

# How Does *Scents* Drive Human Behavior?

A conversation with Dr. Patrice Bellon,  
President of the French Society of Cosmetic Chemists

**EURO COSMETICS:** *Patrice, you have a long experience in innovation management such as Director-General, Head Pharmacist, Research & Development Manager in Cosmetic and Vice President Innovation and Applied Research in Perfumery. Tell us something more.*

**Dr. Patrice Bellon:** Something more about my experience. You know, when I look at my career, I think I was lucky to have achieved everything that I wanted to do and I realize that I have always worked for innovation, in pharmacy, perfumes or cosmetics. Throughout my professional life I have tried to innovate and create new things with my staff, to make them work together, to exchange ideas and to “connect” the data of a problem differently. Innovation is an attitude. “If you always do what you are used to doing: what you sow you reap” The phase is simple and not trivial. It was pronounced by Albert Einstein. It could easily be applied to innovation. We must go against new disciplines. We must be curious about everything without restriction and force ourselves to venture on new paths. “Innovation is what distinguishes a leader from a follower,” said Steve Jobs.

**EURO COSMETICS:** *And your professional beginnings?*

**Dr. Patrice Bellon:** After two PhDs in Pharmacy, I started my professional life at 29 years old as a pharmaceutical factory manager. The factory management teaches you a lot about exchanges with people: “Know everything at once”. Holding this position requires strong assets, you have to be or become a “conductor”. Moreover, we must integrate all the parameters of its function: technical skills, human factors, rate of work and production and working conditions, to respect the environment and the relations with the communities. Another required quality is the ability to decide quickly. Making decisions and sharing them with the company’s stakeholders are fundamental bases for claiming different responsibilities, such as assuming the Presidency of the French Society of Cosmetology.

**EURO COSMETICS:** *You are an expert in aromachology. What is that exactly?*

**Dr. Patrice Bellon:** Aromachology or psychology of aromas, (association of two words: Aroma molecule & Psychology = Aroma-Chology or Aromacology), studies the relation between psychology and scents.

It is a relatively new science, developed since 1989 by the Sense of Smell Institute (SSI), a division of ‘The Fragrance Foundation’. A range of emotions elicited by scents through stimulation of the olfactory pathways in the human brain have been researched since then.

Actually, aromachology is dedicated to the study of the inter-relationship of psychology and the latest in fragrance technology to



Dr. Patrice Bellon

transmit through odor a variety of specific feelings directly to the brain (relaxation, pleasure, sensuality, happiness, self-esteem ...). The theories of aromachology have a solid neurobiological basis. Olfactory stimuli reach the limbic system of the brain, where memory, basic instincts (hunger, thirst, sex, survival) and the sense of smell are located. It is one of the most primitive parts of our brain and it has a strong influence in our behavior, though always in a subconscious way. The psychological effects are achieved through the use of scents that stimulate the olfactory neuronal pathways of the brain, triggered by the perceived smells.

The benefits of aromachology can be substantiated by means of scientific research. For example, psycho-physiological and behavioral tests with 40 people exposed to different olfactory stimuli, according to the experimental design of the research. The influence of the cognitive aspects (perception, identification, cultural associations, etc.) of the smells is included in the trials. This way the emotional benefits of the holistic sensorial experience can be evaluated: olfactory stimuli and also their cultural meanings. The cultural meanings are particularly interesting since it can have a powerful influence in the emotional reactions of the subject. Some brands of fragrances and cosmetics already on the market, are dedicating large efforts to the research of the beneficial properties of scents in our sense of wellbeing.

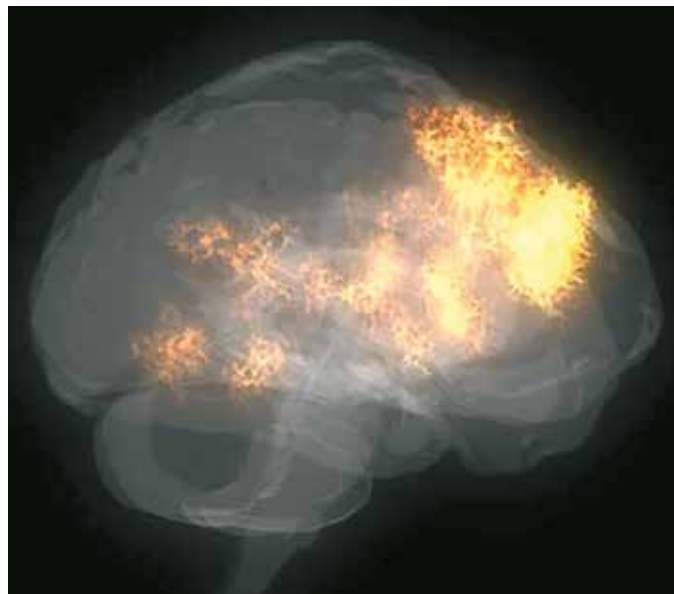
**EURO COSMETICS:** *Aromachology vs aromatherapy: What's the difference?*

