Note : most of the slides the Dr. viewed were not in the booklet ,so I tried mentioning the title or what they begin with .

The Dr . said “ovarian proteins forget them “ ☺

**Slide beginning with “four ovarian proteins essential for ovulation…”**

**Page num 42 in booklet**

The earliest responses of the ovary to the cycle is LH

The drastic rise in LH because of the estrogen , LH causes ovulation , LH serve the release of vasodilatory substances , such as histamine, bradykinin and prostaglandins which mediate increased ovarian and follicular blood flow . the high vascularised dominant follicle becomes hyperemic and edematous and swells along with these enzymes plazmin , collagenase and also prostaglandins (E AND F series ) are believed to be involved with ovulation ,these prostaglandins participate in the release of lysosomal enzymes to digest the follicular wall. (So substances + enzymes) .

Ovulation occurrence ,do you think each cycle always ends in ovulation ?

at the beginning of puberty and beginning of menopause some cycles do not end in ovulation .

Women that take pills in order not to become pregnant ,she has menstruation, she doesn’t take the pills for the whole period , she takes it for 21 days so as the menstruation to occur ,this cycle also does not end in ovulation.

The uterine cycle 3 phases : menstrual, proliferative , secretory phase .

The duration is 28 days .

Ovarian cycle occurs at the same time as the uterine cycle.

At the end of the cycle progesterone and estrogen level decreases because the pregnancy did not occur . if there is pregnancy progesterone level continues to be almost constant and also estrogen but less than progesterone. But if there is no pregnancy occur corpus luteum regress and estrogon and progesterone level decrease .

**Slide beginning with “ the withdrawal of estrogen and progesterone “**

the withdrawal of estrogen and progesterone just before menses has 2 effects :

 1- induces catastrophic degeneration of the endometrium that leads to menstrual bleeding , this period is the menstrual phase of the endometrium cycle (uterine cycle ).

2- the fall in estrogen and progesterone levels diminishes the feedback inhibition of the hypothalamus-pituitary system and gonadotropin secretion rises once a day that’s the beginning o menstrual cycle . because of the very low level of progesterone and estrogen the menstrual phase begins .

The usual duration of the menstrual phase 3-5 days “the average” as short as 1 day and as long as 8 days but usually 3-5 days (average 4) more than 8 is abnormal .

Blood shed is usually 30ml ranging from spots to 80 ml , its affected by

1-the thickness of the endometrium

 2-medication

3-disease .

Above 80 ml is abnormal.

As the corpus luteum weighs the endometrial thickness is reduced by loss of ground substances , increased coiling of the spiral arteries causes ischemia and sloping of the endometrium .

The 2nd phase the “proliferative phase” coincide with the estrogen levels , sometimes the phase is called estrogen phase

Menstrual phase ends then the proliferative phase begins , uterine gland elongate and spiral arteries grow to supply the thickened endometrium .

The secretory phase coincide with the progesterone , sometimes called progesterone phase . further thickness of endometrium , marked growth of the coiled arteries and increased complexity of the uterine gland .

SO these are the 3 phases of the uterine cycle .

**Page num 51 in the booklet**

Estrogen**s 3** hormones : estradiol , estrone, estriol .

The most potent is estradiol then estrone , estroil.

Estradiol and estrone are produced directly from the ovaries . estriol is metabolized from these 2 hormones both estradiol produces estriol as well as estrone produces estriol.

After the ovulation body temperature rises from 0.5-1 because progesterone raise body temperature .some women measure their body temperature so as to avoid the pregnancy , its accurate but difficult to be acquired why ? because she can avoid sexual intercourse in the upcoming days but not before because if its before 2,3 or even 4 days the sperm is stil surviving to accept the ovum ,so its difficult .

**Page num 53**

The time of the development of different physical manifestations of puberty in boys and girls .in girls the first sign of puberty is the appearance of breast buds this is called thelarche this usually occurs even before age 9 then the beginning of menstrual cycles at age 12 this is called menarche and puberty is called puberache at about age 13 . there is a little bit difference between menarche and puberarche “ irregular cycles”.

The first sign of puberty in boys which occurs later than the girls is the increased size of the testis .

The adrenal androgens are responsible in part for pubarche (its called adrenarche).

