

Letter to the Editor

Dear *Cutis*[®]:

The article "Body Odor in Dermatologic Diagnosis" by Senol and Fireman (*Cutis*. 1999;63:107-111) has a number of informative points for the reader. Unfortunately, much of the information describing body odor is based on outdated, and in one case, an incorrect literature citation. The authors failed to note the work of Sato et al¹ at the University of Iowa; consequently, an incomplete description of eccrine sweat is presented. Sato et al¹ wrote concerning their work on eccrine glands and eccrine sweat, demonstrating that eccrine gland secretion does contain more than just water and electrolytes.

In addition, the authors state incorrectly that the odor of patients with schizophrenia is caused by trans-3-methyl-2-hexenoic acid. Although an article appeared in *Science* describing this,² the data was later demonstrated to be incorrect by a group at the Philadelphia Veteran's Hospital.³

The authors also failed to discuss 8 references in the literature that have been published since 1991 that detail the type, nature, and abundance of axillary odor and its formation from apocrine secretions.⁴⁻¹¹ None of these were cited by the authors. These articles present evidence demonstrating that axillary odor is caused by bacterial metabolism of apocrine secretion and that the odiferous compounds produced

are organic acids C₆-C₁₁ in chain-length with various branchings and unsaturations. There is no evidence for amines being present in the characteristic axillary odors and only scant evidence that volatile steroids play a role in this characteristic human odor. Amines only appear to be present if the patient has the genetic, odor-producing disorder, trimethylaminuria.

Further, many of the C₆-C₁₁ organic acids which constitute the characteristic axillary odor are not formed by the bacteria metabolizing skin secretions. These acids appear to be formed elsewhere in the body and are carried to the apocrine glands bound to nonvolatile precursor molecules. The axillary bacteria metabolize the nonvolatile precursors and liberate these volatile organic acids.^{5,6}

We hope this information will be of interest and use to your audience of clinicians.

Sincerely,
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AUTHOR RESPONSE

Dear *Cutis*:

We thank Drs. Preti and Leyden for their thoughtful comments concerning our article, and we are gratified that they agree with 98% of the content of this article.¹

Our manuscript was prepared as a clinical review to alert and aid the practitioner of clinical dermatology in the office evaluation of those diseases that are associated with various body odors. This brief report was never intended as an exhaustive review of the biochemistry of perspiration and the metabolic basis of body odor. We concur with Drs. Preti and Leyden that microbes are essential in the pathogenesis of body odor and, in fact, we cite Dr. Leyden and his coworkers in our own article's references 12 and 15. We regret that we did not acknowledge the more recent contributions of Dr. Leyden and his coworkers to the biochemistry and metabolism of constituents of perspiration.

A unique, if not peculiar, odor is present in the perspiration of many, but not all patients with schizophrenia. Smith et al¹ isolated a substance causing this peculiar odor from the perspiration of 7 patients with schizophrenia and identified it as trans-3-methyl-2-hexenoic acid (TMHA). Gordon et al² studied the perspiration of 7 patients with schizophrenia and 12 controls. They found comparable levels of this fatty acid, TMHA, in both groups and concluded there was no relationship between TMHA and schizophrenia. Gordon and coworkers did not assess the odor of the perspiration of their subjects with schizophrenia. Therefore, we neglected to cite Gordon in our manuscript.

We have received other inquiries related to our manuscript and are pleased that our brief communication stimulated much interest.

Sincerely,
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