

# Shampoo Therapy in Dogs and Cats

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This article was originally printed in the 1994 Pedigree Breeder Forum.

## DEFINITIONS

- ~ keratolytic - enhancing shedding of surface dandruff
- ~ keratoplastic - normalizing skin cell growth
- ~ antipruritic - anti-itch
- ~ antimitotic - stopping cell division and growth
- ~ pyoderma - bacterial infection of the skin
- ~ antimicrobial - agent used to kill bacteria, fungi, or other organisms

## INTRODUCTION

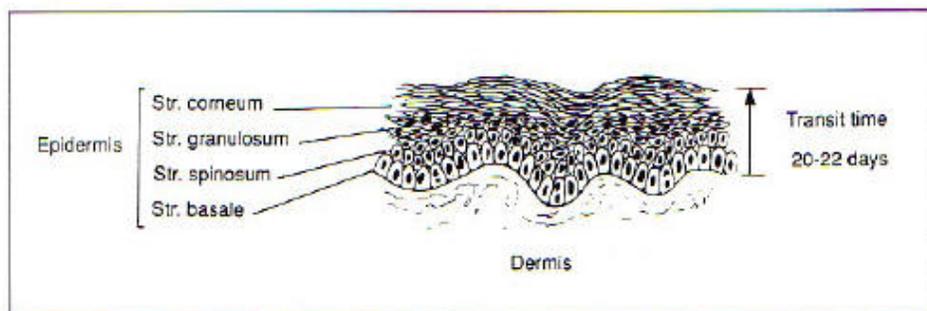
The increasing use of shampoo therapy in veterinary dermatology over the past few years has sparked the emergence of several new medicated shampoos. To benefit from shampoo therapy, it is important to know the types of shampoo available and when they should be used.

When used correctly, veterinary shampoos can help control or prevent skin diseases. Proper use of these products is of utmost importance to achieve the maximum effect. First, *contact time* of 5 to 15 minutes allows for hydration of the skin and provides sufficient time for penetration and action of the shampoo ingredients. Water in itself is an excellent skin hydrator, but if not left on long enough, evaporation and drying of the surface layers of the skin may result. Too long a contact time will result in the 'dishpan hands' syndrome, whereby the skin becomes macerated. It is difficult to judge time, especially when a wet, soggy, 150-pound Newfoundland is ready to shake and fight in order to get out of the tub. An egg timer or watch should be used to monitor the contact time. The *frequency* of bathing is also important. While common sense would dictate that the time to bathe a dog is when it is dirty, the interval between bathing is based on the presence of skin disease as well as the shampoo being used. Commonly, shampooing may be required two to three times a week until adequate control of scale, grease, and odor is achieved. Thereafter, a maintenance frequency of once weekly or once monthly may be all that is needed. Maintenance shampoo therapy is also dictated by seasonal influences. Variations in heat and humidity affect dryness, scaliness, greasiness, and the tendency to develop secondary bacterial infections.

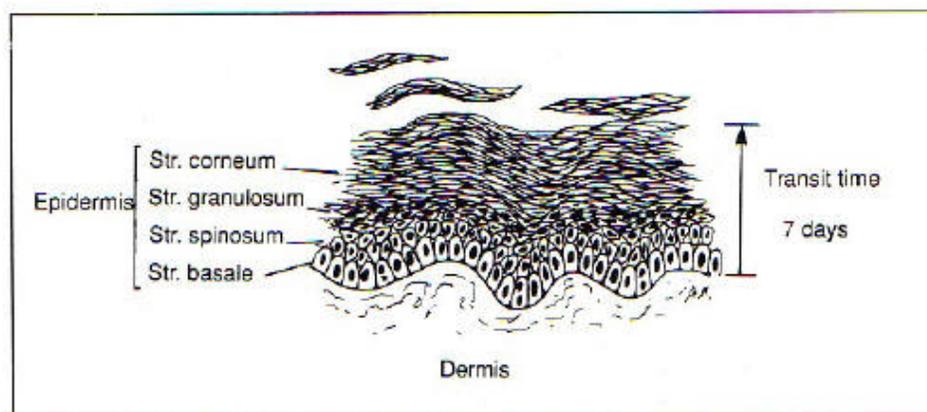
Lastly, shampooing *technique* must be considered. Preshampooing preparations include placing cotton balls in the ear canals and using a lubricant such as Akwa Tears (Akorn, Inc., Abita Springs, Louisiana 70420) in the eyes. Any shampoo that has been retained within the eye lubricant can be quickly removed by flushing the eyes with AK-Rinse (Akorn, Inc.) at the completion of the bath. The mechanical process of shampooing is beneficial in that it helps to remove crusts, scales, dirt, organisms, and residual medication. All too often, however, the underside of the pet, which is frequently the most severely affected area, is neglected. Shampooing the entire pet and rinsing *thoroughly* will provide optimal results and decrease the irritating effects shampooing can have.

