

Researchers discover scent of skin cancer

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According to new research from the Monell Center, odors from skin can be used to identify basal cell carcinoma, the most common form of skin cancer. The findings, presented at the 236th meeting of the American Chemical Society, may open doors to development of new methods to detect basal cell carcinoma and other forms of skin cancer.

The researchers sampled air above basal cell tumors and found a different profile of chemical compounds compared to skin located at the same sites in healthy control subjects.

"Our findings may someday allow doctors to screen for and diagnose skin cancers at very early stages," said Michelle Gallagher, PhD.

Human skin produces numerous airborne chemical molecules known as volatile organic compounds, or VOCs, many of which are odorous. In the study presented at the ACS, the researchers obtained VOC profiles from basal cell carcinoma sites in 11 patients and compared them to profiles from similar skin sites in 11 healthy controls.

Both profiles contained the same array of chemicals; the difference involved the amounts of specific chemicals – some were increased and others decreased in samples from basal cell carcinoma sites.

The researchers plan to characterize skin odor profiles associated with other forms of skin cancer, including squamous cell carcinoma and melanoma, the most serious form of skin cancer.

To identify changes related to cancer, the researchers first needed to identify a normative profile for VOCs and to determine whether this profile varies as a function of age, gender or body site.

In research published online last month in the *British Journal of Dermatology*, Gallagher and collaborators sampled air above two skin sites – forearm and upper back – in 25 healthy male and female subjects, who ranged in age from 19 to 79.

Using gas chromatography-mass spectrometry techniques, they identified almost 100 different chemical compounds coming from skin. The normative skin profile varied between the two body sites, with differences in both the types and concentrations of VOCs.

Aging did not influence the types of VOCs found in the profiles; however, certain chemicals were present in greater amounts in older versus younger subjects.

This work provides the first comprehensive characterization of skin volatile organic chemicals at sites other than the underarm in people of different ages and genders. Previous studies of human skin had used either male or female subjects and had only examined one skin area.

Implications of the research are wide-ranging. Together, the two studies may help advance development of new methods to analyze skin for signs of altered health status.

"Chemical biomarkers may eventually serve as objective clinical markers of disease if effective sensor technology can be developed," said Monell analytical organic chemist George Preti, PhD.

Increased understanding of the chemicals related to skin odor could also lead to development of more effective anti-aging skin care products.

Source: Monell Chemical Senses Center

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