Physiological adaptation of the female to pregnancy

1) **Blood:** the blood volume increases by 20% or about 1L ,this increase is mainly because of increase in plasma volume. this increase occurs mainly during the latter half of pregnancy . this caused of the increased volume is likely due at least in part to aldosterone and estrogen which are greatly increased in pregnancy and to increase fluid retention in kidneys . in addition the bone marrow becomes increasingly active and produces extra red blood cells to go with the extra fluid volume. Therefore at time of birth of the baby, the mother has about 1 to 2 liters of extra blood in her circulatory system. Only about one forth of this amount is lost through bleeding during delivery of the baby , thereby allowing a considerable safety factor for the mother .
2) **Cardiovascular system:**
   Cardiac output : generally, cardiac out put increases by about 30% in the first trimester. After the 3rd month, cardiac output starts decreasing and reaches almost the normal level in the later stages of pregnancy
   Blood pressure: arterial blood remains unchanged during the first trimester. During the second trimester, there is a slight decrease in blood pressure. It is due to diversion of blood to uterine sinuses. And, hypertension develops if proper prenatal care is not taken.
3) **respiratory systems:** overall activity of respiratory system increases slightly. Tidal volume, pulmonary ventilation and oxygen utilization(20% above normal) are increased. The increase in oxygen utilization relates to the additional energy requirements of the fetus as well as the other metabolic alteration . also the functional residual capacity of the lungs is decreased . the reduction is attributed to the elevation of the diaphragm from the enlarging uterus.
4) **Excretory systems:** renal blood flow and glomerular filtration rate (GFR) increases resulting in increase in urine formation . it is because of increase in fluid intake and the increased excretory products from fetus. The urine becomes diluted with the specific gravity of 1.025. in the first trimester, the frequency of micturition increases because of the pressure exerted by the uterus on the bladder.
5) **Digestive system:** during the initial stages of pregnancy, the morning sickness occurs in mother. It involves nausea, vomiting and giddiness. This is because of the hormonal imbalance. The motility of the GI tract decreases by progesterone and constipation in common. Indigestion and hypochlorhydria (decrease in the amount of hydrochloric acid in gastric juice) may occur.
6) **Endocrine systems :**
   i) Anterior pituitary gland: during pregnancy the size of the anterior pituitary glang increases by about 50%. And secretion of corticotropin, thyrotropin and prolactin increases. However, in the secretion of follicle stimulating hormone and luitenizing hormone decreases very much. It is because off negative feedback control by estrogen and progesterone, which is continuously secreted from corpus luteum initially and placenta later on.
   ii) Adrenal cortex: there is a moderate increase in secretion of cortisol which helps in the mobilization of amino acids from the mothers tissues to the fetus. Aldosterone secretion also increases. It reaches the maximum at the end of pregnancy. Along with estrogen and progesterone , aldosterone is responsible for the retention of water and sodium

iii) Thyroid gland: the size and the secretory activity of the thyroid gland increase during pregnancy. The increased secretion of thyroxine helps in the preparation of mammary glands for lactation. It is also responsible for increase in basal metabolic rate.

iv) Parathyroid gland: parathyroid also shows an increase in the size and secretory activity. Parathormone is responsible for maintenance of calcium level in mother's blood in spite of loss of large amount of calcium to fetus.

7) **Nervous system:** there is a general excitement of nervous system during pregnancy. It leads to the psychological imbalance such as change in moods, excitement of depression in the early stages of pregnancy. During the later months of pregnancy, the woman becomes very much excited because of anticipation of delivery of the baby, labor pain, etc