## SELECTION OF SHAMPOOS

The primary objective when addressing any aspect of treatment is to do no harm. The mildest product that will accomplish the task, which will vary based on the animal's condition, is best. The possibility of any allergic reaction to the shampoo, particularly that of the bather, must also be considered. For choosing shampoos, it is important to become familiar with how they work and the potential problems they may cause.



**Figure 1**—Skin: The epidermis and dermis with cell turnover rate depicted for a normal dog.



**Figure 2**—Skin: Seborrheic condition with decreased cell turnover rate and excess skin formation.

One of the most common skin problems in small animals is excessive scaling of the skin. Skin is comprised primarily of keratin, which is a tough, stable, inert protein that provides a dynamic protective barrier. The process of keratinization is initiated within the active basal cells of the epidermis, called *keratinocytes*. Through many transformations, these cells eventually migrate to the surface and die, progressing through the basal, spiny, granular, and cornified layers (Figure 1). Many of the shampoos are formulated based on this cell turnover process. It is of interest to note that differences exist between the skin of humans and the skin of dogs and cats. The human epidermis is 10 to 15 layers thick and normally displaces a 28-day transit time from the basal cell to the cornified cell, whereas animal skin varies from 1 to 3 cell layers in the cat to 3 to 5 cell layers in the dog, with turnover times decreased by more than one week in dogs and cats, as compared with humans. These parameters imply that problems may be seen with greater frequency in pets than in humans. There is also a difference in surface pH. Animal skin has a nearly neutral pH of 7.5, while human skin has an acidic pH of 5.5. Thus, the age-old question "can I use human shampoos on my pets?" is answered -- "NO!" Bathing with a shampoo formulated for the pH of human skin may decrease the surface pH of a pet's skin and potentially result in irritation, drying, scaling, and changes in superficial bacteria. Only shampoos formulated for veterinary use should be used on animals.

One of the most important factors regarding shampoo selection is owner acceptance. Odor, color, staining or bleaching potential, and lathering ability of a shampoo are all characteristics to consider when selecting a shampoo. Some tar shampoos, for instance, are brown in color, small like a sooty fireplace, and do not lather well, and thus would not be considered a shampoo of choice for many conditions. Cost is another factor to consider, as some shampoos cost as much as \$20.00 for 6 ounces. If a costly medicated shampoo is needed and the pet is dirty, it may be helpful to bathe first with an inexpensive product, such as a flea shampoo. Fleas shampoos have less than 6 hours residual activity and thus are not appropriate as the sole means of flea control, It is preferable to choose a medicated shampoo to address the skin and leave the flea control to dips and sprays.

#### CLEANSING AND MOISTURIZING SHAMPOOS/SPRAYS

Cleansing and moisturizing shampoos are mildly medicated and hypoallergenic products that clean without soap, using detergent soap substitutes and anion/amphoteric surfactant systems. They mainly serve to rehydrate and cleanse the skin, and therefore can be used as a maintenance shampoo for dogs and cats with normal coats. Scaly skin is common in indoor pets during the winter months because of the drying effects of heat. In addition, many flea dips have a drying effect on dogs' coats.

