

IN THE SPOTLIGHT

Training Professional Noses

In the highly specialized field of perfumery, P&G really stands out. Not only is P&G the world's largest user of perfumes and perfume raw materials, but it is also the only consumer products company that conducts its own internal perfumer training program. There are only about 400 accredited perfumers in the world. The nearly 50 perfumers employed and trained by P&G around the globe possess a set of skills that is unmatched in the rest of the industry.

Candidates for P&G's three-year training program must possess a critical blend of odor acuity, technical skills, and interest in areas that require creativity. Upon completion of their training, P&G

perfumers will have memorized the odor of over 5,000 individual raw materials and will understand how each material performs in various product bases, such as shampoos, bar soaps, deodorants, lotions and detergents.

In a field where new aroma-chemicals are introduced regularly, the training may be complete, but the learning never stops. And for P&G perfumers,

the combination of technical knowledge,

love of the creative process, and the opportunity to get close to consumers provides an edge that sets P&G apart from all of its competitors.



FAST FORWARD

Ethnic Alopecia

Ethnic alopecia, medically known as Central Centrifugal Cicatricial Alopecia (CCCA), is a type of hair loss affecting women of African descent that can lead to visible and permanent hair loss if left untreated. Although various hair grooming techniques like hot combing and chemical relaxers have been blamed for this condition, its actual cause is currently unknown. Over the past two years, P&G Beauty has provided research grants to the North American Hair Research Society (NAHRS) to fund special studies to better understand the incidence, levels of severity, and best treatments for CCCA. P&G Beauty experts have also joined forces with this special task force of world-leading hair dermatologists to help get to the root of this problem and find solutions to treat it.

DID YOU KNOW?

P&G Beauty scientists have developed a "fake sweat" that smells very much like pungent body odor. This synthetic sweat is used in P&G laboratory tests to help screen new technologies and new perfume ingredients for covering such odors.



P&G BEAUTY SCIENCE

P&G Beauty Science has more than 1,800 scientists and technical employees working at nine 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.

Two billion times a day, P&G brands touch the lives of people around the world. P&G's beauty business had more than \$17 billion in global sales in fiscal year 2003/04, making it one of the world's largest beauty companies. The beauty business sells more than 130 different brands in over 180 countries worldwide. Its beauty brands include Pantene®, Head and Shoulders®, Olay®, SK-II®, Cover Girl®, Joy®, Hugo Boss®, Herbal Essences® and Clairol Nice 'n Easy®. Please visit www.pg.com for the latest news and in-depth information about P&G and its brands.

CONTACT INFORMATION

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BREAKTHROUGHS: SCIENCE NEWS FROM P&G BEAUTY

NEW MASCARA WAND TECHNOLOGY GIVES WOMEN WHAT THEY WANT: SUPERB, FLAWLESS LASH DEFINITION

When modern mascara was developed by chemist T.L. Williams in 1913, it consisted of a cake form applied with a wet brush. Little did Williams know that mascara would become the cosmetic more than 50 percent of women claim to be their most essential. Since the introduction of the modern tube and wand applicator in 1958 by Max Factor, cosmetics companies have worked to refine the formulation and wand technology to deliver even distribution with less smearing and clumping.

P&G Beauty has taken mascara technology to the next level with a new brush and mascara formulation that allows for a more even application than ever before.

Traditionally, mascaras have relied on the twisted wire brush delivery system, but this system can have limitations. Due to its design and limited flexibility, it can be difficult for the traditional wire brush to reach lashes and to achieve precise, even and defined brushwork from root to tip. The bristles of a traditional wire brush are made of nylon and originate in groups or tufts, making it more difficult to remove excess product from the tip of the brush. As a result, coating corner lashes without smudging or smearing the mascara proves almost impossible for most women.

Through the use of patent pending Moldtrusion® technology, P&G Beauty scientists have developed a mascara brush that is the first of its kind. The Moldtrusion® brush is engineered with soft, deformable bristles with distinct origination points on a flexible core. Each bristle is intentionally and precisely placed. The bristles are made of thermoplastic rather than nylon, so they are extremely soft and flexible. This means they can easily conform to reach lashes for precise definition from root to tip.

