

FAST FORWARD

Aquaporin Technology Maximizes Skin Hydration

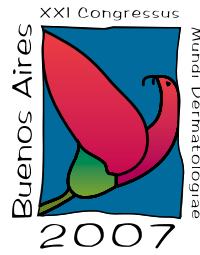
Aquaporins are responsible for regulating the transport of water and other small solutes across plasma membranes, ultimately acting as pores within the walls of skin cells. Through the use of innovative technologies, P&G Beauty scientists have discovered how to manipulate aquaporins in order to maximize the skin's moisture.

Breakthrough aquaporin-stimulating technologies have been shown to infuse moisture throughout the epidermis, hydrating the full thickness of the skin. As a result, skin stays softer and smoother longer than with traditional lotions, which only penetrate the top layers of the skin.

IN THE SPOTLIGHT

Science Sneak Peek: World Congress of Dermatology

P&G Beauty researchers from around the world will convene at the World Congress of Dermatology (WCD) meeting in Buenos Aires, Argentina, September 30–October 5. The WCD, a global meeting that takes place every five years, last took place in Paris, France and drew more than 12,000 physicians and 3,800 scientific abstracts. P&G Beauty has a number of activities planned for the upcoming meeting, including:



- "Latest Advancements in Skin Health and Anti-Aging" Symposium: This session will provide an overview of the differences and similarities in skin care needs in varying global populations and address the role of inflammation and use of botanicals in management of skin disorders.
- "Cosmeceuticals: Practical Solutions for Common Problems" Symposium: New biomolecular research has paved the way for better understanding of the effects of ingredients on many common dermatological conditions, leading to an explosion in what have been dubbed "cosmeceuticals." This session will review the latest ingredients and treatment strategies.
- "Hot Topics in Hair and Scalp Science" Symposium: This course will discuss the challenges involved in treating common hair and scalp disorders, including delivery of the appropriate therapeutic ingredients in a cosmetically-acceptable form to encourage patient compliance.

P&G Beauty is also serving as a 2007 WCD Gold Patron, and will present a number of scientific posters. Check www.pgbeautyscience.com for meeting updates, including symposium proceedings and more.

DID YOU KNOW?

P&G is committed to being the innovation leader in every category where we compete. To do this, we define innovation broadly and we look for sources of innovation inside and outside P&G. Externally P&G people connect to a global network of nearly two million innovation experts and technology problem-solvers that include scientists, inventors, suppliers, government laboratories, academic communities, and at times, competitors.



P&G BEAUTY SCIENCE

P&G Beauty Science has more than 1,800 scientists and technical employees working at 11 global technical centers with an unparalleled commitment to technology development. Company scientific efforts have resulted in over 3,500 active beauty care patents. This allows P&G to develop products uniquely suited for different types of hair and skin, and tailored to different cultures and climates. P&G scientists are constantly seeking new ways of turning inspiration into innovation.

P&G Beauty products help make beauty dreams real and grooming enjoyable every day for millions of women and men worldwide. With more than 100 brands available in nearly 130 countries, P&G Beauty delivered sales of more than \$21 billion in fiscal year 2005/06, making it a leading global beauty company. P&G Beauty offers trusted brands with leading technology to meet the full complement of beauty and grooming needs: Pantene®, Olay®, Head & Shoulders®, Max Factor®, Cover Girl®, Always®, Sassoon Professional®, Wellaflex®, Rejoice®, Sebastian Professional®, Herbal Essences®, Koleston®, Clairol Professional®, Nice 'n Easy®, Venus®, Gillette®, SK-II®, Wella Professionals®, Joy® by Jean Patou, Rochas®, Escada®, Hugo Boss®, and Lacoste® fragrances.

Please visit www.pg.com or www.pgbeautyscience.com for the latest news and in-depth information about P&G Beauty and its brands.

CONTACT INFORMATION

To talk to a P&G Beauty scientist or to learn more about ongoing research at P&G Beauty, contact:

Lauren Thaman
P&G Beauty Science
+513-626-1370

Heather Cunningham
P&G Beauty Science
+513-626-2606

BREAKTHROUGHS:
SCIENCE NEWS FROM P&G BEAUTY

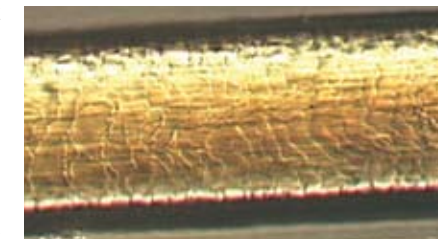
ANCIENT BOTANICAL FINDS APPLICATIONS
IN MODERN HAIR CARE

Cassia is considered one of the 50 fundamental herbs in Chinese medicine and is a revered staple in Ayurvedic medicine. But similar to many plant species treasured throughout history, modern science is allowing us to better understand and unlock the full extent of cassia's benefits. In recent years, the botanical has withstood the test of peer-reviewed research, with published benefits in lowering cholesterol, reducing blood pressure and relieving eye inflammation. Adding to the plant's portfolio of benefits, P&G Beauty researchers have recently discovered that a specific polymer within the cassia plant may be extremely effective as an ingredient in hair care products.

