikipedia.org/wiki/Smoking_and_pregnancy) [smoking](https://en.wikipedia.org/wiki/Smoking_and_pregnancy), and alcohol, taking regular exercise, having [blood tests](https://en.wikipedia.org/wiki/Blood_test), and regular [physical examinations](https://en.wikipedia.org/wiki/Physical_examination).

 [Complications of pregnancy](https://en.wikipedia.org/wiki/Complications_of_pregnancy) may include [disorders of high blood](https://en.wikipedia.org/wiki/Hypertensive_disease_of_pregnancy) [pressure](https://en.wikipedia.org/wiki/Hypertensive_disease_of_pregnancy), [gestational diabetes](https://en.wikipedia.org/wiki/Gestational_diabetes), [iron-deficiency anemia](https://en.wikipedia.org/wiki/Iron-deficiency_anemia), and [severe nausea](https://en.wikipedia.org/wiki/Hyperemesis_gravidarum) [and vomiting](https://en.wikipedia.org/wiki/Hyperemesis_gravidarum).

 In the ideal childbirth labor begins on its own when a woman is "at term". Babies born before 37 weeks are "[preterm](https://en.wikipedia.org/wiki/Preterm)" and at higher risk of health problems such as [cerebral palsy](https://en.wikipedia.org/wiki/Cerebral_palsy).

 Babies born between weeks 37 and 39 are considered "early term" while those born between weeks 39 and 41 are considered "full term".

 Babies born between weeks 41 and 42 weeks are considered "late term" while after 42 weeks they are considered "[post term](https://en.wikipedia.org/wiki/Postterm_pregnancy)".

 [Delivery](https://en.wikipedia.org/wiki/Childbirth) before 39 weeks by [labor induction](https://en.wikipedia.org/wiki/Labor_induction) or [caesarean section](https://en.wikipedia.org/wiki/Caesarean_section) is not recommended unless required for other medical reasons.

**parturition**, or **birth** or **childbirth** or **labour** or **delivery**:

Process of bringing forth a child from the uterus, ending [pregnancy](https://www.britannica.com/summary/pregnancy).

It has three stages. In dilation, uterine contractions lasting about 40 seconds begin 20–30 minutes apart and progress to severe labour pains about every 3 minutes.

The opening of the cervix widens as contractions push the fetus.

Dilation averages 13–14 hours in first-time mothers, less if a woman has had previous babies.

When the cervix dilates fully, expulsion begins.

The ―water‖ (amniotic sac) breaks (if it has not already), and the woman may actively push.Expulsion lasts 1–2 hours or less. Normally, the baby’s head emerges first; other positions make birth more difficult and risky.

In the third stage, the placenta is expelled, usually within 15 minutes. Within six to eight weeks, the mother’s [reproductive system](https://www.britannica.com/summary/human-reproductive-system) returns to nearly the prepregnancy state.

***Lactation:***

Lactation is the process of producing and releasing milk from the mammary glands in your breasts.

Lactation begins in [pregnancy](https://my.clevelandclinic.org/health/articles/9709-pregnancy-am-i-pregnant) when hormonal changes signal the mammary glands to make milk in preparation for the birth of your baby. It’s also possible to induce lactation without a pregnancy using the same hormones that your body makes during pregnancy.

Lactation ends once your body stops producing milk.

Feeding your baby directly from your breasts is called [breastfeeding](https://my.clevelandclinic.org/health/articles/5182-breastfeeding) (or sometimes chestfeeding) or nursing.

You can also feed your baby milk that you have expressed or pumped from your breast and saved in a bottle.

***Where does human milk come from:***

Human milk comes from your mammary glands inside your [breasts](https://my.clevelandclinic.org/health/articles/8330-breast-anatomy).

These glands have several parts that work together to produce and secrete milk:

* Alveoli: These tiny, grape-like sacs produce and store milk. A cluster of alveoli is called lobules, and each lobule connects to a lobe.
* Milk ducts: Each lobe connects to a milk duct. You can have up to 20 lobes, with one milk duct for every lobe. Milk ducts carry milk from the lobules of alveoli to your nipples.
* Areola: The dark area surrounding your nipple, which has sensitive nerve endings that lets your body know when to release milk. To release milk, the entire areola needs stimulation.
* Nipple: Your nipple contains several tiny pores (up to about 20) that secrete milk. Nerves on your nipple respond to suckling (either by a baby, your hands or a breast pump). This stimulation tells your brain to release milk from the alveoli through the milk ducts and out of your nipple.

It helps to think of the lactation system as a large tree. Your nipple is the trunk of the tree. The milk ducts are the branches. The leaves are the alveoli.

***Why do people lactate:***

* The primary reason people lactate is to feed a baby.
* Lactation is a biological, hormonal response that occurs during and after pregnancy to feed a newborn baby.
* Your body triggers specific hormones to initiate milk production and ejection (releasing of milk).
* All mammals lactate for this purpose and it’s possible to induce lactation in men and in non-pregnant women using the right hormone medications.