Moisturizers are commonly used for mild, dry, scaly conditions or even after use of a potential drying agent. Moisturizers include such categories as emollients and humectants. Emollients are vegetable and animal oil products that protect and soften the skin by filling in the spaces between the dry skin flakes, thus smoothing roughened surfaces of the stratum corneum. Humectants rehydrate the skin without

using oils - they act by pulling moisture to the skin from the pet's own body fluids. The active ingredients in this category include lactic acid, urea, carboxylic acid, glycerin, and propylene glycol. Emollients and humectants may be available in a shampoo or a spray. Of the sprays, emollients are preferably applied immediately after a bath to provide an oil barrier to retain the moisture of the skin. Humectants, on the other hand, can be used daily to aid in alleviating dry, scaly conditions.

#### ANTISEBORRHEIC SHAMPOOS

Seborrhea is the excess scale formation that results from abnormal cell migration, increased cell division in the stratum basale, biochemical anomalies in keratin production, and aberrations in intercellular lipid production (Figure 2). Antiseborrheic shampoos are used primarily for eliminating surface scale by causing cell damage and ballooning, resulting in softening and shedding of the stratum corneum (keratolysis), and decreasing cell turnover rate by growth inhibitory effects on basal cells (keratoplasty). When added in equal proportions, *sulfur* and *salicylic acid* improve the overall effect of antiseborrheic shampoos. The efficacy of the sulfur relies on its direct interaction with the skin. Thus, sulfur is often formulated as a colloid to increase its surface area for enhanced contact with the skin. Properties of sulfur include keratoplastic activity primarily related to the formation of cystine, an important constituent of the stratum corneum. Keratolytic, antifungal, antibacterial, and antiparasitic (mites and lice but not fleas) activity are primarily a result of hydrogen sulfide and pentathionic acid formation from the combination of sulfur with cystine. Sulfur has also been demonstrated to decrease itching and is extremely safe, even on newborn animals. Attributes of salicylic acid include keratoplastic, keratolytic, antipruritic, astringent, and bacteriostatic activity. The keratolytic activity of salicylic acid is produced by decreasing surface pH, resulting in increased hydration of keratin and thus swelling of cells in the stratum corneum. Salicylic acid also solubilizes the natural binding material between cells, promoting the shedding of attached surface cells.

