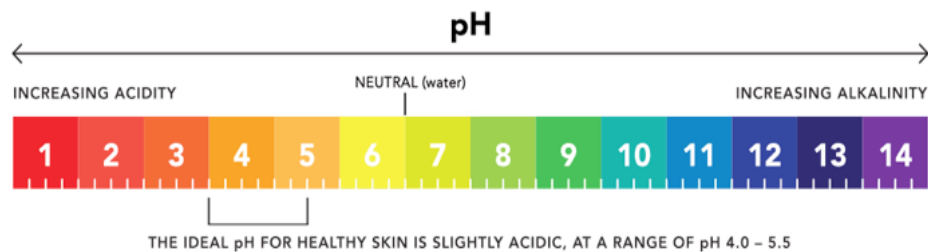


## Skin Surface pH

The role of skin surface pH, also referred to as “acid mantle,” was described more than 90 years ago and due to developing insights has now returned into focus.<sup>1</sup> Skin surface pH is influenced by endogenous and exogenous factors such as age, anatomic site, genetic predisposition, ethnic differences, sebum, skin moisture, and sweat production.<sup>2-4</sup> Stratum corneum (SC) pH can be documented by measuring pH and buffer capacity of the skin. The pH is a measure of the molar concentration of hydrogen atoms in a solution and describes the acid-alkaline ratio of a substance ranging from the most acidic (0) to the most alkaline (14), with 7 as neutral (Figure 1).<sup>5</sup>

**FIGURE 1.** Skin surface pH.



Physiological skin surface pH is acidic (4–6), while the body’s internal pH is neutral to slightly alkaline (~7.4).<sup>5</sup> Buffer capacity is the result of keratinocyte-produced free fatty acids (FFA), and components of (close up space) natural moisturizing factors (NMF), urocanic acid, carbonic acid, and keratins. Buffer capacity is decreased in babies and the elderly.<sup>5</sup> Repeat washing with alkaline soap and the use of elevated pH moisturizers reduces buffer capacity.<sup>5</sup> Skin surface pH influences skin barrier homeostasis, SC integrity and cohesion, and antimicrobial defense mechanisms.<sup>2-4</sup> In inflammatory skin diseases such as atopic dermatitis (AD) and acne, skin surface pH is elevated and therapeutic measures, cleansers, and moisturizers may contribute to deterioration of the condition.<sup>5</sup>

The current consensus paper explores the influence of genetic and environmental factors on the exacerbation of epidermal barrier breakdown in AD and acne and to what extent these factors attribute to the elevation of SC pH. We further examine the effects of a sustained increase in skin surface pH in these inflammatory conditions, as well as clinical insights into the role of pH and the influence of cleansing and moisturizer use as a measure to sustain skin pH at physiological levels.

### REFERENCES

- Schade H, Marchionini A. Der säuremantel der haut nach gaskettenmessngen. *Klin Wochenschr.* 1928;7:12–14.
- Fluhr JW, Kao J, Jain M, Ahn SK, Feingold KR, Elias PM. Generation of free fatty acids from phospholipids regulates stratum corneum acidification and integrity. *J Invest Dermatol.* 2001;117:52–58.
- Hachem JP, Crumrine D, Fluhr J, Brown BE, Feingold KR, Elias PM. pH directly regulates epidermal permeability barrier homeostasis, and stratum corneum integrity/cohesion. *J Invest Dermatol.* 2003;121:345–353.
- Hachem JP, Man MQ, Crumrine D, Uchida Y, Brown BE, Rogiers V, et al. Sustained serine proteases activity by prolonged increase in pH leads to degradation of lipid processing enzymes and profound alterations of barrier function and stratum corneum integrity. *J Invest Dermatol.* 2005; 125:510–520.
- Prakash C, Bhargava P, Tiwari S, et al. Skin surface pH in acne vulgaris: insights from an observational study and review of the literature. *J Clin Aesthet Dermatol.* 2017;10(7):33–39.