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Personal Care Spectator

Chapter 21

Cosmetic Idols...

Holidays are different, in case you hadn't noticed. You sleep more, you eat more and you see more of your children than usual. One of the major things I learned these holidays is the impact of children on our buying behavior. They tell us what to eat, where to go and although we tend to ignore all these requests (or should I say demands?), they often get what they want. This brings me to the theme of this month's column "What convinces our children in making their choices, and are we adults any different?" Just before you think you are reading an educational magazine instead of your familiar cosmetic trade magazine, let me reassure you that there is a link with cosmetics.

One of the weekly events in our family recently has been to spend the Saturday evening in front of the TV watching *Idols*. In case you do not have children, do not listen to the radio or do not read the newspapers, this is a program in which anyone young could try to become a singing superstar by

experts that selected the best 30

top ten performers that entered into a weekly dropout race so that after

born. Although the name of the

By the time cosmetic products reach the market place, it seems as if product quality has become irrelevant.

show may have been different from country to country, the concept was the same from Australia to the United States, from Sweden to South Africa, from Germany to the United Kingdom. It was always a knowledgeable panel that selected the initial 30 candidates and thereafter the public that selected the winner (or so it was claimed).

A question that was often posed was whether the best singer was also the winner. In the Netherlands, this was certainly not the case—according to my wife, a qualified musician. When determining the qualities of the ultimate Idol, charisma and sex appeal clearly outperformed musical capabilities, although nowhere was this as obvious as in Germany where vocal qualities were almost absent in some candidates. However, in general, you needed predominantly vocal qualities to pass the first round but thereafter, additional qualities took over. All very nice, but what has this to do with cosmetic science?

Think about our cosmetic market as an *Idols* contest. All of us dream to create that specific cosmetic product that will be the next big top-selling blockbuster, the next Idol. But as in show business, it is lonely at the top. There is only room for one. We cosmetic formulators have suggested many products but only a few have made it to the marketplace, the top 30 of the *Idols* analogy. These initial winners were selected out of hundreds of products of variable quality by our experts, knowledgeable people that may have ranged from the proverbial "wife of the CEO," to well-executed consumer panels that identified the product with the highest consumer preference. But once a product has hit the shelves, the contest really starts and it is at the mercy of the consumer. Cosmetic quality will come a long way but other qualities also play an important role such as product image and marketing.

It was often claimed–rightly or wrongly–that the winner of the *Idols* program was already fixed beforehand by the sponsors and regulated by the amount of attention given to specific candidates. This is marketing for you in real life. A good product from a small cosmetic firm has to be significantly better in cosmetic performance than an above average product of a big cosmetic firm to be successful.

But now back to the original question, "What convinces our children in making their decisions, and are we adults any different?" My

holidays made it clear to me that image and charisma is driving my children's preference. Cosmetic quality is a given and without that, you can forget it altogether. By the time cosmetic products reach the market place, it seems as if product quality has become irrelevant. When my daughter needed yet another jar of hair fixing gel, it was remarkable to see how she picked all major brands, even ones that do not exist in the Netherlands. We adults finally settled on the cheapest as my children apply it ten minutes before they go for a swim anyway. The pot is still in our bathroom, hardly used, but the content would be gone quickly if I took the trouble to transfer it to a jar with an appealing label.

Having said all this, how does the above make you feel as a cosmetic formulator? Is it as if what you formulate does not really matter, as long as our marketing colleagues do their jobs properly? No, no, no! Our jobs may not be as public and fashionable, but without our formulating efforts, there would be no job for our colleagues, the marketers, the packaging specialist and no hair fixing gel for my daughter at all! As in the *Idols* contest, there are some cosmetic products that make it to the market on quality alone. Maybe *we* are the true Idols of this industry because, let's be honest, the other specialists could just as well put their efforts into another product category and be successful but there would not be cosmetic products without us!

