The sebaceous glands are microscopic glands in the skin which secrete an oily/waxy matter, called sebum, to lubricate the skin and hair of mammals. In humans, they are found in greatest abundance on the face and scalp, though they are distributed throughout all skin sites except the palms and soles. In the eyelids, meibomian sebaceous glands secrete a special type of sebum into tears. There are several related medical conditions, including: acne, sebaceous cysts, hyperplasia, sebaceous adenoma and sebaceous gland carcinoma (see section below: Pathology).

**Locations and morphology**

A branched type of acinar gland, the sebaceous glands exist in humans throughout the skin except in the palms of the hands and soles of the feet.

Sebaceous glands can usually be found in hair-covered areas, where they are connected to hair follicles (see image at top). 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 muscle, and sebaceous gland is known as a pilosebaceous unit.

Sebaceous glands are also found in non-haired areas (glabrous skin) of eyelids, nose, penis, labia minora, and nipples. Here, the sebum traverses ducts which terminate in sweat pores on the surface of the skin.

At the rim of the eyelids, meibomian glands are a specialized form of sebaceous gland. They secrete a form of sebum (called meibum) onto the eye, slowing the evaporation of tears.
Sebaceous glands secrete the oily, waxy substance called sebum (Latin, meaning fat or tallow) that is made of fat (lipids), wax, and the debris of dead fat-producing cells.[5] In the glands, sebum is produced within specialized cells and is released as these cells burst; sebaceous glands are thus classified as holocrine glands.

Sebum is odorless, but its bacterial breakdown can produce odors. Sebum is the cause of some people experiencing "oily" hair,[6] as in hot weather or if not washed for several days. Earwax is partly composed of sebum. Excess sebum has been linked to eating red meats, fried, oily or other foods, but studies are not conclusive.

Function

Although it is commonly believed that sebum acts to protect and waterproof hair and skin, scientists have contended that "low levels of sebaceous gland activity are not correlated with dry skin" and it may serve little or no purpose in modern humans.[7]

Composition

The composition of sebum varies between species. In humans, the lipid content is as follows:[8]

<table>
<thead>
<tr>
<th>Percent composition</th>
<th>Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>wax monoesters</td>
</tr>
<tr>
<td>41%</td>
<td>triglycerides</td>
</tr>
<tr>
<td>16%</td>
<td>free fatty acids</td>
</tr>
<tr>
<td>12%</td>
<td>squalene</td>
</tr>
</tbody>
</table>

Sapienic acid is a sebum fatty acid that is unique to humans.

Control

The following treatments have been shown to reduce sebum secretion rates:

- Isotretinoin[9]
- SMT D002[10]
- Spironolactone[11] (suitable for females only)

Changes during development

The sebaceous glands of a human fetus in utero secrete a substance called Vernix caseosa, a "waxy" or "cheesy" white substance coating the skin of newborns.

The activity of the sebaceous glands increases during puberty because of heightened levels of androgens. In males, sebaceous glands begin to appear predominantly on the penis, on the shaft and around the rim of the penile head during and after puberty. This is however normal, not to be confused with an STD. In females, they appear predominantly in the labia minora.
Pathology

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 "microcomedone". The prescription drug isotretinoin significantly reduces the amount of sebum produced by the sebaceous glands, and is used to treat acne.

The extreme use (up to 10 times doctor-prescribed amounts) of anabolic steroids by bodybuilders, for muscle gain can cause acne. The sebaceous gland is stimulated due to some steroids conversion into dihydrotestosterone. This may cause serious acne on the face, neck, chest, back and shoulders.

A blocked sebaceous gland can result in a sebaceous cyst.

A condition involving enlarged sebaceous glands is known as sebaceous hyperplasia.

Sebaceous gland carcinoma is a rare and aggressive form of cancer involving the sebaceous glands; sebaceous adenoma is a more benign neoplasm of the sebaceous glands.

Sebum can also build up around body piercings.[12]

Importance to other animals

Certain species of Demodex mites feed on sebum and are commonly found in the sebaceous glands of mammals, including those of humans.

The preputial glands of mice and rats are large modified sebaceous glands that produce pheromones.

Additional images

- Pilosebaceous unit
- Base of pilosebaceous unit
- Insertion of sebaceous glands into hair shaft
Sagittal section through the upper eyelid.

A hair follicle with associated structures.

References

[12] Playe, Stephen J (July 2002). "Infectious Complications of Body Art: Infection is reported in about 1% of tattoos and in up to 45% of piercings, depending on the technique employed, body location, and after care" (http://journals.lww.com/em-news/Citation/2002/07000/Infectious_Complications_of_Body_Art__Infection_is.7.aspx). Emergency Medicine News 24 (7): 10–3. doi:10.1097/01.EEM.0000334232.52899.06 (inactive 2010-06-14).
External links

- Histology at BU 08801loa (http://www.bu.edu/histology/p/08801loa.htm) - "Integument: scalp"
Sebaceous gland

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