Cassia: A Potential Solution to an Ongoing Challenge

Hair science has advanced exponentially over the past few decades, but a perpetual challenge has vexed hair product formulators, namely identifying an ingredient that can effectively deposit conditioning agents onto the hair while not compromising the cleaning performance or aesthetics of the product.

In the 1970s, formulators discovered cationic polymers as a valuable conditioning agent that helps to protect hair against damage. This class of polymers is common in today's shampoos. Cationic polymers play a critical role in coacervate formation, a water-insoluble complex that conditions and carries other hair care ingredients to the hair strand. The coacervate function is particularly useful in reducing the amount of friction that is caused by brushing or combing hair while it is wet, a time when hair is especially vulnerable to damage. Though the important characteristics of cationic polymers are better understood and more polymers are available for use today, high levels still negatively affect both lather and product stability, and hair formulators have grappled with finding the precise balance of cationic polymers and other ingredients to achieve an end product that cleans and protects hair in an aesthetically-pleasing form.



A strand of hair enveloped in a protective sheath created by deposition of cassia polymer and silicone conditioner.

What's Inside

- Pyrithione zinc dandruff treatments stand firm against tachyphylaxis
- Self-tanning technology creates pigmentation equilibrium
- N-acetyl glucosamine shown to be an effective topical precursor to hyaluronic acid

In their ongoing studies to identify superior hair care ingredients, P&G Beauty scientists recognized the unique sugar structure of the cassia extract and felt that this natural polymer had great potential for hair care. In study after study, P&G Beauty researchers have observed

cassia's benefits to hair care and refined test formulas accordingly. To date, P&G Beauty has studied cassia applications in hair care products in 11 countries and with input from more than 6,800 women worldwide.

"We've found that the naturally-derived cassia polymer can replace or serve as an adjunct to traditional polymers," said Jim Staudigel, Senior Scientist, P&G Beauty. "This advance takes us many steps closer to finding the ideal hair care balance of lather, conditioning, stability and aesthetics."

Functions of Cassia-derived Ingredient in Nature and in Hair Care

Scientists have based their investigations on a derivative of the endosperm of the cassia, known as the galactomannan. The galactomannan is an energy reserve and a significant component of the cassia endosperm's cell walls, an effective physical barrier that offers support and strength to the cell. In one recent study, P&G Beauty researchers added this isolated polymer to a shampoo

(continued on next page)





(continued from previous page)

formula and compared it against shampoo with a traditional cationic polymer. The control and test shampoos were tested using multiple technological measures, including turbidity, flow cell differential interference contrast microscopy and cryo-scanning electron microscopy. The study found the cassia formula performed better than the traditional cationic polymer formula in its ability to effectively deposit hair-enhancing ingredients and reduce the damaging friction between the hair and a comb.

Another study testing cassia in hair conditioner found that the cassia formula increased silicone deposition by 16 percent, demonstrating that the naturally-derived ingredient enhances the efficacy of the synthetic ingredients. The cassia also decreased the thickness of the conditioner, making it easier to spread through the hair.

“Throughout our investigations of cassia hair care products, P&G Beauty researchers have found that the galactomannan derivative performs an analogous ‘protective shield’ function in hair care products, just as it does in its naturally-occurring environment within the cassia endosperm,” said Staudigel. “This protective shield reduces hair damage and deposits conditioner more effectively, offering potentially significant benefits for consumers seeking better conditioning, especially through a more natural route.”

There is perhaps nothing more gratifying for a scientist than to harness the power of nature in the lab setting to reap broad benefits. In the near future, P&G Beauty scientists will find the results of their research—founded on 5,000 years of accumulated cassia knowledge—at last unveiled to the consumer.



Jim Staudigel

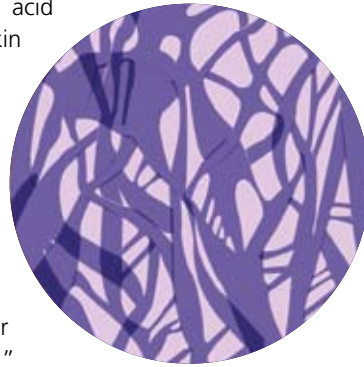
SKIN CELL CHEMISTRY IMPROVES HYDRATION VIA TOPICAL PRECURSOR

Hydration is considered a major component in the appearance of aging skin. To improve hydration during the aging process, scientists are exploring topical applications that may increase levels of hyaluronic acid (known as “nature’s moisturizer”) within the skin.

Hyaluronic acid is an essential element of the extracellular matrix in the skin that keeps skin moist and agile and gives it a healthy, youthful appearance.

New research shows that when n-acetyl glucosamine is applied topically, it penetrates the skin and combines with d-glucuronic acid to form hyaluronic acid. The newly-formed polymer acts as a molecular sponge, binding up to 1,000 times its weight in water. Hyaluronic acid continues to be synthesized, filling intercellular spaces and improving hydration. The result is a plumping of fine lines and wrinkles.