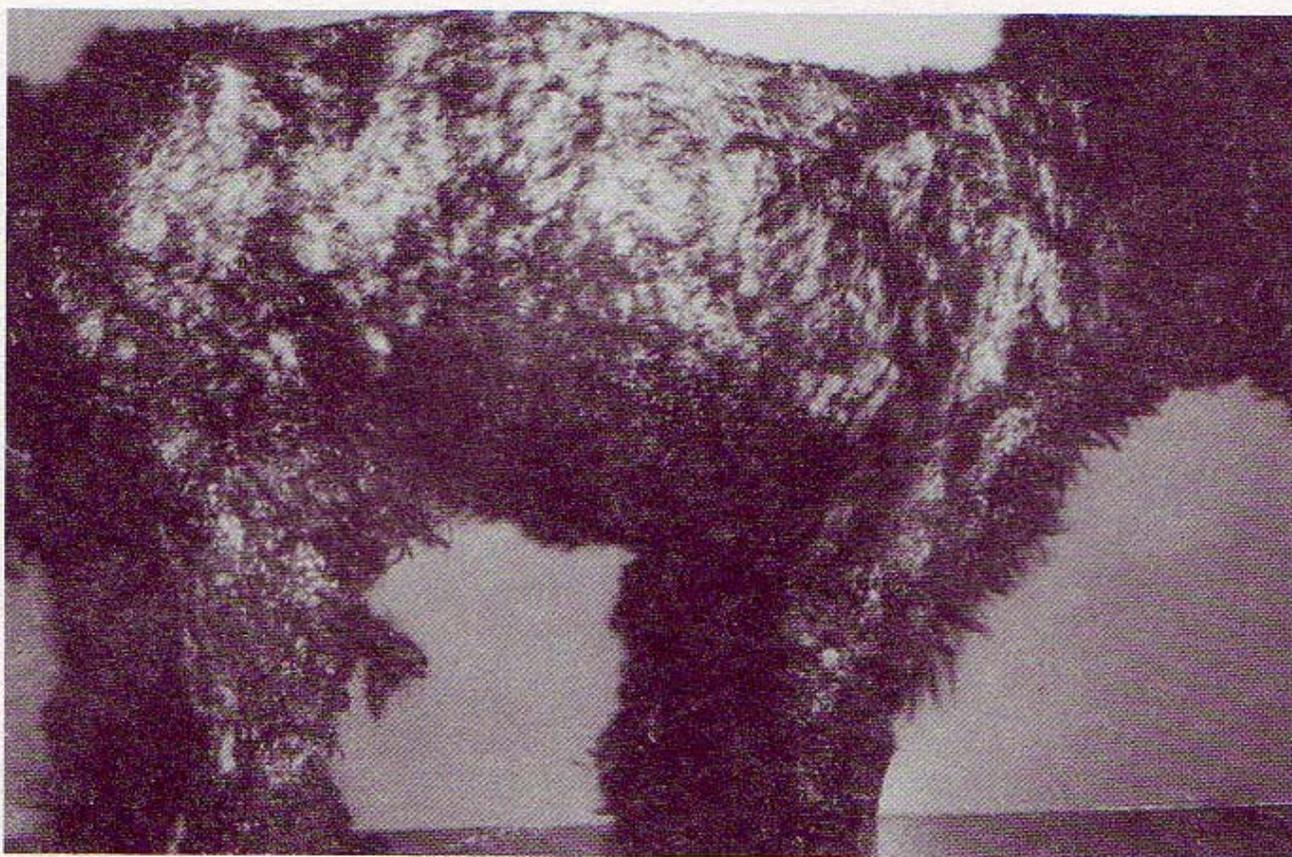
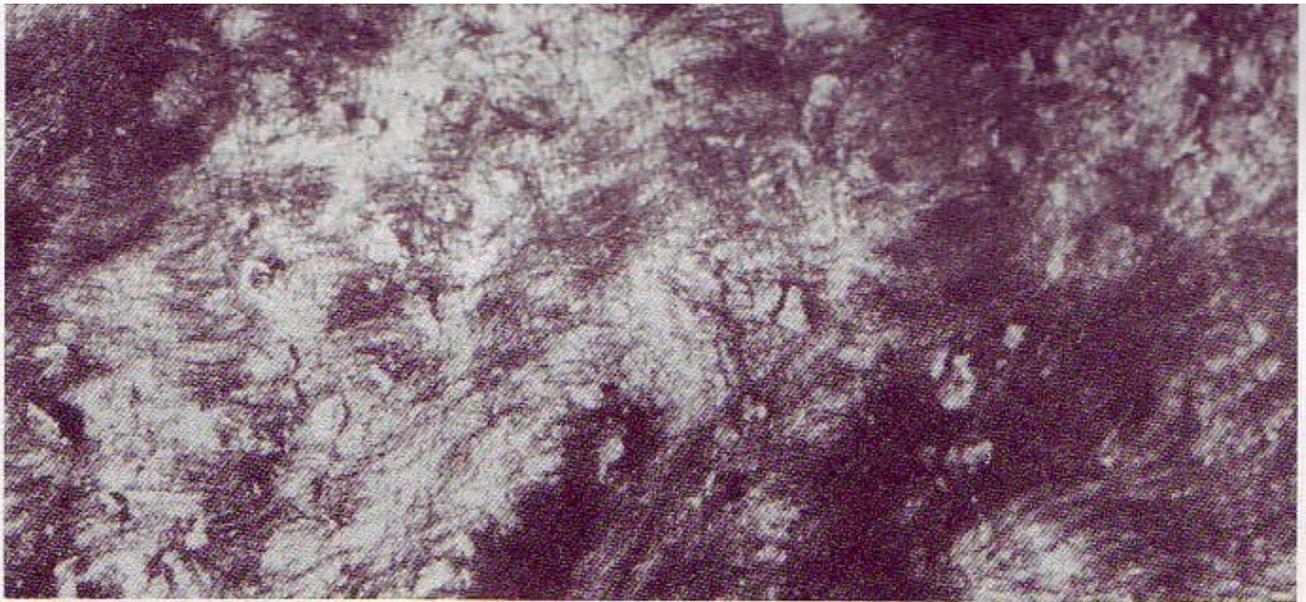


Figure 3A





**Figure 3B**

**Figure 3—(A and B)** A dog with excessively dry, flaking skin. A sulfur and salicylic acid shampoo would be a suitable choice to treat this condition.