Most people are not aware that their eyelashes have surface energy properties that affect how mascara is transferred from the brush onto



What's Inside

- New Perspectives on the Emerging Science of Nanotechnology
- Engineering Better Anti-aging Technologies
- P&G's Trained Noses Make Sense of Scent

their lashes. In fact, different ethnicities have lashes with different surface energies and therefore experience different cosmetic results with traditional mascaras.

Traditional twisted wire brushes have a surface energy more similar to the mascara formulation than the lash and therefore it is a challenge for the product to transfer easily onto the lashes. The surface energy of the Moldtrusion® brush is more similar to the surface energy of the eyelash than to that of the mascara. This means that the surface characteristics of the Moldtrusion® brush and mascara have been optimized such that the mascara has a lower energy barrier to cross in order to transfer product to the lashes. Thus, application is improved as the mascara moves effortlessly onto the lashes rather than staying entrapped in nylon bristles. Although consumers cannot feel tugging on their lashes, the higher friction of the Moldtrusion® brush leads to better combing and lash separation versus traditional wire brushes.

Brushes aren't the only important piece of the equation though – mascara formulation is also essential to optimal mascara application. P&G Beauty has developed a patented mascara formula designed to work in tandem with the Moldtrusion® brush. The formula contains a purified mineral complex. This complex has a positive cationic charge that is attracted to the negatively charged eyelashes, enhancing deposition and volume. On the eyelash, the cationic

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charge naturally repels itself, promoting the separation of the lashes. The formula also contains polymers that are resistant to heat, abrasion and water to allow the mascara to last all day with no smudging or smearing.

This revolutionary step in mascara brush and formulation technology exemplifies P&G Beauty's leadership in mascara and makeup innovation.



"The Moldtrusion® process brings a revolutionary innovation in mascara wand technology. Studies have shown that this new mascara deposits more product on the lashes in a more uniform manner, with less clumping, smearing and smudging than mascaras applied with a traditional wire brush," says Dr. Sarah Vickery, Senior Scientist, Procter & Gamble Cosmetics.



Nanotechnology involves working on the most miniature scale. An easy size comparison: a nano-structural unit is to a soccer ball as a soccer ball is to the earth.

Opponents of nanotech claim that the technology risks are unknown because the safety of compounds changes too dramatically once they are made into nano-sized particles, as if they were novel compounds. On this basis, it has been said that nanotech has the potential of becoming a "pariah" in the media, as has been the case for genetically modified organisms (GMOs).

At P&G Beauty, scientists have a very balanced approach. Today, P&G Beauty only uses nanoparticles that are specifically safety tested for their particles' properties. You can find these in sunscreens containing titanium dioxide and zinc oxide. Both compounds are widely used by P&G Beauty and other companies, and they are supported by an overwhelming amount of safety data both on the native form and on the nano-sized particles used by the industry. Why are nano-sized sunscreens needed? To improve their effectiveness and to avoid too much whiteness on the skin – without nanotech we would all look like white ghosts when wearing sunscreens!

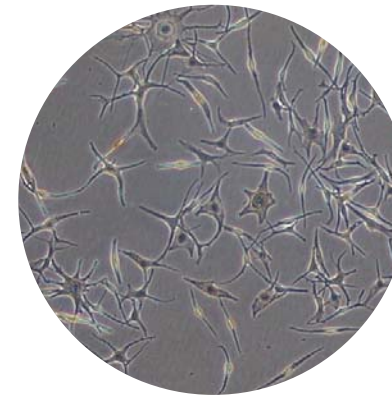
At P&G Beauty, scientists are optimistic and believe nanotech is a friend. The easy scares about self-replicating "nano-bots" taking over the world are in the realm of science fiction. Even opponents are now recognizing this. Unlike GMOs, where safety-testing procedures had to be reinvented from scratch, nanotech products can be safety tested largely with existing protocols. Also, unlike GMOs, investment in nanotech is very widespread across the globe, even in less developed countries like India, Mexico, Russia, Romania, China and others. Finally, nanotech can help the environment, as it can be used to clean air and water, making it difficult for even the most radical environmental opponents to dismiss nanotechnology completely.

