

A SECOND SKIN

The gut is not the only part of the human body that hosts an important microbiome. The surface of the skin is home to a sprawling and complex microbial ecosystem, which interacts with the immune system and influences dermatological health.
By Michael Eisenstein; infographic by Lucy Reading-Ikkanda

MICROBIAL NICHES

The skin contains a diverse microbial ecosystem, which is seeded at birth, but evolves until a person reaches sexual maturity.

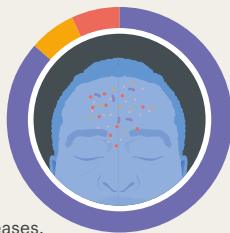
Relative abundance of bacteria, eukaryotes and viruses on the skin of healthy adults¹

● Bacteria ● Eukaryotes ● Viruses

OILY SKIN

(for example, ear folds and forehead)

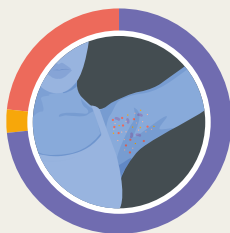
This area is home to bacteria that consume lipids, such as *Staphylococcus* spp. and *Cutibacterium acnes*, particularly during puberty, when sebum production increases.



MOIST SKIN

(for example, the groin and armpit)

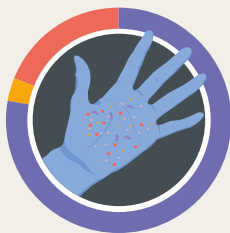
Sweat attracts species of *Corynebacterium* and *Staphylococcus*, which contribute to body odour.



DRY SKIN

(for example, the forearms and palms)

Dry skin has the most diverse microbiome, which is rich in species of Betaproteobacteria and Flavobacteriales.



THE FEET

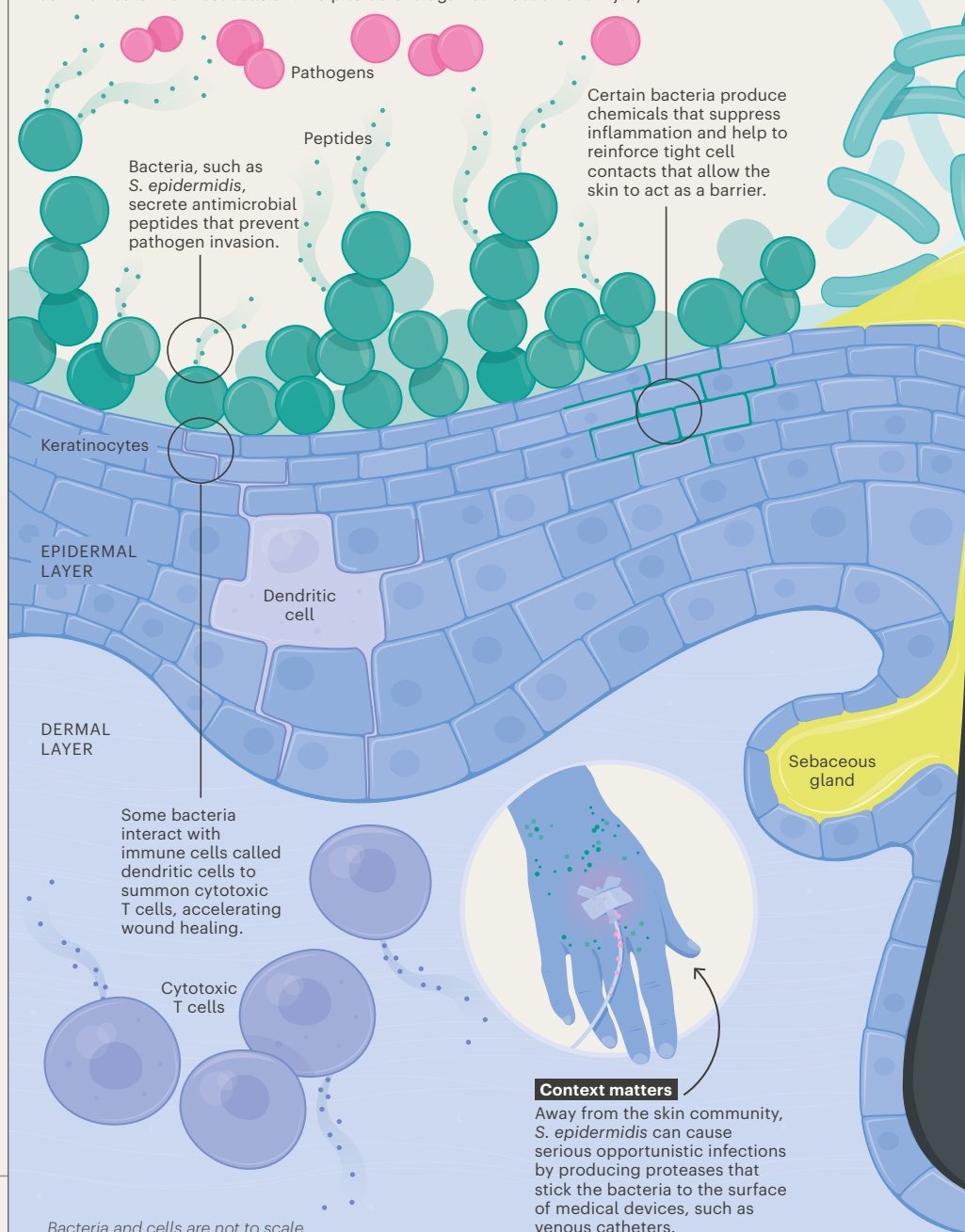
Feet have their own distinctive ecosystem. The community is made up mainly of bacteria, but the fungi present are much more diverse than in other areas of the body.



References: 1. Byrd, A., Belkaid, Y. & Segre, J. *Nature Rev. Microbiol.* **16**, 143–155 (2018); 2. Flowers, L. & Grice, E. A. *Cell Host Microbe* **28**, 190–200 (2020); 3. Scharschmidt, T. C. et al. *Immunity* **43**, 1011–1021 (2015).

HEALTHY COLLABORATIONS

The skin is a largely dry and nutrient-poor environment, but some microbes such as *Staphylococcus epidermidis* and *Cutibacterium acnes* are able to survive. These skin residents communicate with host cells and help to defend against infection and injury².





Watch an animation
at [go.nature.com/
collections/skin-
microbiome-outline](https://go.nature.com/collections/skin-microbiome-outline)

TURF WARS LEAD TO DISEASE

The bacterium *Staphylococcus aureus* is associated with atopic dermatitis, a form of eczema common in children that can give rise to other allergies later in life. Several beneficial species of *Staphylococcus* normally protect against *S. aureus*, but genetics, and possibly environmental and lifestyle factors, can mean this balance of power is disturbed in some individuals, making them susceptible to the condition.