The conditions for which sulfur/salicylic acid combinations are prescribed include primary keratinization abnormalities causing a dry scaling dermatosis or conditions secondary to bacterial pyoderma, parasitic infections, allergy, autoimmune disorders, environmental influences, and metabolic imbalances such as hypothyroidism (Figure 3). Numerous sulfur-salicylic acid shampoos are available. Some are formulated with equal proportions of sulfur and salicylic acid, thus enhancing the keratolytic effects synergistically. Others have lanolin, which helps to condition the coat. Certain shampoos contain salicylic acid in the chemical form of a salt, sodium salicylate, which enhances the shampoo's latherability. Triclosan, an antiseptic agent, is sometimes added to enhance the antimicrobial activity of the shampoo. The most appropriate choice will depend on the pet's condition.

#### TAR SHAMPOOS

Tar shampoos are a distillation produce of coal, bitumin (shale deposits rich in fossilized fish), or woods such as pine, juniper, and beech. Crude coal tar is a composition of thousands of elements. Manufacturers are attempting to define the active ingredients in order to eliminate those that cause odor and staining. This has led to the development of shampoos with the same activity but with fewer unwanted attributes. Quite often, tar shampoos are combined with sulfur and salicylic acid, which allows for a decreased concentration of tar to provide the desired keratolytic activity. Treatments should be discontinued or followed by a conditioning rinse if drying or irritation occur. The staining properties of tar shampoos prohibit their use in white-coated show dogs.



**Figure 4A**



**Figure 4B**

**Figure 4—(A and B)** A West Highland white terrier with extremely greasy, thickened, black skin. A tar shampoo would be an appropriate choice for this condition.

Characteristics of tars include antimittotic, keratolytic, antipruritic, degreasing, and anti-inflammatory activity. The antimittotic effects of tars are a result of suppression of epidermal growth and DNA synthesis of the stratum basale. The primary clinical application of tar shampoos is in the treatment of dogs with very oily skin (Figure 4). The higher the concentration of tar, the better its effects, but high concentrations increase susceptibility to contact allergies, excessive drying, or skin irritation. Concentrations greater than 4% refined tar have been shown to be irritating. As a general rule, tar shampoos should be avoided in cats.

