

= Sebaceous gland =

Sebaceous glands are microscopic exocrine glands in the skin that secrete an oily or waxy matter , called sebum , to lubricate and waterproof the skin and hair of mammals . In humans , they occur in the greatest number on the face and scalp , but also on all parts of the skin except the palms of the hands and soles of the feet . The type of secretion of the sebaceous glands is referred to as holocrine .

In the eyelids , meibomian glands , also called tarsal glands , are a type of sebaceous gland that secrete a special type of sebum into tears . Fordyce spots are ectopic (misplaced) sebaceous glands found usually on the lips , gums and inner cheeks . Areolar glands surround the female nipples . Preputial glands also known as Tyson 's glands are found in the genitals of both sexes of mice and rats .

Several related medical conditions involve sebum ? including acne , sebaceous cysts , hyperplasia , and sebaceous adenoma . These are usually attributable to overactive sebaceous glands , which produce excess sebum .

= = Structure = =

= = = Location = = =

The sebaceous glands are found throughout all areas of the skin except the palms of the hands and soles of the feet . There are two types of sebaceous gland , those connected to hair follicles , in pilosebaceous units , and those that exist independently .

Sebaceous glands are found in hair @-@ covered areas , where they are connected to hair follicles . One or more glands may surround each hair follicle , and the glands themselves are surrounded by arrector pili muscles . The glands have an acinar structure (like a many @-@ lobed berry) , in which multiple glands branch off a central duct . The glands deposit sebum on the hairs , and bring it to the skin surface along the hair shaft . The structure consisting of hair , hair follicle , arrector pili muscles , and sebaceous gland is an epidermal invagination known as a pilosebaceous unit .

Sebaceous glands are also found in hairless areas (glabrous skin) of the eyelids , nose , penis , labia minora , the inner mucosal membrane of the cheek , and nipples . Some sebaceous glands have unique names . Sebaceous glands on the lip and mucosa of the cheek are known as Fordyce spots , and glands on the eyelids are known as meibomian glands . Sebaceous glands of the breast are also known as Montgomery 's glands .

= = = Development = = =

Sebaceous glands are first visible from the 13th to the 16th week of fetal development , as bulgings off hair follicles . Sebaceous glands develop from the same tissue that gives rise to the epidermis of the skin . Overexpression of the signalling factors Wnt , Myc and SHH all increase the likelihood of sebaceous gland presence .

The sebaceous glands of a human fetus secrete a substance called vernix caseosa , a waxy , translucent white substance coating the skin of newborns . After birth , activity of the glands decreases until there is almost no activity during ages 2 ? 6 years , and then increases to a peak of activity during puberty , due to heightened levels of androgens .

= = Function = =

Sebaceous glands secrete the oily , waxy substance called sebum (Latin : fat , tallow) that is made of triglycerides , wax esters , squalene , and metabolites of fat @-@ producing cells . Sebum waterproofs and lubricates the skin and hair of mammals . Sebaceous secretions in conjunction with apocrine glands also play an important thermoregulatory role . In hot conditions , the secretions

emulsify the sweat produced by the eccrine glands and this produces a sheet of sweat that is not readily lost in drops of sweat . This is of importance in delaying dehydration . In colder conditions , the nature of sebum becomes more lipid and in coating the hair and skin , rain is effectively repelled .

Sebum is produced in a holocrine process , in which cells within the sebaceous gland rupture and disintegrate as they release the sebum and the cell remnants are secreted together with the sebum . The cells are constantly replaced by mitosis at the base of the duct .

== Sebum ==

Sebum , secreted by the sebaceous gland in humans , is primarily composed of triglycerides (~ 41 %) , wax esters (~ 26 %) , squalene (~ 12 %) , and free fatty acids (~ 16 %) . The composition of sebum varies across species . Wax esters and squalene are unique to sebum and not produced as final products anywhere else in the body . Sapienic acid is a sebum fatty acid that is unique to humans , and is implicated in the development of acne . Sebum is odorless , but its breakdown by bacteria can produce strong odors .

Sex steroids are known to affect the rate of sebum secretion ; androgens such as testosterone have been shown to stimulate secretion , and estrogens have been shown to inhibit secretion . Dihydrotestosterone acts as the primary androgen in the prostate and in hair follicles .

== Immune function and nutrition ==

Sebaceous glands are part of the body 's integumentary system and serve to protect the body against germs . Sebaceous glands secrete acids that form the acid mantle . This is a very fine , slightly acidic film on the surface of the skin that acts as a barrier to bacteria , viruses , and other potential contaminants that might penetrate the skin . The pH of the skin is between 4 @. 5 and 6 @. 2 , and this acidity helps to neutralise the primarily alkaline nature of contaminants .

Sebaceous lipids make an important contribution in maintaining the integrity of the skin barrier , and express both pro @- inflammatory and anti @- inflammatory properties . Sebum may act as a delivery system for antioxidants , antimicrobial lipids , pheromones , and hydration of the stratum corneum . The insoluble fatty acids contained within sebum have broad antimicrobial activity . Additionally , sebaceous gland secretion provides vitamin E to the upper layers of facial skin .