Just to prove that point, why don't we organize an *Idols* contest for cosmetic formulators? If all of us would submit our best formulations whilst a group of knowledgeable industry experts would separate out in a televised International Cosmetic Show the definite losers from the potential winners, would that not give a boost to cosmetic formulators as a profession as we see for the increased numbers of contestants for reruns of *Idols*? The thirty winners could subsequently distribute free try-out samples in stores or door-to-door to select the ultimate ten that would make it to the dropout race. Instead of a song, one week a shower gel, the next week a shampoo. At this moment in time, our marketing colleagues will probably take over and make a success out of our success. But note that they need our success to be successful themselves. They could not play on brand and image if our product was not good in the first place. Our industry

would be the ultimate winner, as the public attention for our profession would bring new blood into our formulation laboratories. Anybody out there willing to try the challenge, or am I marketing a bad product here? You could be our next Cosmetic Idol, you know…

Modified from a column "Cosmetic idols" previously published in *SPC*, October 2003

Chapter 22

Choosing Your Partner...

No, I am not writing a column on how to identify your husband or wife. Not this time. Neither have I started a dating agency. It is simply that time of year, you know, that you reflect on the choices you've made in your life. But as you are probably not interested in my personal life (I don't even have one, always "at your service!"), let's reflect on some of the choices that we have all made in our professional lives.

It actually already starts before you even have a profession. You chose to study a specific subject and I bet, at that moment in time, you were definitely not thinking about cosmetics. Only very few of us made a conscious decision to go into the cosmetic industry. But once you made that decision, you thought you had found your partner. How wrong can one be as it turned out that the possibilities were still endless? Am I going to join a global manufacturing company or a small local player, a supplier or a contract laboratory?

What arguments do people actually have when they make their choices? When you applied for your first job, you were probably not too critical, nor did you have too many choices. You probably wished the salary was somewhat higher but you had no experience. Maybe you joined a big global player because

The only incentives in making your decisions, I hope, will be truth, honesty and justice.

they, on average, provide better training, maybe you picked a geographical location that suited your needs best. Only once we're in our first job do we realize what this industry is all about and make our choices on what really matters to us. Some call it the benefit of experience.

But let's get clinical about some of our subsequent choices. If you ended up in clinical research as I have done, choosing your partner, (i.e., where to do a clinical study) if you cannot do this in-house, is a choice you will have to make. But there are many more partners, obvious and not so obvious ones, when doing clinical research. For instance, the active ingredient, the supplier of the active ingredient, the formulation, the study design, the measuring method, the measuring time(s), the controls, etc. The strange thing is that we do not see the latter things as our partners, but only those issues where humans are involved. But in reality, for success in cosmetic science, human and non-human partners are both equally important.

Let's look for the sake of argument at how we deal with a new active ingredient. We have three, at best five, standard formulations in the lab that are all sensorially pleasing. We incorporate the new active ingredient in some of these, do some stability testing and then do a small clinical study to identify whether the formulation really works. The supplier of the active ingredient said it would, but you cannot see it working. You therefore ditch the chemical and maybe even the supplier but not the formulation. You are definitely not going to partner with that active ingredient again. Again, how wrong may you have been? Who said that the standard formulation you chose was indeed the best delivery system for the active ingredient? The factors that determine whether or not you get sufficient skin delivery of your active ingredient are the polarity of the active ingredient, the skin and the formulation. You therefore need to optimize the latter for each active ingredient, every time again. That's what I call formulating for efficacy!

A partner we almost always forget is the control, the blank, the placebo or whatever you would like to call it. It is, of course, the black sheep of partnering. We simply do not like to partner up with a placebo or a control. What do I mean? A while back, I was doing a

clinical study in which I compared the skin whitening activity of octadecenedioic acid with that of a marketed product containing another skin whitener. Someone accused me of having chosen the wrong partner: I should have used exactly the same formulation as the octadecenedioic acid formulation and only replace this skin whitener for the other. You need to know that octadecenedioic acid is a lipophilic chemical whereas the other is a hydrophilic one. So, if I would replace the lipophilic whitener in a formulation that has been optimized to deliver a lipophilic chemical for a hydrophilic whitener, then the latter simply will not be delivered well and the lipophilic chemical will always win. On the other hand, if I would put the lipophilic whitener in the formulation optimized to deliver the hydrophilic whitener, the latter would always win. The choice of the control, the placebo, your partner; therefore, decides the outcome of the trial and this should be recognized. In the example above, I therefore simply had to compare two totally different formulations containing two totally different ingredients.

