

chapter. The discussion is designed to remain as simplistic as possible in an attempt to introduce concepts that can be studied in more detail by consulting the original research efforts that are referenced.

## II. SKIN AND SURFACE LIPID EXCRETION

The skin is traditionally divided into three major regions: the stratum corneum, the viable epidermis, and the dermis. The outermost of these layers, the stratum corneum, provides a barrier against the permeation of most substances. This layer is composed of non-viable, keratin-filled cells (squames) that are roughly pentagonal plates 0.5  $\mu\text{m}$  thick and 30 to 40  $\mu\text{m}$  across (1). Filling the inter-cellular space between these cells are bilayer-structured lipids (2). The structure of these lipids has proved to be important to the moisture-retaining ability of the stratum corneum (3,4). The viable epidermis lies below the stratum corneum and consists of stratified keratinizing epithelial cells whose final function is to produce the stratum corneum. This layer does not contain blood vessels, relying on nourishment by cell fluid from the deeper dermis layer. The deepest layer of skin is the dermis, which consists of dense, irregularly arranged connective tissue, and it is nourished directly by blood vessels (5). Combined, these layers form the skin and are connected to the subcutaneous tissue by bundles of collagen fibers.

Embedded in the skin are eccrine sweat glands, apocrine glands, hair follicles, and sebaceous glands. Eccrine sweat glands are simple tubular glands distributed over almost all of the human body. Each gland has a secretory part located below the dermis in the subcutaneous tissue and an excretory duct that ultimately opens directly on the skin surface. These glands produce perspiration and are particularly numerous on the palm of the hand. Apocrine glands produce characteristic body odors and are primarily located in the axilla. The secretion of this gland contains cholesterol, steroids, and proteinaceous substances (6) and contributes substantially to the surface lipid on the axilla, thus, being primarily important to deodorant and antiperspirant formulations. When present, the apocrine gland empties into the hair follicle above the sebaceous gland.

Two major classifications of hair exist on humans: terminal hairs and vellus hairs. Terminal hairs are the courser hairs of the scalp and male trunk hair, and the root of terminal hairs may extend more than 3 mm below the skin surface into the subcutaneous fatty tissue. Vellus hair is the fine, often unnoticed, body hair that populates regions such as the forehead, and extends less than 1 mm