

Mammalian Glands

Integumentary glands in mammals are primarily of two types: sweat glands and sebaceous glands. Mammary glands and scent glands are derived from these two types of glands.

Sweat glands or Sudoriferous glands

These glands are unique to mammals but these are not found in all mammals. The secretion of this gland is known as **sweat** or **perspiration**. Aquatic forms like whale and manatees do not have any sweat glands. These glands are absent in elephants. In humans and chimpanzee large number of sweat glands are present all over the body, even on the palm and sole. Distribution of these glands varies. In rats, mice and cats these glands are found on the paws. In duck-bill platypus the snout contains sweat glands and in rabbits sweat glands are found around the lips. In deer, these glands are present at the base of the tail.

Structurally the sweat glands are small and simple. These appear as long, coiled, tubular invaginations of the epidermis, the inner coiled end of which remains in the dermis. The secretion of each gland comes to the surface of the body through a small pore. There are two types of sweat glands. One type is not associated with hair follicles and secretes thin sweat. The other type remains in association with the hair follicle and produces viscous sweat. It is responsible for "body odour" and starts functioning at puberty, where the first type functions before puberty.

Sweat, a watery substance being secreted through the sweat glands, evaporates from the body surface. Thus it helps in regulation of body temperature by dissipating heat. Salt, urea and some other wastes are also excreted in the sweat.

Sebaceous glands are also found only in mammals. Their secretion is known as sebum which is an oily secretion and released into the hair follicle. These glands are not found on the palms and soles. They generally occur in association with hair and only in the lips, nipples and genitalia these glands occur without relation to hair.

These branched alveolar glands in the mammalian integument secrete the oily sebum that conditions the fur and helps to make it water proof. It also prevents excessive drying of the skin. In the lips, nipples and genital area sebum helps in lubrication of the skin surface.

Scent glands in mammals are derived from sweat glands. Their location varies in different mammals. In deer, antelope and bats scent glands are found on the face and in rabbits these are present on the chin. Elephants possess scent glands on the temporal region of the head, behind the eye. In adult male elephants during the 'musth' phase these organs swell up and produce huge quantities of odorous protein rich fluid that flows down the face of the elephant. Scent glands are found in the anal region of some mammals like dogs, cats and rodents. Many carnivores bear these glands on the chest and arms, musk deer bears them on the abdomen, squirrels and camels have scent glands at their back and many ungulates have them on the legs and feet. Scent from the scent glands mark the territory. Scent also serves for defence, recognition and sexual attraction.

Mammary glands are present in all mammals and are characteristic mammalian features. These glands were previously considered to be derivatives of Sweat gland. But Blackburn (1991) observed some characteristics of these glands to be similar to sebaceous glands.

During embryonic development **milk lines** appear as paired epidermal ridges extending from the chest to the inguinal region. Epidermis sinks into the dermis at intervals along the milk lines at places where the adult mammary glands or mammae will develop. These epidermal invaginations branch into solid cords.

In females these cords enlarge at maturity, push out under the skin and become functional. Mammary glands secrete milk for nourishing the young ones. Milk is a watery substance containing fat, carbohydrate and protein. Release of milk for suckling baby is known as lactation.

The number of mammary glands generally correlate with the number of young produced in a single litter. The number varies from species to species, from one pair to upto twelve pairs. Though the glands in females become functional during parturition males also bear equal number of mammae as the female counterpart. Malaysian fruit bat is an exceptional mammal where the males have been found to be lactating.

The position of the mammary glands also varies. In most mammals these are found in the chest (primates, elephants, manatees, bats) but in ungulates these are found in the inguinal area. In carnivores and rodents these glands are found in rows at intervals between chest and inguinal area.

Structurally the mammary gland consists of numerous lobules. Each lobule contains a cluster of alveoli capable of secreting milk. Alveoli open into a common duct and numerous such ducts from the many alveolar clusters open to the body surface through an elevated structure, the nipple, which is an epidermal papilla, which the young can hold with the lips and suck.