Following our reflective moods over the Festive Season, it is time for New Year resolutions. Why don't you have a critical look at your partners and see whether they are indeed the right ones? Replace those that do no longer meet your scientific criteria and expand on those that help you to build success. The only incentives in making your decisions, I hope, will be truth, honesty and justice. I wish you all a happy year and look forward to seeing you at one of our many industry events. Maybe we could partner up somehow…

Modified from a column "Choosing your partner" previously published in *SPC*, December 2003

Chapter 23

The Race for the Race

Initially, I wanted to call this column "Four weddings and a funeral," simply because the number of interracial marriages within the United States has risen to such an extent that one wonders if race truly exists in the United States. Let's have a quick look at the four types of interracial marriage. In the United States, there are 8.1 Black-White marriages for every 100 Black-Black marriages, 32.6 Hispanic-White marriages for every 100 Hispanic-Hispanic marriages, 195.4 Native American-White marriages for every 100 Native American-Native American marriages and 31.0 Asian-White marriages for every 100 Asian-Asian marriages. It is estimated that up to 70% of Americans classified as Black have White ancestors and that as many as 21% of American Whites have African blood. And that's why I have concluded that as a result of all these interracial marriages, we simply have to bury the concept of race as we have known it for centuries, hence "Four weddings and a funeral."

But is it presumptuous of me to conclude the death of race based only on an increased number of interracial marriages? The outward signs on which most definitions of race are based, such as skin color and hair texture, are dictated by only a handful of genes. The many other genes of two people of the same

While the words on the packaging of ethnic skin care products should be different, the ingredients in the container could in the majority of cases be exactly the same.

"race" can be very different. Equally, two people of different "races" can share more genetic similarity than two individuals of the same race. Geneticists have identified tiny variations (so-called polymorphisms) in human DNA on which they can sort large populations according to their ancestral geographical origin. One useful class of polymorphisms, the *Alus*, are short pieces of DNA that are similar in sequence to one another. *Alus* replicate occasionally and the resulting copy ties itself together at random into a new position on the original chromosome, usually in a location that has no effect on the functioning of the nearby genes. If two people therefore have the same *Alu* sequence at the same time in their genome, they must descend from a common ancestor who gave them that specific segment of DNA. Michael J. Bamshad of the University of Utah describes in a recent article in *Scientific American* that he needs to study at least 60 *Alus* polymorphisms to assign individuals to their continent of origin with 90% accuracy. To cut a long story short, even with molecular biology, it is difficult to differentiate between the various races.

By now, it is time for my usual question, what has all of this got to do with cosmetic science? Actually quite a lot, because what we see nowadays is a Race for the Race. Almost every manufacturing cosmetic company is launching products for ethnic skin and hair care. Whereas the physiological differences between hairs from various ethnicities are prominently present (Asian hair is more circular and of a larger cross sectional area than the hair of White and Black subjects), there are hardly any differences in skin physiology between representatives of various ethnic groups other than melanin content. The number of melanocytes in Asians, Blacks and Whites are the same, but the degree of aggregation, size and number of melanosomes are different and, therefore, responsible for the difference in color. Many other aspects of skin physiology such as the size of corneocytes, barrier function, number of eccrine glands, etc., have been investigated but the bulk of the evidence suggests that there is no significant difference between races. There are some hints that Black skin may be thicker and less permeable than Asian or White skin, but the number of subjects in the various groups are too small for these differences to be statistically significant.