“Data proving n-acetyl glucosamine can be used as a topical precursor to hyaluronic acid is an important development in skin health research,” said Dr. Rosemarie Osborne, Ph.D., Principal Scientist at P&G Beauty. “It plays an integral role in the development of new, more efficacious skin care products. We hope to continue identifying possible applications of topical n-acetyl glucosamine as a precursor to hyaluronic acid in order to improve skin’s hydration over time.”



Hyaluronic acid network

MYTHS & FACTS

- **Changing your anti-dandruff shampoo every few weeks is more effective.**

MYTH—Clinical data suggests it is not necessary to change or rotate anti-dandruff shampoos in order to maintain efficacy. A recent study reports that tachyphylaxis, the natural decreasing effectiveness of a therapy after regular and repeated administration, does not occur when pyrithione zinc-containing anti-dandruff shampoos are used as directed over extended time periods.

- **A cosmetic conditioner used after an anti-dandruff shampoo decreases the shampoo’s effectiveness against dandruff.**

FACT—Studies show that a cosmetic conditioner used immediately after a pyrithione zinc-containing anti-dandruff shampoo can wash away 70 percent of the pyrithione zinc deposited by the shampoo. Using a pyrithione zinc-containing conditioner maintains, and can even elevate, the amount of pyrithione zinc that remains on the scalp to fight dandruff. Therefore it is important to follow an anti-dandruff shampoo with an anti-dandruff conditioner.

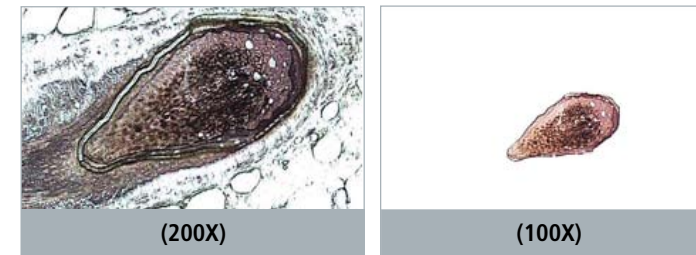
GLOBAL BEAUTY

Trends In Hair Color Around The World

Globally, men and women tend to color their hair to look and feel better about themselves, but color preferences vary according to geographic location. These trends suggest that hair color preference may play a role in attitudes about lifestyles in different cultures. Although shades of brown and blonde are the most popular hair colors globally, red is a preferred color in Russia, which is likely related to a desire to stand out among a crowd. Other country-specific color preferences include black in China for a more natural look, and reds in Mexico and China, used as a “statement” of color. Research into these preferences helps P&G Beauty formulate unique regional hair color shade collections that are optimized to deliver natural looking hair color for consumers around the world.

STRANGELY BEAUTIFUL

Mapping of the human genome is providing P&G Beauty researchers with an unprecedented opportunity to study complex cellular processes in skin and hair. However, analyses of these data are often difficult to interpret because tissue from clinical samples represents a complex mixture of different cell types, each with its own repertoire of expressed genes. Laser Capture Microdissection allows the selection and isolation of specific cell types from complex tissue samples. This technique is commonly used by cancer researchers to isolate cancer cells. Desired cells are identified microscopically and selected for collection by overlaying the tissue section with a membrane and exposing it to a laser beam. The laser induces the membrane to adhere to the cells and nonselected cells remain attached to the microscope slide. The selected cells are then extracted from the membrane and RNA is isolated for genomic analysis.



Left: Skin biopsy before laser capture dissection, Right: Isolated cells from a skin biopsy

LAB NOTES

Dandruff Treatments Stand Up To Tachyphylaxis

Dandruff affects nearly half of the global population, making effective treatment options a priority for many dermatologists. There is a common belief that these treatments are susceptible to tachyphylaxis (decreasing effectiveness of a therapy after regular and repeated administration). However, clinical studies of dandruff sufferers suggest that tachyphylaxis is not a concern for treatments containing pyrithione zinc (PTZ).

Two long-term (6-month and 12-month), placebo-controlled clinical trials were conducted using dermatology-assessed flaking severity as an end point. These studies observed the efficacy of 2 percent and 1 percent PTZ-based shampoos compared to placebo. Both studies concluded that extended use of PTZ-based treatments provided consistent benefit compared to placebo. “Consumer reports of reduced efficacy are likely the result of problems of inconsistent compliance to treatment,” stated study author James R. Schwartz, Ph.D., “but with regular use, consumers have the ability to effectively control symptoms of dandruff.”

CLOSE-UP

Pigmentation Transformed

Take a closer look at the graphic below to view how a new self-tanning technology works in harmony with the skin. In self-tanners a pigment ingredient called dihydroxyacetone (DHA) reacts with the keratin proteins of the dead skin cells in the stratum corneum to create a semi-permanent, but faint, golden tone. With daily use, the color deepens, yielding the same effect as a tan. However, sometimes it’s difficult to maintain the same intensity and evenness of color from day to day. A new self-tanning technology created by P&G Beauty scientists works with the skin’s natural exfoliation process, which renews the top layer of skin approximately every 7-10 days. With equilibrium color technology, the cycle of DHA application harmonizes with natural skin turnover, resulting in even and consistently pigmented layers of skin.