#### SELENIUM SULFIDE

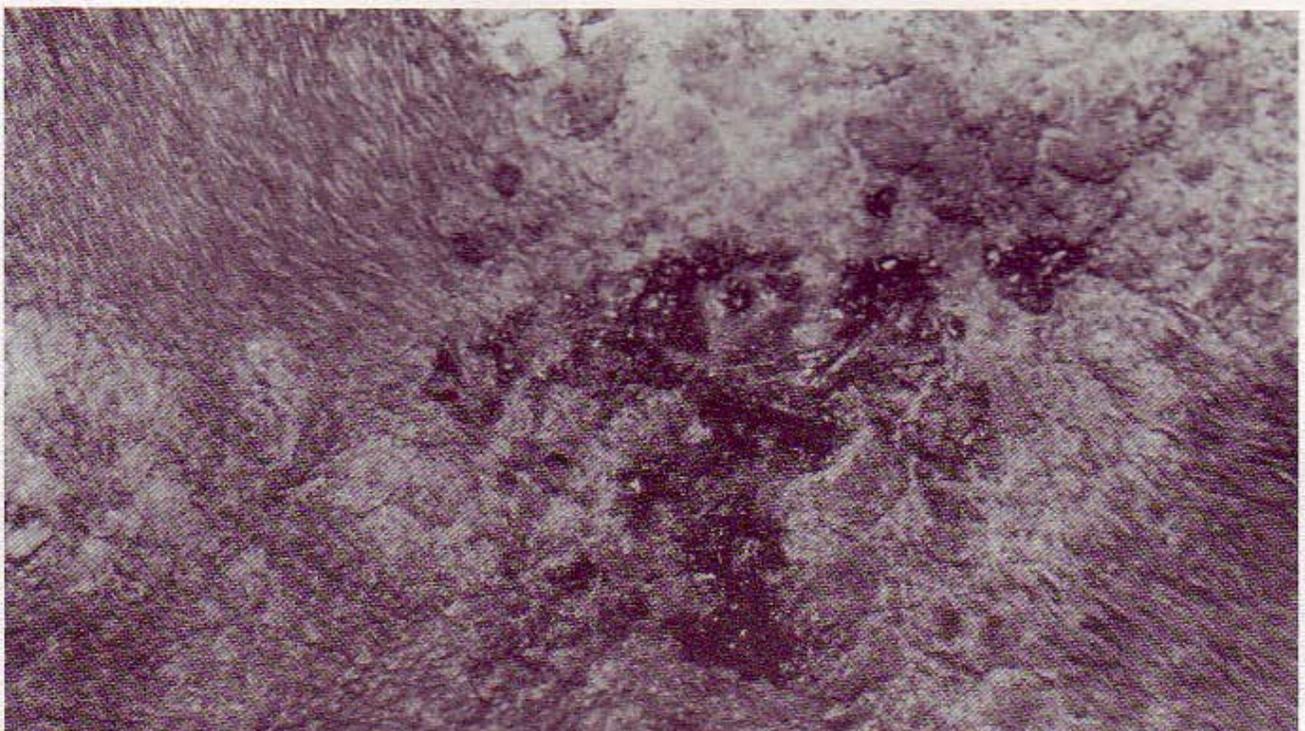
Selenium sulfide is antiseborrheic, but has limited usage because of its staining, drying, and irritating effects, especially to the mucous membranes and the scrotum. Properties of selenium sulfide include keratoplastic and keratolytic activity by depression of epidermal cell turnover rate and interference with hydrogen bond formation in the keratin. Selenium sulfide is also a potent degreaser. With the availability of less irritating degreasing products, selenium tends to be used as a last resort for those seborrheic dogs that do not respond to other products. Products containing selenium are definitely not recommended for used in cats. The familiar human product, Selsun Blue, contains 1% selenium sulfide at a pH similar to veterinary products and thus may be used dogs.

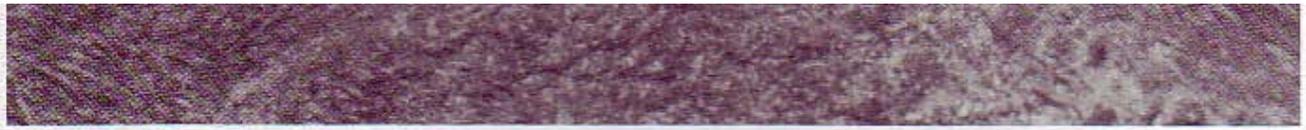
#### BENZOYL PEROXIDE

Benzoyl peroxide is included with antiseborrheic agents, but also has superior antimicrobial activity. It is often formulated at 2.5% to 3% in veterinary products because of its irritating effects at higher concentrations. In addition, benzoyl peroxide has the potential for bleaching fabrics and hair coats. Benzoyl peroxide has excellent keratolytic activity and its residual antibacterial spectrum of 48 hours makes benzoyl peroxide one of the most active antibacterial agents. It is also the only product available that has follicular flushing properties, which enhance removal of scale, glandular secretions, and bacteria from hair follicles. It is often used before treatment for generalized demodicosis, as it flushes the mites from the hair follicles and provides increased exposure to the dip treatment (Figure 5). The excellent degreasing activity of benzoyl peroxide is generally considered to be an advantage. Animals with sensitive skin may develop excessive drying or irritation; however, this can be relieved by alternating treatments with a milder product or by using emollients. Benzoyl peroxides generally do not lather well.



**Figure 5A**





**Figure 5B**

**Figure 5—(A and B)** Dog with generalized demodicosis and a secondary bacterial pyoderma. Benzoyl peroxides are often used 24 hours prior to using the dip that kills the mites.

