NOTES & COMMENTS

Scaly skin and bath pH: Rediscovering baking soda

To the Editor: The republication in the newsletter of the Foundation for Ichthyosis and Related Skin Types (FIRST) of a translation, from German,[1] of a paper by Küster,[2] has prompted testimonials about the usefulness of bicarbonate baths for exfoliating scales from patients with ichthyosis. Küster[2] treated more than 300 patients who had ichthyosis and routinely recommended adding baking soda to the bath water. Having been professionally interested in ichthyosis for a number of years, I was stunned that this simple therapeutic suggestion was completely foreign to me. Quick consultations with colleagues both here and abroad revealed that none had heard of this remedy, and no modern texts make mention of baking soda for scale removal. An intellectually obligatory—but alas increasingly less frequent—trip into the stacks of the local library revealed that texts from 100 years ago routinely did recommend baking soda baths.[3,4] Quietly and without explanation, those recommendations vanished from textbooks 70 to 80 years ago. So what are we to think? Is baking soda in the bath good, bad, or useless? A review of the existing data provides some clues.

Water facilitates scale removal, and we all hear reports from patients suggesting that the source of the water matters. Many patients who have ichthyosis report that their skin looks and feels better after a week at the seashore. Patients rarely voice such praise for lake water. Most dermatologists assume it is the salt. Could it be the pH? Two handsful of baking soda (Küster's recipe) raises the pH from 5.5 to 7.9 in a tub half-filled with tap water drawn from Hamden, CT. According to the US Geological Survey (http://ga.water.usgs.gov/edu/phdiagram.html), most "fresh" water has a pH of around 5.0. In striking contrast, ocean water usually has a pH above 8.1.

Do dermatologists have a bias against alkaline pH? Eighty years ago, Schade and Marchionini[5] reported that the stratum corneum of epidermis is slightly acidic. Since then, this "acid mantle" has intrigued skin biologists as to its origin, its purpose, and its role in disease.[6] We have therapeutic and cosmetic uses for weak organic acids. By contrast, we warn that strong alkalis, such as ammonia and lye, are caustic to skin. Most soaps contain lye and have pH above 9.5. Dove soap, the best-selling soap worldwide, was introduced in 1957 and widely marketed—and then recommended by dermatologists—as the first pH-neutral bar soap.

We may have to rethink our opposition to alkaline pH in specific situations. Normal desquamation requires enzymatic dissolution of desmosomes, and several of the serine proteases involved in desmosome degradation have alkaline pH optima.[7] Topical application of superbases raises the pH and increases the amount of stratum corneum, which can be mechanically removed by tape stripping.[8]

Are there risks to alkalinization? I can find no data indicating that exposure to the mildly alkaline nature of dissolved sodium bicarbonate is either irritating or harmful. Moreover, long immersion in sea water at pH 8.1 is generally not irritating, some natural spring water spas have alkaline pH, and distributors of some home "spas" recommend alkalinizing the water.

Normal stratum corneum has evolved to have a particular thickness so that it can perform its protective functions and still renew itself on a regular basis. Many disorders in which the stratum corneum is thickened represent a quantitative response (increased thickness) to a qualitative defect (abnormal function). We must be careful that our attempts to normalize the thickness do not exacerbate the functional defect(s). In patients with excessive scaling, periodic (1-3 times per week) exposure to lengthy (approximately 30-60 minutes) immersion in water at pH 8 followed by application of bland emollient is likely to be safe and, for some, may be justified in order to facilitate removal of scale and improve comfort and cosmesis.

Leonard M. Milstone, MD

Department of Dermatology, Yale University School of Medicine, New Haven, Connecticut

Funding sources: None.

Conflicts of interest: None declared.

Correspondence to: Leonard M. Milstone, MD, Department of Dermatology, Yale University School of Medicine, 333 Cedar St, New Haven, CT 06520-8059

E-mail: Leonard.milstone@yale.edu

REFERENCES

1. Traupe H, Burgdorf WHC. Treatment of ichthyosis—There is always something you, can do! In memoriam: Wolfgang Küster. J Am Acad Dermatol 2007;57:542-7.
2. Küster W. Ichthyoses: suggestions for an improved therapy [in German]. Dtsch Arztebl 2006;103:A1684-9.