== Unique sebaceous glands ==

During the last three months of fetal development , the sebaceous glands of the fetus produce vernix caseosa , a waxy white substance that coats the skin to protect it from amniotic fluid .

The areolar glands are in the areola that surrounds the nipple in the female breast . These glands secrete an oily fluid that lubricates the nipple , and also secrete volatile compounds that are thought to serve as an olfactory stimulus for the newborn . During pregnancy and lactation these glands , also called Montgomery 's glands , become enlarged .

Meibomian glands , in the eyelids , secrete a form of sebum called meibum onto the eye , that slows the evaporation of tears . It also serves to create an airtight seal when the eyes are closed and its lipid quality also prevents the eyelids from sticking together . The meibomian glands are also known as tarsal glands , Zeis glands and palpebral glands . They attach directly to the follicles of the eyelashes , which are arranged vertically within the tarsal plates of the eyelids .

Fordyce spots , or Fordyce granules , are ectopic sebaceous glands found on the genitals and oral mucosa . They show themselves as yellowish @- white milia (milkspots) .

Earwax is partly composed of sebum produced by glands in the ear canal . These secretions are viscous and have a high lipid content , which provides good lubrication .

== Clinical significance ==

Sebaceous glands are involved in skin problems such as acne and keratosis pilaris . In the skin pores , sebum and keratin can create a hyperkeratotic plug called a comedo .

== = Acne == =

Acne is a very common problem , particularly during puberty in teenagers , and is thought to relate to an increased production of sebum due to hormonal factors . The increased production of sebum can lead to a blockage of the sebaceous gland duct . This can cause a comedo , (commonly called a blackhead or a whitehead) , which can lead to infection , particularly by the bacteria *Propionibacterium acnes* . This can inflame the comedones , which then change into the characteristic acne lesions . Comedones generally occur on the areas with more sebaceous glands , particularly the face , shoulders , upper chest and back . Comedones may be ' black ' or ' white ' depending on whether the entire pilosebaceous unit , or just the sebaceous duct , is blocked . Sebaceous filaments ? innocuous build @-@ ups of sebum ? are often mistaken for whiteheads .

There are many treatments available for acne from reducing sugars in the diet , to medications that include antibiotics , benzoyl peroxide , retinoids and hormonal treatments . Retinoids reduce the amount of sebum produced by the sebaceous glands . Should the usual treatments fail , the presence of the Demodex mite could be looked for as the possible cause .

== = Other == =

Other conditions that involve the sebaceous glands include :

Seborrhoea refers to overactive sebaceous glands , a cause of oily skin or hair .

Sebaceous hyperplasia , referring to excessive proliferation of the cells within the glands , and visible macroscopically as small papules on the skin , particularly on the forehead , nose and cheeks .

Seborrhoeic dermatitis , a chronic , usually mild form of dermatitis effected by changes in the sebaceous glands . In newborn infants seborrhoea dermatitis can occur as cradle cap .

Seborrheic @-@ like psoriasis (also known as " Sebopsoriasis , " and " Seborrhiasis ") is a skin condition characterized by psoriasis with an overlapping seborrheic dermatitis .

Sebaceous adenoma , a benign slow @-@ growing tumour ? which may , however , in rare cases be a precursor to a cancer syndrome known as Muir @-@ Torre syndrome .

Sebaceous carcinoma , an uncommon and aggressive cutaneous tumour .

Sebaceous cyst is a term used to refer to both an epidermoid cyst and a pilar cyst , though neither of these contain sebum , only keratin and do not originate in the sebaceous gland and so are not true sebaceous cysts . A true sebaceous cyst is relatively rare and is known as a steatocystoma .

Phymatous rosacea is a cutaneous condition characterized by an overgrowth of sebaceous glands .

== History ==

The word sebaceous , meaning " consisting of sebum " , was first termed in 1728 and comes from the Latin for tallow . Sebaceous glands have been documented since at least 1746 by Jean Astruc , who defined them as " ... the glands which separate the fat . " He describes them in the oral cavity , on the head , eyelids and ears , as " universally " acknowledged . , viii Astruc describes them being blocked by " small animals " that are " implanted " in the excretory ducts , and attributes their presence in the oral cavity to aphthous ulcers , noting " these glands naturally [secrete] a viscous humour , which puts on various colours and consistencies ... in its natural state is very mild , balsamic , and intended to wet and lubricate the mouth " In The Principles of Physiology 1834 , A. Combe noted that the glands were not present in the palms of the hands or soles of the feet .

== Other animals ==

The preputial glands of mice and rats are large modified sebaceous glands that produce pheromones used for territorial marking . These and the scent glands in the flanks of hamsters have a similar composition to human sebaceous glands , are androgen responsive , and have been used as a basis for study .

Sebaceous adenitis is an autoimmune disease that affects sebaceous glands . It is mainly known to occur in dogs , particularly poodles and akitas , where it is thought to be generally autosomal recessively inherited . It has also been described in cats , and one report describes this condition in a rabbit . In these animals , it causes hair loss , though the nature and distribution of the hair loss differs greatly .

= = Additional images = =