**Dr. Patrice Bellon:** Aromachology should not be confused with Aromatherapy, since they are totally different fields. The aroma components from natural products like essential oils have been used for mental, spiritual and physical healing since the beginning of recorded history. In aromatherapy, fragrance substances (aroma/odor/scent) from various natural sources have been used for the treatment of various disorders. The aromatherapy treatment is a natural way of healing a person's mind, body and soul. Many ancient civilizations, including Egypt, China and India, have used aromatherapy as a popular complementary and alternative therapy for more than thousands of years. In traditional medicine as well as in aromatherapy and herbal medicine, essential oils and fragrance compounds have been used for the treatments of various psychological and physical disorders such as headaches, pain, insomnia, eczema, stress-induced anxiety, depression and digestive problems.

In recent years, various aromachology studies have revealed that olfactory stimulation through fragrance inhalation exerts various psychophysiological effects on human beings. In general only physiological aspects are considered and cognitive factors are not. Therefore, similar benefits are expected in different subjects, and the cultural factors related to aromas are not taken into account. While aromatherapy is quite known, the overuse of 'aromatherapy claims', often in products with low contents in good quality essential oils, has resulted in a lack of credibility of a lot of products sold in the market.

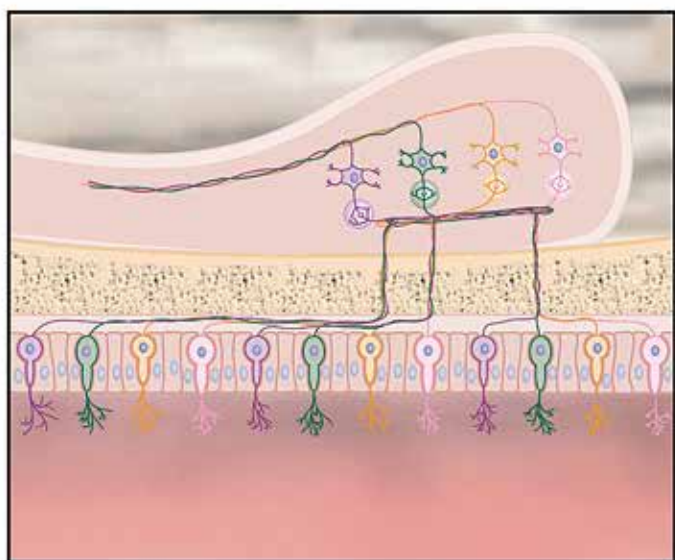
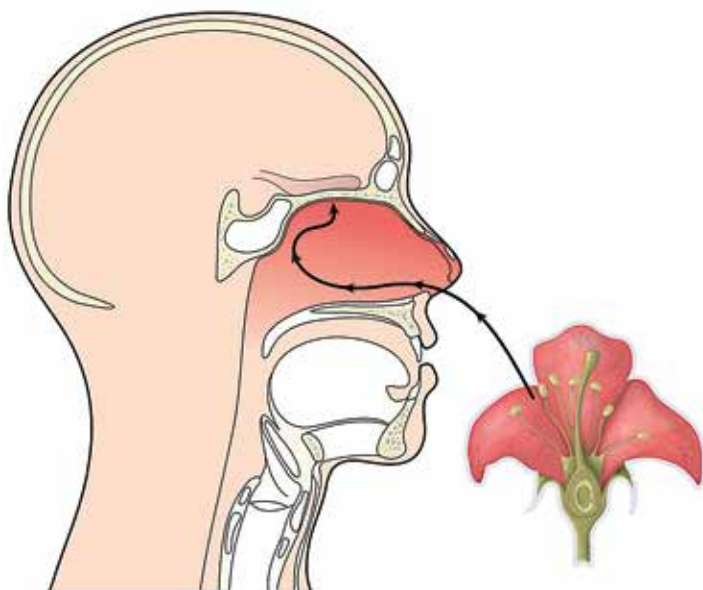
**EURO COSMETICS:** *You have more than 20 years experience in neurosciences. What can you tell us about the influence of fragrances on brain function.*

**Dr. Patrice Bellon:** The brain is a very complex system. The frontal cortex, the region where most of our conscious thoughts and decisions are made, leads to less than one-tenth of total brain activity. The planning and the modeling of our environment, the interpretation of sensory data including perception of reality, memory processing and storage, occur in many functional areas around the brain.