3. Sutton RL. Diseases of the skin, 2nd ed. St. Louis: C.V. Mosby; 1917.
4. Stelwagon HW. Treatise on diseases of the skin. Philadelphia and London: W.B. Saunders; 1902.
5. Schade H, Marchionini A. The acid mantle of the skin [in German]. Klin Wochenshr 1928;7:12-4.
6. Rippke F, Schreiner V, Schwanitz HJ. The acidic milieu of the horny layer: new findings on the physiology and pathophysiology of skin pH. Am J Clin Dermatol 2002;3:261-72.
7. Brattsand M, Stefansson K, Lundh C, Haasum Y, Egelrud T. A proteolytic cascade of kallikreins in the stratum corneum. J Invest Dermatol 2005;124:198-203.
8. 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;121:345-53.

doi:10.1016/j.jaad.2009.04.011

Solar urticaria: Photoprotection from a naphthoquinone-modified dihydroxyacetone Maillard reaction

To the Editor: We note that the well written review of solar urticaria[1] in the December 2008 issue of the *Journal* did not include a discussion of melanoidin sunscreens. Although they are not presently available, some data exist that they can be helpful in this setting. Rice[2] reported two patients treated with daily bedtime topical applications of US Food and Drug Administration (FDA)-approved 3% dihydroxyacetone (DHA) followed by 0.25% lawsone (DuoShield; Rowell Laboratories, Baudette, MN).[2] Treatment with the overnight nonenzymatic naphthoquinone-modified DHA Maillard reaction[3] followed by morning soap showers to prevent clothing stains achieved complete ultraviolet/Soret-band photoprotection without experiencing sunburns (ultraviolet B light sun protection factor >18) in 30 photosensitive patients.

The Maillard equilibrium reaction produces a Schiff base and water in the stratum corneum.[3] The stratum granulosum's high water content prevents deeper penetration.[4] Further complex chemical reactions[3] produce a continuous covalently keratin-bound melanoidin sunscreen that desquamates in a week.[5] Patients' cutaneous environmental contacts from clothing, perspiration, swimming, and soap washings did not cause major daily photoprotection losses,[2,3] but stored topical DHA/lawsone mixtures were partially degenerated causing unpredictable photoprotection.[2,6-8]

Termination of DuoShield's marketing following pharmaceutical mergers ended with the loss of chemical vehicle stability files, and reintroduction would likely require an FDA investigational new drug application.

Ramon M. Fusaro, MD, PhD,[a] and Edwin G. Rice, MD[b]

Departments of Pharmacy Sciences, Preventive Medicine and Public Health, and Internal Medicine,[a] School of Pharmacy and Health Professions, School of Medicine, Creighton University, Omaha, Nebraska; and the Department of Dermatology, Park-Nicolet Health System,[b] Minneapolis, Minnesota

Funding sources: None.

Conflicts of interest: None declared.

Correspondence to: Ramon M. Fusaro, MD, PhD, Department of Preventive Medicine and Public Health, Creighton University, College of Medicine, 2500 California Plaza, Omaha, NE 68178

E-mail: rmfusaro@creighton.edu

REFERENCES

1. Botto NC, Warshaw EM. Solar urticaria. J Am Acad Dermatol 2008;59:909-20.
2. Rice EG. Dihydroxyacetone naphthoquinone protection against photosensitivity. Dermatologica 1976;153:38-43.
3. Fusaro RM, Rice EG. The maillard reaction for sunlight protection. Ann N Y Acad Sci 2005;1043:174-83.
4. Nguyen BC, Kochevar IE. Factors influencing sunless tanning with dihydroxyacetone. Br J Dermatol 2003;149:332-40.
5. Johnson JA, Fusaro RM. Persistence of skin color and fluorescence after treatment with dihydroxyacetone. Dermatology 1994;188:247.
6. Fusaro RM, Runge WJ, Lynch FW, Watson CJ. Sunlight protection in normal skin. By absorptive filter chemically induced in stratum corneum. Arch Dermatol 1966;93:106-11.
7. Fitzpatrick TB, Pathak MA. Chemical binding of protective agents to the stratum corneum. Contract No. DA 49-092-ARO-85, Department of the US Army, Army Research Office. Arlington, VA: 1968.
8. Donaldson EM, Donaldson AD. Protection from sunlight. Br Med J 1970;2:298.

doi:10.1016/j.jaad.2009.09.031

Research letters

Estimating the time required for a complete skin examination

To the Editor: The time physicians spend with patients is important for several reasons. Patients are more satisfied when they feel that time was taken to address their concerns.[1] In addition, physicians' reimbursement is indirectly tied to the time required for a physician–patient encounter. A recent article