

## GLYCOTECHNOLOGY<sup>1</sup>

Several approaches have been taken by manufacturers in an attempt to either extend the residual action of topical products, or somehow make them useful as longer-term maintenance treatments. Such approaches have included:

- Physical reformulation of ingredients into alternate vehicles, such as “leave-on” conditioners or spray-on formulations that are not rinsed off.
- Reformulation of ingredients into novel, “slow-release” delivery systems such as liposomes or “Spherulites”
- Addition of novel ingredients which are intended to interfere with initial colonization of the skin with organisms, such as “glycotechnology.”

Glycotechnology is a concept developed and recently incorporated. The idea is that by addition of simple sugars or other carbohydrate molecules to a topical preparation, the sugars will “block” adhesion of microbes to epidermal surfaces, thus potentially decreasing the chances for colonization and infection. This concept is intriguing and very promising, but there is not yet direct clinical evidence of the degree of benefit that “glycotechnology” provides.

Bacteria and yeast have lectins (sugar-binding receptors) on their cell surfaces. One function of the microbial lectins is that they allow the organism to attach to surface glycoproteins on epidermal cells. Glycotechnology proposes to topically apply exogenous sugars (mannose, galactose, rhamnose, alkylpolyglucoside) that are able to bind to the microbial lectins, and thus block their attachment to the skin.

Laboratory studies have demonstrated that in vitro adherence of microbes to epidermal cells can be reduced by 40-50% by adding these sugars to cultures of *Pseudomonas*, *Staphylococcus*, or *Malassezia*. It has not been yet demonstrated that this effect translates to reduction in occurrence of skin infections clinically. In laboratory studies, addition of these sugars to cultures of epidermal cells can inhibit cytokine release. This *suggests* that they may have some anti-inflammatory action. Potential benefits and uses:

- Chronic ear infections. Following resolution of a severe or longstanding ear problem, many patients require long-term maintenance therapy to make the ear canal less prone to re-infection. Glycotechnology is one possible approach.
- Atopic dermatitis. Because major therapeutic goals are control of inflammation and of recurrent infection, glycotechnology-based products may help with both.

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<sup>1</sup> Courtesy of Doiug Deboer, DVM, 2008, University of Wisconsin.

- If these products are shown to live up to their potential, fewer infection relapses should contribute to minimizing antibiotic use in the future.

## **PHYTOSPHINGOSINE<sup>2</sup>**

Phytosphingosine is a biosynthetic molecule that is similar to the sphingosine compounds that form part of the intercellular matrix of epidermal cells. It has been shown to have several properties that may benefit chronic skin conditions. This may augment barrier function and produce antimicrobial action for both staphylococci and yeast. Further, anti-inflammatory actions have been demonstrated in vitro. This product comes in shampoos and spray on formulations (“substitute for shampooing”). Based on these properties, these types products have been most often recommended in the following situations:

- **Atopic dermatitis:** serve to enhance barrier function, reduce recurrent infections, and may have an anti-inflammatory action
- **Recurrent staphylococcal pyoderma**
- **Malassezia dermatitis**
- **Primary seborrheic diseases (seborrheic Cockers!)**
- **Granulomatous sebaceous adenitis.**

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<sup>2</sup> Courtesy of Doiug Deboer, DVM, 2008, University of Wisconsin.