

The 'Grandmother Hypothesis': Skin behind the ears and between the toes can host a collection of unhealthy microbes

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Grandmother was right: Scrubbing behind the ears and between the toes may help keep the skin in those regions healthy, or so says a new study by a team at the George Washington University.

The [microbiome](#), or the collection of microbes living on and in the [human body](#), are known to play a role in [human health](#) and the skin is no different. A new study by a team at the George Washington University has shown that the composition of the skin microbiome varies across dry, moist and oily regions of the skin.

The new study, titled "[Spatial diversity of the skin bacteriome](#)," was published Sept. 19 in the journal *Frontiers in Microbiology*.

Researchers at the GW Computational Biology Institute wanted to take a closer look at the skin microbiome of healthy people. Marcos Pérez-Losada, an associate professor of biostatistics and bioinformatics at the GW Milken Institute School of Public Health, and his team were interested in testing what they call "the Grandmother Hypothesis."

Keith Crandall, Director of the Computational Biology Institute and professor of biostatistics and bioinformatics at GW says his grandmother always instructed the kids in his family to "scrub behind the ears, between the toes and in the belly button." Crandall posited that these hotspots are normally washed less often compared to the skin on the arms or legs and thus may harbor different types of bacteria.

But would the Grandmother Hypothesis hold up if put to the test? Pérez-Losada and Crandall designed an innovative genomics course and then unleashed a team of students to help them find out.

The 129 graduate and [undergraduate students](#) were taught to collect their own data—by swabbing certain moist and oily hotspots, behind the ears, between the toes and in the navel. They also collected samples from

control dry areas like the calves and forearms.

The students then learned how to extract and sequence the DNA in the skin samples in order to compare the microbes living in the hotspots to those in the control regions.

The researchers found that forearms and calves, which are often cleaned more thoroughly at bath time, had a greater diversity and thus potentially a healthier collection of microbes compared to the samples taken in the hotspots.

When certain trouble-making microbes take over the microbiome, they can shift the balance away from health, Crandall says. If the microbiome tips in favor of detrimental microbes, [skin diseases](#) like eczema or acne can be the result, he says.

The students proved the Grandmother Hypothesis and their results suggested that cleaning habits can change the microbes living on your skin and consequently its [health status](#), Crandall says.

This research, including an earlier [study by the same team](#), is one of the first to look at the diversity of sites across the skin microbiome in healthy adult subjects and may provide a reference point for future research. Crandall says the study of how the collection of microbes on the [skin](#) leads to health or disease is in the early stages.

More information: Marcos Pérez-Losada et al, Spatial diversity of the skin bacteriome, *Frontiers in Microbiology* (2023). [DOI: 10.3389/fmicb.2023.1257276](#)

Provided by George Washington University

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