## ANTIMICROBIALS

Topical antimicrobial shampoos help to eliminate overgrowth of pathogenic organisms on the surface of the skin. As mentioned above, benzoyl peroxides have excellent antibacterial activity with a 48-hour residual effect.

*Chlorhexidine* is a synthetic biguanide with broad-spectrum activity against bacteria, fungi, and yeasts, but exhibits no antiseborrheic effects. It is characterized by rapid kill and a 36-hour residual activity. Available products include Nolvasan (Fort Dodge Laboratories, Inc., Fort Dodge, Iowa 50501) and ChlorhexiDerm (DVN Pharmaceuticals, Inc., Miami, Florida 33172) in 1.0% chlorhexidine concentrations.

*Iodine* preparations have decreased in popularity as a result of their unwanted properties and the development of more efficient products. Iodine has good activity against bacteria, viruses, and fungi, especially when combined with pyrrolidone nitrogen. Residual effects last only 6 to 8 hours. Side effects include irritation, staining, and contact hypersensitivity. Iodine shampoos are not recommended for use in cats.

*Imidazoles* act by interfering with cell wall formation in fungal and yeast organisms, which increases cellular permeability, thus suppressing metabolic function and inhibiting growth. There has also been evidence that *ketconazole* exerts an inhibitory effect on keratinocytes in culture. Available shampoo products include Nizoral (Janssen Pharmaceutica, Inc., Piscataway, New Jersey 08854), a 2% ketoconazole shampoo, and Dermazole (Allerderm/Virbac, Inc., Fort Worth, Texas 76118), a 2% miconazole/0.5% chlorhexidine shampoo. They are both extremely safe and nonirritating and both exhibit excellent activity against fungi and yeast. The cost of these products may be prohibitive. Lauricare (3M Animal Care Products, St. Paul, Minnesota 55144-1000) is a nontoxic, nonirritating, moisturizing medicated shampoo containing 2% lauricidin glyceryl monolaurate and 1.5% lactic acid in a soap-free, high-lathering cleansing system. It has been demonstrated to have broad-spectrum activity against bacteria and yeast as a teat dip for dairy cattle and in the treatment of ear infections due to yeast. It has recently been formulated as a veterinary shampoo.

## TOPICAL ANTIPRURITICS

Topical antipruritic therapy is gaining increasing interest as adjunctive therapy to control itching. It is believed that itching results from noxious agents and allergens being absorbed through the skin. The main source of relief comes from oatmeal-based shampoos. Oatmeal is formulated as a colloid, which provides a large surface area. The noxious agents and allergens are absorbed by the oatmeal and subsequently washed away, eliminating the source of irritation and inflammation. Several products are available, including Episoothe (Allerderm/Virbac, Inc., Fort Worth, Texas 76118) and Florida Foam (Meridian Veterinary Products, Inc., St. Augustine, Florida 32806). The latter has a higher percentage of colloidal oatmeal incorporated into the shampoo, thus providing a greater surface of activity. The veterinary product Episoothe and Aveeno (Rydelle Laboratories, Racine, Wisconsin 53403), a human product also come in a powdered formulation to be added to a *cool* bath.

Recently, shampoos containing topical anesthetics and anti-inflammatory agents have been introduced to the veterinary market. These include Relief (DVM Pharmaceuticals, Inc., Miami, Florida 33172), 1% pramoxine hydrochloride, omega-6 fatty acids, and 2% colloidal oatmeal; and FS Shampoo (Meridian Veterinary Products, Inc., St. Augustine, Florida 32806), 0.01% fluocinolone acetonide and 8% colloidal oatmeal. Only anecdotal reports concerning these three shampoos are available at this time; however, the reports are quite favorable where the shampoos have been used as directed, i.e., 10 to 15 minute contact time. In addition, several of the aforementioned products have been formulated as cream rinse conditioners containing 20% colloidal oatmeal.

## CONCLUSION

It is obvious that shampoos play a major role in veterinary medicine. It is also becoming increasingly difficult to remain abreast of all the available information and products. By understanding the principles of the various categories of shampoos, one can select an appropriate medicated shampoo.

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