For the future, P&G Beauty is looking at nanotechnologies in several areas of beauty for shampoos, cosmetics, skin creams and hair colorants. One fundamental thing that will remain constant is that any new technology is always supported by specific safety tests before it is used in any P&G product.

*A simple definition of nanotechnology is provided by the book *Nanosystems* by K. Eric Drexler published by John Wiley & Sons, Inc.
"... any technology related to features of nanometer scale ..." nanometer = a billionth of a meter

STRANGELY BEAUTIFUL

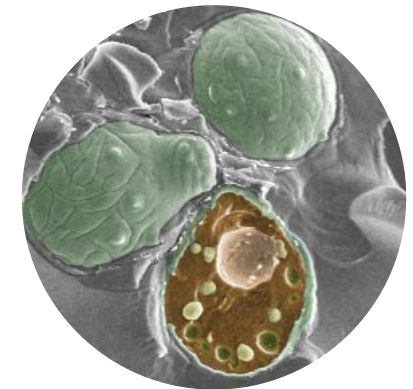
Did you know that your skin has specific cells in it that determine its color? These cells are called melanocytes and they produce a pigment called melanin. The human skin melanocytes shown here are growing in a plastic Petri dish. With their long, slender processes they transfer their melanin pigment to the structural cells of the skin, the keratinocytes. The amount and type of melanin produced by your melanocytes determines if you are naturally fair or dark-skinned. When you go out in the summer sun, your melanocytes produce more melanin and your skin darkens.



Melanocytes

CLOSE-UP

P&G Beauty scientists were the first to pinpoint the actual fungus responsible for dandruff, a fungus called *Malassezia globosa*. Since their discovery, they have continued to study *M. globosa* to understand how it causes dandruff and how it reacts to current and new dandruff treatments. The scanning electron microscope (SEM) photograph below is one of the world's few existing colorized photos of this fungal culprit.



Malassezia globosa

MYTHS AND FACTS

- **The pH of a personal cleanser is mainly what determines whether or not it will irritate the skin. False** – *The results of several comparative studies of personal cleansing products (including in-home, soap chamber and wash tests) suggest that a skin cleanser's pH level is not linked to its irritancy potential.*
- **Petrolatum is the #1 skin-moisturizing ingredient recommended by dermatologists. True** – *In a survey of 2,228 dermatologists, 63 percent considered petrolatum to be the most effective moisturizing ingredient for treating dry skin. Petrolatum has the ability to aid in the restoration of the barrier function of the stratum corneum, therefore improving skin's overall health and even helping damaged skin to heal.*

LAB NOTES

P&G Beauty scientists have been studying ways to harness the skin's natural healing processes in order to engineer better anti-aging products. Because skin is primarily comprised of protein, peptides or protein fragments could be the key. The pentapeptide, a chain of five amino acids, has been shown to stimulate the synthesis of several proteins found in the skin – including collagen, elastin and fibronectin – in ways typically associated with the skin's natural regenerative process. P&G Beauty scientists have conducted and presented several studies over the last few years that show Pal-KTTKS – a chain of five amino acids (KTTKS) modified with a lipid (palmitoyl) – reduces wrinkle length and depth by stimulating collagen growth.

GLOBAL BEAUTY

Easing Acne in Asian Teens

Despite countless differences in culture, language and customs, acne is one of the most common health problems experienced by teenagers across the globe. In China, acne affects up to 91 percent of 15- to 25-year-olds. P&G Beauty scientists conducted a study of more than 100 Chinese young adults (9-18 years old) to assess the effectiveness of antibacterial bar soap as an adjunct to prescribed acne medications. Of those who washed their faces twice daily with an antibacterial cleanser, 89 percent saw a decrease in the severity of their acne. This study underscores the importance of using antibacterial soap as part of a daily acne treatment regimen for teens around the world.