**Slide beginning with “During the repubertal period ……”**

During the repubertal period the hypothalamus-pituitary-ovarian excess becomes activated ,remember when this excess matures the pubarche begins and even its known gonadarche the increase in gonadotropins which are” FSH AND LH” is a direct result of increased secretion of gonadotropin releasing hormones .

Factors stimulating the secretion of gonadotropin releasing hormones include glutamate, norepinephrine and neuropeptide while emanating from synaptic inputs to GRH produces neuron , in addition a decrease in gamma aminobutyric acid and inhibitor of GRH secretion may occur at this time . this is the beginning of puberty.

**Slide beginning with “genetic, nutritional,climatic and geographic factors determine the timing of puberty”**

genetic, nutritional,climatic and geographic factors determine the timing of puberty.

Leptine appears to have permissive effect on the initiation of puberty providing signals to the CNS that there are sufficient energy stores to support reproduction .

Distance from the equator and lower altitude are associated with early puberty, girls have their puberty at 10 years or less not 12 (in valleys)

Obesity and heavy exercise delay puberty, remember BMI (body mass index) indicates the obesity .

The pubertal growth sperms required concerted action of sex steroid , growth hormones and insulin like growth factor-1 (those 3 should function together ).

**Slide title” response of the mother to pregnancy”**

A mother is considered pregnant at the moment of fertilization, the life span of the sperms and ova is about 2 days .

The mean duration of pregnancy is approximately 266 days,38 weeks from the time of ovulation OR 280 days , 40 weeks from the first day of the last menstrual period .(So they calculate it either from the time of ovulation OR from the last menstrual period ).

**Slide begins with “the female sex response facilitates sperm transport through the female reproductive tract………”**

the female sex response facilitates sperm transport through the female reproductive tract,

1st uterine and cervical activity increases by spinal reflexes during orgasm

 , 2nd the cervix dilates during orgasm

, 3rd obsitosin release at the time of orgasm increases uterine contractility

,4th the mucus of the cervical canal increase movement of the sperms under estrogen dominance and orgasm

 , 5th however peristaltic activity and fluid flow in the oviduct assist transport .(So all these play role in the transport of the sperm from the uterus toward the fertilization site ).

**Slide with fig num 82.2**

The zygote moves toward the uterus to be implanted after 5-7 days . blastocyst implant 5-7 days after the fertilization site . the ovi duct (fallopian tube ) transport sperms from uterus toward fertilization site and also transports the fertilized ovum from fertilization site toward the uterus to be implanted .

This required coordination between smooth muscle contraction , ciliary movement and fluid secretion ,all of which are under hormonal and neural control.

They say that there is polarity for the sperm to move toward fertilization site and from the uterus toward the fertilizated ovum .

Remember peristalsis movement in the intestine is similar or exactly plays an important role in transport especially the zygote . the sperm is a different story .

Implantation after 2 weeks , placenta is formed , placenta secretes human chorionic gonadotropin , this hormone causes the growing of corpus luteum ,to continue to grow ,secretes more and more progesterone and estrogen ,it reaches the peak at the end of 2nd month ,decreses after 2nd month , ceases at the end of the 4th month, placenta takes over to produce progesterone and estrogen, this is called **“taking over period “**

**Page num 60 in booklet + slide with title “implantation requires interaction between ….”**

Pregnancy needs Progesterone (progesterone pregnancy hormone).

In the beginning of pregnancy corpus luteum produces or secrete progesterone. it continues from the beginning of pregnancy to the second month where it reaches the maximal level then it decreases from the 2nd month to the end of the fourth month. Now, there is no progesterone.

The pregnant women need progesterone this comes from the placenta (taking over period ) If the placenta doesn't secrete sufficient amount of progesterone abortion

occurs. therefore these women need injection of progesterone.

Capacitation (sperms in the female reproductive system gain more motility and fertility).

It has been said that capacitation lasts for about 1 hour, but other researchers said it lasts from one hour to several hours. but the doctor doesn't believe it lasts for several hours because the life span for sperms are different.

Sperms need capacitation, this is facilitatory not obligatory because it is not needed in vitro.

Until implantation , the embryo is enclosed in the pellucida zone, protection against mechanical damage or adhesion to the oviduct toward and prevention of immunological rejection by the mother, this is very important because any one of those might happen.

enclosure by pellucida is very important for the ovum or the blastocyst or the fertilized ovum.