In order to map the true activity of the brain, it is very important to measure the signals of the different cortical structures around it. We are able to assess the well-being and brain activity of the brain uses a revolutionary technology (Symrise researches). This high spatial resolution provides detailed information on brain wave activity: Delta (1 Hz to 4 Hz), Theta (4 Hz to 7 Hz), Alpha (7 Hz to 14 Hz) and Beta (15 Hz to 30 Hz). We are able to reconstruct a cerebral image of all brain regions and to see their interaction. The spatial resolution thus obtained is essential to demonstrate in depth brain activity, triggered by a stimulus, here an olfaction, which gives a precise map of the activity of neuroactive cosmetics.

The influence of fragrances on the psychophysiological activities of humans has been known for a long time, and its significance is gradually increasing in the medicinal and cosmetic industries. A fragrance consists of volatile chemicals that humans perceive through the olfactory system. In humans, about 300 active olfactory receptor genes are devoted to detecting thousands of different fragrance molecules through a large family of olfactory receptors of a diverse protein sequence. The sense of smell plays an important role in the physiological effects of mood, stress, and working capacity. Different technologies like electrophysiological studies have revealed that various fragrances affected spontaneous brain activities and cognitive functions, which are measured by an Electroencephalograph (EEG) or a functional Magnetic Resonance Imaging system (fMRI). The EEG is a good temporal measure of responses in the central nervous system and it provides information about the physiological state of the brain both in health and disease. A quantitative EEG uses computer software to provide the topographic mapping of the brain activity in frontal, temporal, parietal and occipital brain regions. It is well known that decreases of alpha and beta activities and increases of delta and theta activities are associated with brain pathology and general cognitive decline. In the last few decades, many scientific studies were conducted to investigate the effect of inhalation of fragrances on



human brain functions. The studies have suggested a significant role for olfactory stimulation in the alteration of cognition, mood, and social behavior. Many studies describe that the inhalation of fragrances highly affect the brain function since the fragrance compounds are able to cross the blood-brain barrier and interact with receptors in the central nervous system. Furthermore, many studies have suggested that the olfactory stimulation of fragrances produces immediate changes in brain functions but on physiological parameters also, such as blood pressure, muscle tension, pupil dilation, skin temperature, pulse rate and behavioral activities as well. We are able to measure all these parameters.

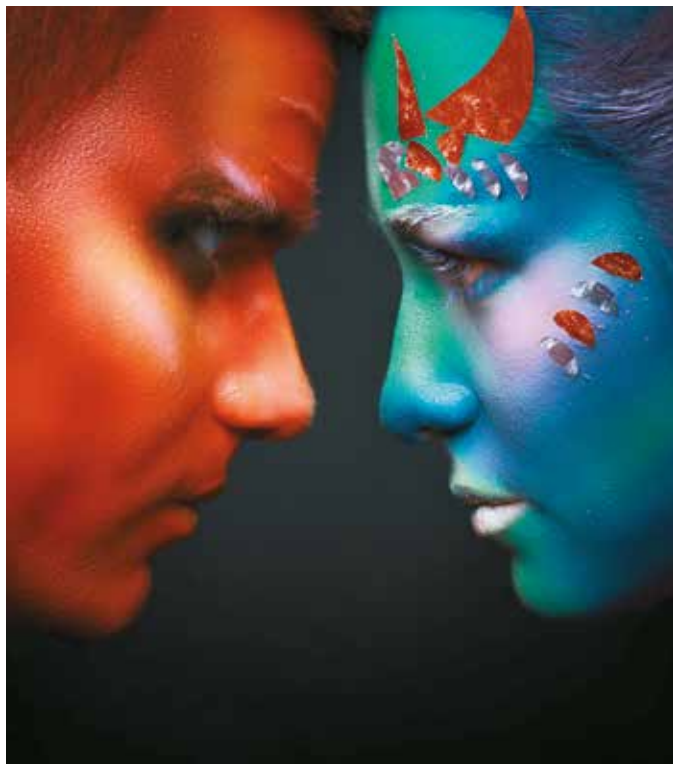
**EURO COSMETICS:** *With scent we want to beguile primarily and emphasize our femininity or masculinity. Does fragrance have a gender?*