There are, of course, perceptual differences such as the ashiness. Ashiness is the number one skin complaint from Black consumers. Dry skin, which normally flakes, is far more visible on dark skin, creating an ashy effect. Proper management of skin moisturization is therefore, as always, a good defense in preventing ashiness of Black skin. But what scientific reasons are there for cosmetic companies insisting on Blacks needing different cosmetic ingredients from whites to moisturize their skins? Taking it even one step further, is there a rationale for ethnic skin care at all if there is from a molecular biology and therefore biology and physiology point of view only one race, the human race?

To answer the last question first, there is definitely a need for ethnic skin care simply because people feel they belong to different races with their own skin characteristics. Our marketing colleagues will excel in identifying and magnifying those differences that underpin the self-image of the target customer and so (continue to) create a profitable new market segment. After all, Black, Asian and Native American buying power is expected to total $1.5 trillion in 2008 in the United States, a 231% increase from 1999. But the second question requires a scientific answer. While the words on the packaging of ethnic skin care products should be different, the ingredients in the container could in the majority of cases be exactly the same. If you are treating the same condition, you can use the same cosmetic ingredients, even the same cosmetic products but you market it differently.

So where is then the major difference in ethnic skin care if it is not in the biology of the customer or in the chemistry of the product? It is in the way cosmetic marketers and cosmetic scientists treat it! Could there actually be a genetic difference between these two professions? Between these two professionals? Do they comprise two different races? And if you would now have an interracial marriage, which of the genes would be dominating? Will their offspring get happily married four times or will it result in a premature funeral? There is only one way to find out, let's race the Race for the Race and see who wins. I'll leave it to you how you interpret the word Race.

Modified from a column "The Race for the Race" previously published in *SPC*, February 2004

Chapter 24

Why Men Won't Work...

Now, this title should raise your interest or, at least, your eyebrows. If you're a man, you might be wondering why I am betraying my own male peer group and if you're a woman, you may wonder why it took me so long to get to the point you had already reached long before puberty. Whilst running the risk of being both rejected by the males and being frowned upon suspiciously by the females, you could also argue that this is my cowardly manner of making myself popular with the girls! But with such an introduction this may not happen…

So what is the reason for my rather provocative statement? I recently read the book *Human Instinct* by Robert Winston, the well-known gynecologist from Hammersmith Hospital in London. In his book, he describes in a mind-challenging way that we all believe we descend from the apes but do not think that we think like them. He uses many examples and easily repeatable home experiments to gradually convince the reader that we still think like we did when we were roaming the savannahs to hunt for our daily food. To summarize for you in one single sentence, you either think about having sex or about being loved and cared for. Identify which one of these two applies most to you, inspect your anatomy and make the connection between typical thoughts and gender.

Let's see what Robert describes a man as typically looking for in a woman: "*Homo sapiens male seeks female of the same species with maximum future reproductive value. Must be young, with clear skin,*

symmetrical facial features, a waist-to-hip ratio of 0.7, lustrous hair and preferably an absence of sores and lesions." So men are looking for signs of fertility in women but this is a property that cannot be easily recognized. Over millions of years, men have accepted facial symmetry, waist and hip sizes, shapely breasts and buttocks to name but a few as signs of female fertility. And this thinking has been pretty constant over time. Pythagoras was not only thinking about the square of the hypotenuse. This ancient Greek (male!) philosopher and mathematician also derived a formula for 'beauty'; the ratio of the width of the mouth to the width of the nose should be 1.618 to 1. This ratio should also hold for the ratio of the width of the mouth to the width of the cheekbones. I challenge you to measure this on the faces of last month's female Oscar winners and you will see that this rule still applies some 2,500 years later.