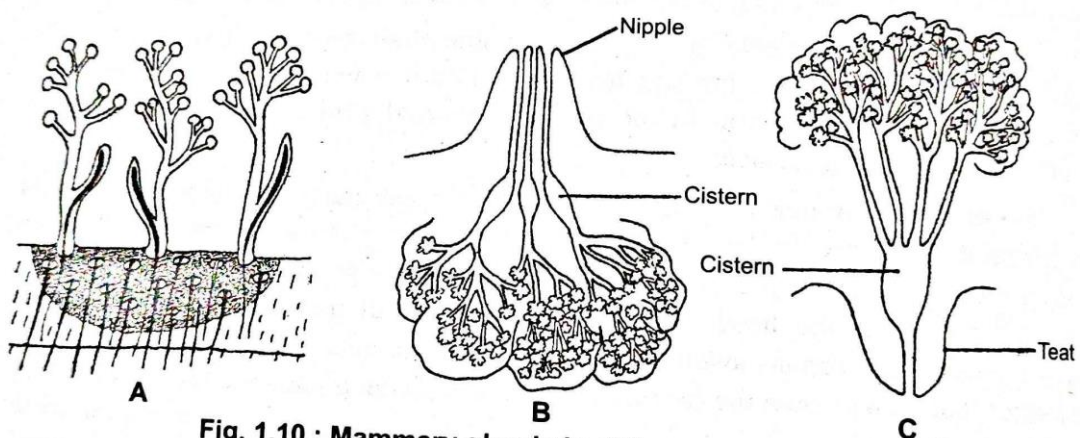


Fig. 1.10 : Mammary glands in different mammals :
A. Monotreme without a nipple; B. Human female with a nipple;
C. Ungulate with a teat

The nipple usually remains surrounded by a circular pigmented area of the integument. This area is known as areola.

In monotremes (e.g. duck-bill platypus) the mammary glands do not have any nipple and open directly to the surface of the skin where there is a milk patch or areola. In some mammals like the ungulates, ducts from the alveoli open into a common chamber called **cistern**.

The cistern remains present within a specified elongated structure of the integument, called the **teat**. A teat duct carries milk from the cistern to the surface of the skin.

Some uncommon glands of mammals include the **Moll's glands** present in the margin of the eyelid. These are modified sweat glands and open near the eyelashes and help to keep the lashes supple. **Wax glands** in the ear or the **ceruminous glands** are modified sweat glands present in the external auditory canals. Their secretion mixes with sebum and dead epidermal cells and produce earwax or **cerumen** to protect the ear from microbes and also to trap dust in the ear canal.

Meibomian glands of the eyelids are modified sebaceous glands. Secretion of these glands occur as an oily film over the eyeball. **Lacrymal glands** secrete tears that wash the conjunctiva of the eyeball.

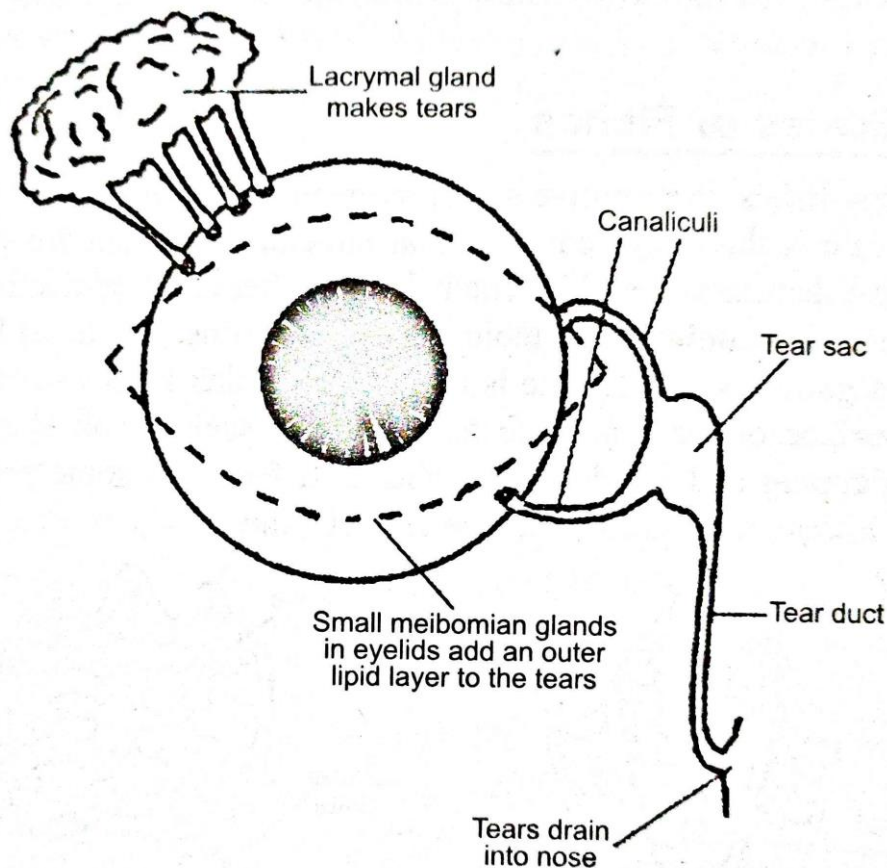


Fig 1.11 : Eye with lacrymal and meibomian glands (Schematic diagram)