**Dr. Patrice Bellon:** It's more subtle than that! We need to make the

difference between genders. The idea that men and women naturally prefer certain scents falls into the same category as “blue for boys, pink for girls.” It's not only based in biology but it's a cultural contrivance of Western society as well. On top of that, the neuroscience behind the gender-scent connection shows that an association with a certain memory influences your reaction to a scent. If you feel that flowery scents are feminine, it may be because those are the fragrances your mom always wore, and she wore them because her mom did, and so on. Gender can affect how a fragrance smells, however. Finally, consider that some scents are marketed as unisex. To appeal to women and men equally, companies rely on middle-of-the-road scents, including crisp citrus fruits like lemon, pungent spices such as nutmeg, and heady florals like jasmine. Some last researches made by Symrise and the Monell Chemical Senses Center in order to understand how our bodies and fragrances interact, gave a few exciting discoveries: It has been proven that men's and women's Natural Scent (NS) is recognizably different in odor character. In the presence of fragrance raw materials men and women differ in their perception of NS. The interaction of NS with fragrance raw material is dependent on the gender of the NS and the gender of who is smells . Heterosexual men and women prefer the NS of the opposite sex further supporting pheromone type qualities of NS. Homosexual







men prefer the scent of homosexual men and heterosexual women while lesbians prefer the scent of lesbians and heterosexual men. Men and women have different smelling abilities/characteristics. Women can smell odors at much lower levels than men and their sense of smell deteriorates less than men as they age. The smelling ability of hormonally active heterosexual women increases 1000's of times when repeatedly exposed to the same smell ... This is not true for heterosexual men, homosexual men, lesbians, prepubescent women and post-menopausal women. There is strong scientific evidence for a link between sexuality, sensuality, scent and smell. Part of NS is responsible for our primal mode of communication. This is mostly related to: attraction, mate selection, reproduction and arousal. Many classic and new fragrance creations incorporate "sensual" notes related to our natural scent in an attempt to heighten a fragrances sexual appeal – skatol, indole, cassis, tonka, beaver, musk, ambroic. Therefore a product/fragrance concept that ties NS with fragrances in a way that creates a favorable blend of the two is novel, rooted in science and could be appealing to the consumer.

**EURO COSMETICS:** *Thinking "out of the box" is your core idea to motivate customers. What services do you offer and what can customers expect?*

**Dr. Patrice Bellon:** Thinking outside, out of or beyond the box is a metaphor that means to think differently, unconventionally, or from a new perspective. This phrase often refers to novel or creative thinking. The concept is not new, requires some lateral thinking to challenge people. To think out of the box is to look further and to try not thinking of the obvious things, but to try

thinking of the things beyond them. Thinking out of the box refers to the capacity of individuals and businesses to see any situation from fresh and new perspectives. Moreover, it refers to the capacity of individuals and business to act highly effectively on these fresh and new perspectives. It provides ways to generate and implement innovative ideas and solutions to address difficult (and even not so difficult) situations. Thinking out of the box can be used to ensure optimal effectiveness in: challenge innovation and R&D strategies, develop products (range or brand), and create value. Thinking out of the box is to exchange intimate knowledge of the fragrances & cosmetics world and creativity, as well. The reality is that everybody can cultivate and improve their thinking out of the box skills. If you've ever said, "There must be a better way." ... there is, and yes you can do that!

**EURO COSMETICS:** *Where do you see the biggest challenges for the fragrance industry?*

**Dr. Patrice Bellon:** Our fragrances and cosmetics industry is constantly adapting to meet the needs of a changing world. Different factors such as globalization, digitalization, e-commerce, the need for more sustainability, the explosion of natural and bio, advanced technologies, sensory and emotions combine to transform the behavior of consumers with cosmetic and perfume products.

Moreover, it is very important to highlight the benefits of cosmetics in everyday life, because when we talk about cosmetics with regulatory authorities or legislators the heart of the subject is often risk, risk and even risk. (Preservatives, nanomaterials, endocrine disruptors, irritating or comedogenic agents ...). We could talk more about risk assessment, because here the real challenge is to change mentalities because we rarely talk about the benefits of cosmetics for the well-being of people. Having a hazard-based approach to a risk-based approach for evaluating ingredients and cosmetics would be good for our industry.

The cosmetics industry is a major contributor to the competitiveness of European industry and research in Europe. Cosmetics play an important role in the daily life of Europeans with a very important social and psychological role.

To conclude, in cosmetics I will say, that the challenges of innovation are driven by three major axes: the evolution of science and technology, the market with the need to develop products adapted to consumers worldwide and no longer locally and the most demanding European regulation, which is the most demanding in the world and also a growth lever to encourage our companies to innovate (e.g. REACH). In perfumery, more specifically I will be happy to open a more transparent debate on sustainability issues, concerning natural ingredient trends and sustainability sourcing and to focus on the array of ingredients alternatives. Highlight the idea that "sustainability is not a trend, it is the reality". Finally I will quote Dr. Torsten Kulke who was SVP global innovation at Symrise and said "urged those in the fragrance industry to use waste materials and fossil fuels in a smarter way".

**EURO COSMETICS:** *Thank you for the conversation.* ■