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LACTATION

Lactation means synthesis, secretion and ejection of milk.

Lactation involves two processes:

A. Milk secretion

B. Milk ejection.

MILK SECRETION

Synthesis of milk by alveolar epithelium and its passage through the duct system is called milk secretion. Milk secretion occurs in two phases:

1. Initiation of milk secretion or lactogenesis
2. Maintenance of milk secretion or galactopoiesis.

Initiation of Milk Secretion or Lactogenesis

Although small amount of milk secretion occurs at later months of pregnancy, a free flow of milk occurs only after the delivery of the child. The milk, which is secreted initially before parturition is called colostrum. Colostrum is lemon yellow in color and it is rich in protein (particularly globulins) and salts. But its sugar content is low. It contains almost all the components of milk except fat.

Role of hormones in lactogenesis

Prolactin is responsible for lactogenesis. During pregnancy, particularly in later months, large quantity of prolactin is secreted. But the activity of this hormone is suppressed by estrogen and progesterone secreted by placenta. Because of this, lactation is prevented during pregnancy. Immediately after the delivery of the baby and expulsion of placenta, there is sudden loss of estrogen and progesterone. Now, the prolactin is free to exert its action on breasts and to promote lactogenesis.

2. Maintenance of Milk Secretion or Galactopoiesis Galactopoiesis depends upon the hormones like growth hormone, thyroxine and cortisol, which are essential for continuous supply of glucose, amino acids, fatty acids, calcium and other substances necessary for the milk production.

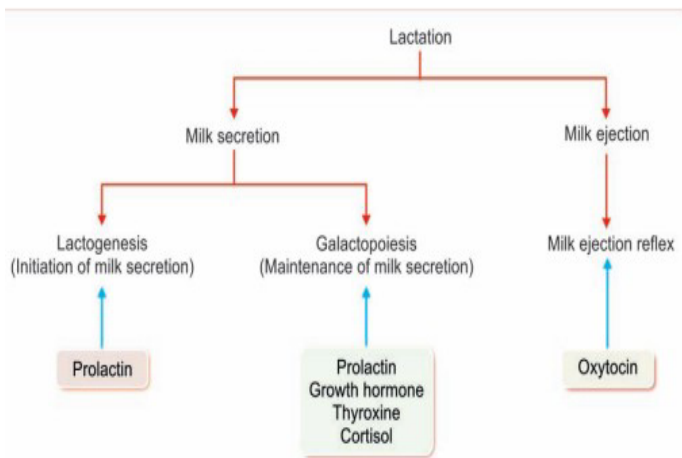
Role of hypothalamus in galactopoiesis

Galactopoiesis occurs till 7 to 9 months after delivery of child provided feeding the baby with mother's milk is continued till then. In fact, the milk production is continued only if feeding the baby is continued. Suckling of nipple by the baby is responsible for continuous milk production. When the baby suckles, the impulses from touch receptors around the nipple stimulate hypothalamus. It is suggested that hypothalamus releases some prolactin-releasing factors, which cause the prolactin secretion from anterior pituitary. Prolactin acts on glandular tissues and maintains the functional activity of breast for subsequent nursing.

MILK EJECTION

Milk ejection is the discharge of milk from mammary gland. It depends upon suckling exerted by the baby and on contractile mechanism in breast, which expels milk from alveoli into the ducts. Milk ejection is a reflex phenomenon. It is called milk ejection reflex or milk let-down reflex. It is a neuroendocrine reflex.

Milk ejection reflex



EFFECT OF LACTATION ON MENSTRUAL CYCLE

Woman who nurses her child regularly does not have menstrual cycle for about 24 to 30 weeks after deliver. It is because, regular nursing the baby stimulates prolactin secretion continuously. Prolactin inhibits GnRH secretion resulting in suppression of gonadotropin secretion. In the absence of gonadotropin, the ovaries become inactive and ovulation does not occur. When the frequency of nursing the baby decreases (after about 24 weeks) the secretion of GnRH and gonadotropins starts slowly. When sufficient quantity of gonadotropins is secreted, the menstrual cycle starts.

BREAST MILK

Breast or human milk forms the primary source of nutrition for infants.

COMPOSITION

Breast milk contains about 88.5% of water and 11.5% of solids. Important solids are lactose, lactalbumin, iron, vitamins A and D and minerals.

ADVANTAGES OF BREAST MILK

Breast milk is always considered superior to animal milk (cow milk or goat milk) because it consists of sufficient quantity of all the substances necessary for infants like iron, vitamins and minerals. Besides nourishment of infant, the breast milk also provides several antibodies, which help the infant resist the infection by lethal bacteria. Even some neutrophils and macrophages are secreted in milk.

These phagocytic cells protect the infant by destroying microbes in the infant's body.

GESTATION PERIOD

Gestation period refers to the pregnancy period. The average gestation period is about 280 days or 40 weeks from the date of last menstrual period (LMP). Traditionally, it is calculated as 10 lunar months. However, in terms of modern calendar it is calculated as 9 months and 7 days. If the menstrual cycle is normal 28 day cycle, the fertilization of ovum by the sperm occurs on 14th day after LMP. Thus the actual duration of human pregnancy is $280 - 14 = 266$ days. If the pregnancy ends before 28th week, it is referred as miscarriage. If the pregnancy ends before 37th week, then it is considered as premature labor.