So, if men basically look for a perfectly proportioned, i.e., healthy body in which to deposit their sperm, what are women looking for in men? Again, Robert Winston has the evolutionary answer to this question: "*Female of child-bearing age seeks older male, high income, risk-taking altruist, but dependable and faithful. Square jaw and symmetry desirable, but not essential. Untrustworthy men with a moustache need not apply.*" Women look for stability and character next to strength, because they will be the ones that will invest long years in raising their children and that can do with some support, so a guy that runs off at the first possible risk or loves to play Russian roulette is pretty useless indeed. To demonstrate this, strength is exactly the reason why boys in their puberty and adolescent years demonstrate such a defiant attitude but calm down tremendously after a (temporary) partner has been identified. I noticed it in the train recently when I was alone with a somewhat aggressive looking teenager waving at someone and whilst I was considering whether or not to leave the train compartment before his friend would arrive, we both felt much more at ease when his girlfriend sat down next to him. But the signs of stability and character are much more difficult to measure externally than the signs of fertility. Could this be the reason why females in general take longer to make up their mind whether or

not to continue a relationship and especially get involved in a sexual relationship?

But you might start to wonder what this has all got to do with cosmetic science. The answer is the same as always, quite a lot. Whether you like it or not, men judge women on how they look. If a woman does not look "good," her chances of obtaining the ideal partner are reduced. But what contemporary women have got in contrast to their predecessors on the savannah are cosmetics. These products can help to lure men into thinking that their potential partner indeed has the perfect body. And so you see that cosmetics are heavily used by young girls in the courtship years. Young boys, on the other hand, invest their time in macho behavior and historically have not used cosmetics. My father's generation still had to confess their profession and income to their would-be father-in-laws to reflect the stability that they could offer their would-be spouses. My generation simply forgot to ask for the hand of the daughter and informed the in-laws of the date of the wedding. I can only hope that I will still be invited to the wedding of my sons in some 10–20 years time. But one thing will be certain, all my three boys will be using cosmetics, the eldest (12 yrs) already does and the second one (9 yrs) is starting. (Post-publication note: our youngest son, then 5 now 11 years old, uses more cosmetics than money can buy; luckily hair styling gels are not that expensive!)

Where does this leave us with the title that "men won't work?" Did you ever see Archie Bunker do anything useful in his *All in the Family* life? Because males are, of course, infallible, let me blame the beautiful female editor of this book who favors a short title so that it will fit on the page. What I want to say is that "cosmetics for men won't work" because most men of our generation have already found their partner and still behaved like cavemen when they were dating. But for the boys of today, cosmetics will definitely work, i.e., contemporary boys will definitely use them. The only guy I feel sorry for is Robert Winston. His book basically indicates that humans have instinctively not developed beyond the species we once were. Once a caveman, always a caveman! Is that why Robert Winston has a

big moustache? Biological evolution is by definition a slow process whereas technology innovation can be very rapid. Personal computers probably did not exist when most of us were born. But although our basic instinct may still be based on cavemen thinking, technological evolutions will have impacted the way we look, dress and beautify ourselves, i.e., behave. Are you still a caveman or cavewoman? Moustache or not, as long as you have a butt like George Clooney, who cares?

Modified from a column "Why men won't work…" previously published in *SPC*, April 2004

Chapter 25

Cutting Edge Science...

I simply have to admit it. There is no purpose in hiding it any longer. I am a workaholic and holidays are not an easy time for me. Regular readers of this column will have noticed the deviation from my bimonthly contribution but, just like you, even I had to recharge my batteries over the holidays. How does a workaholic entertain himself on a campsite in France? Although I had planned to read that latest textbook on molecular biology, the family had different plans for me. In their minds, even I was supposed to have a great time, and molecular biology, quantum physics and evolutionary biology were not part of it. In between swimming, sightseeing and shopping, I opted for a relatively new style of books, the scientific thriller.

Although you may not realize it, I am sure that you know the genre. Authors like Patricia Cornwell, Kathy Reichs and even more recently Dan Brown (of *The Da Vinci Code* and even better, *Angels and Demons*) fit into this category. Patricia Cornwell has a morbid pleasure in introducing as much as medical terminology in her books as possible. Her lead character, the medical examiner Kay Scarpetta, loves to speak to us in easily accessible language: "Swelling, with widening of the gyri, narrowing of the sulci, all good for ischemic encephalopathy brought on by his

How much cutting edge science do you see in your daily work?

profound systematic hypotension," is only but a typical sentence from page 15 from Cornwell's *Unnatural Exposure*. Most mortals would not understand a word of thism but her subjects are stone dead anyway, in either a state of advanced rigor mortis or decomposition. Reich's Tempe Brennan typically does not have the need to show off her knowledge of medical terms, probably because Reich herself is a professor of anthropology at the University of North Carolina: "I looked at each collarbone where it met the sternum at the base of the throat. Though the one on the right was detached, the joint surface was encased in a hard knot of cartilage and ligament" (*Déjà Dead*, page 22).