Even the blastocyst secrete many substances very important for the continuation of the pregnancy. the most important of these substances is the human chorionic gonadotropine (HCGHormone) , it's one of the most important factors secreted by the trophoblast of the blastocyst.

They stay before the placenta.

beside rescuing corpus luteum, human chorionic gonadotropine acts as an immunosuppressive agent, has growth promoting activity and acts as an autocrine growth factor that promote trophoblast growth and placental development. Also it may have a role in adhesion of the trophoblast to the epithelium of the endometrium. And also it has activity as human chorionic gonadotropin levels are high in the area where the trophoblast face the endometrium.

 Other important targets of human chorionic gonadotropin are the fetal adrenal gland at the testis (to affect the testis because there is no LH, because LH is not yet developed yet).

Leyding cells need LH from anterior pituitary, but the anterior pituitary of the fetus is not developed yet, so leyding cells are affected by Human chorionic gonadotropin to produce the testestorone which is important for the development of the genital organs of the baby, as well as for the testis.

**Slide that contains table 55-2 hormones made by the placenta**

Even in the placenta human chorionic gonadotropin is the most important and also many substances (remember substances in the "Taking over period" progesterone, estrone, estradiol, and estriol)

In the placenta in addition to the human chorionic gonadotropins there are 2 other hormones related to human chorionic gonadotropin these are:

human placental lactogen 1 and 2.

And also there is placental proteins 12+14 and other substances.

So these 2 hormones (human placental lactogen 1+2) are structurally related to the growth hormone and placental variant growth hormones as well as prolactin along with human chorionic gonadotropins .

so all these 4 are almost similar in structure and function. they play role of conversion of glucose to fatty acids and ketone bodies. thus coordinating the level economy of the fetoplacental unit. the fetus and placenta use fatty acids+ ketones as energy and stores them as fluids in the preparation for the early neonatal period.

Human placental lactogen 1+2 also promote development of the maternal mammary gland during pregnancy.

The secretion of these human placental lactogen1+2+human chorionic gonadotropin similar ,but there is difference in the control. so the secretion is the same but there is difference in the control.

There are some indicators that the increased level of human chorionic gonadotropin and thyroxine accompany the maternal morning sickness.

so the morning sickness is the result of these two hormones.

Human chorionic gonadotropines is high between week 10 and 15 coincide with the rise in the testosterone ( which is from week 8-18).

Page 57 fig.39.6 and slide that contains fig 38.7

According to the slide that contains fig 38.7

The fetoplacental unit and steroidogenesis ( the production of steroids).

Which one do you think is the most important ? fetus , placenta or the mother ?

The most important of these is the placenta.

 Cholesterol comes from the mother

Progesterone comes fetus + mother

Progesterone is produced in placenta into the fetus and mother.

Dehydroepialdestorone sulfate is produced from the progesterone in the fetus, again to the placenta to produce estrone+ estradiol.

The level of esteriol in the plasma, amiontic fluid, or urine are used as an index of fetal wellbeing.

Low level of esteriol will indicate protection fetal distress, although rarely inherited from sulfatase enzyme deficiency can also lead to low esteriol level.

**Slide title “ The fetal endocrine system develops early to regulate fetal homeostasis”**

The fetal endocrine system developes early to regulate fetal homeostasis.

The protective intrauterine environment postpones the initiation of some physiological functions that are essential for life after birth for example:

fetal lungs and kidneys they do not act as organs of gas exchange and excretion because the placenta carries out their functions .

also the GI tract doesn't carry out digestive activities, the fetal nervous system and immune system develop slowly .

However, the fetal endocrine system plays a vital role in the fetal growth, development and homeostasis.

The fetus is almost self sufficient in it's hormonal requirement. Fetal hormones perform the same function as the adult hormones but also they subserve unique processes such as sexual differentiation .

**Slide title “fetal adrenal glands are unique in both structure and function”**

The fetal adrenal glands are unique in both structure and function and at about the 4th months of gestation they are larger than the kidneys.

The fetal zone produces large amount of dehydroepialdostrone sulfate and provide Androgenic precursors for estrogen synthesis by placenta.

The definitive zone produces cortisol which has multiple functions during fetal life including:

- promotion of pancreas and lung maturation.

- the induction of liver enzymes

- the promotion of intestinal tract and (cyto)differentiation

The adrenal medulla also develop at week 10 and secrete large amount of adrenaline and noradrenaline.