Why am I reading such medically oriented scientific thrillers during my holidays? Because both Cornwell and Reichs are dead right in what they write, the former having been a computer analyst in the Chief Medical Examiner's Office and the latter being a practicing forensic anthropologist as mentioned above -, you can often pick up some new biochemical techniques in their books. My first introduction to PCR (polymerase chain reaction) came from one of Cornwell's books. But sometimes the arrogant and precise Kay Scarpetta is wrong, deadly wrong even: "Height I could not positively ascertain, but I could estimate by using Trotter and Gleser regression formula charts to correlate femur length to the victim's stature. I sat at a nearby desk and thumbed through Bass's *Human Osteology* until I found the appropriate table for American white females. Based on a 50.2 millimeter, or approximately twenty-inch, femur, the predicted height would have been five-foot-ten." (Patricia Cornwell, *Point of Origin*, page 199). Conversion to the metric scale is not the strongest point of this–or for that matter also the other–self-declared American superstar! Let there be no mistake about it, but you're dead on wrong.

The more Y-incisions, chemical reagents such as Gram's iodine for bacteria, Oil Red for fat in liver, silver nitrate, Biebrach Scarlet and Acridine Orange, waves of bright red eosinophilic inclusions within infected epithelial cells or cytoplasmic Guarnieri bodies I encounter in these books, the sunnier my holidays become. I even pour myself an extra glass of the local Cahors wine when identifying

that the chick embryo chorioallantoic membrane culture is nothing but the HET-CAM assay known for the assessment of skin irritancy in cosmetic science (*Unnatural Exposure*, pages 176, 177 and 279). But for me, the dead of summer arrived when skin was discussed. Cornwell's *Black Notice* reveals on page 113 that "Skin is elastic. Once it is excised, it will contract, and it was important when I pinned it to the corkboard that I stretched it back to its original dimensions or any images that might be tattooed on the skin would be distorted." Just in case you're reading this column whilst having your lunch, I will not repeat how fingerprints are taken from decomposing bodies overflowing with cadaverous smells and maggots. But I have to give Cornwell credit for distributing smallpox from a door-to-door free sample of a cosmetic product in one of her books. Cosmetic products are truly multifunctional nowadays.

Enough of my morbid reading and my desire for cutting-edge science during my holidays. We're all back at work in cosmetic science. How much cutting edge science do you see in your daily work? Are you doing enough to keep these two coroners capable of astonishing their fans with fancy terminology and spelt-out acronyms? We are about to find this out at the next IFSCC Congress in Orlando where we will unlock the mystery, fantasy and reality of cosmetic science. Will it be another of these meetings where the manufacturing cosmetic industry will reveal for the first time, work they did roughly eight years ago (or say nothing at all which is even worse) and where the supplier industry will shed light on yesterday's findings? Is that cutting edge science in our cosmetic world?

A form of literal cosmetic cutting edge is the latest trend in beauty programs such as "Ten years in ten days" or "Total makeover" in which an elderly looking lady is positioned on a street corner and people are asked to guess her age which always turns out to be far beyond her calendar-age. More than skin deep cosmetic science such as Botox injections, fruit acid peelings, as well as new hairstyles, dental revisions and a complete new outfit, rocket this dead-as-a-dodo lady back into modern times. Of course, during the second questioning the reborn and now smiling lady is within earshot when the interviewer asks passersby to guess her age, which automatically

knocks off five years. I wouldn't be seen dead in that program but that really would be flogging a dead horse.

Holidays are over, we're back in action and I'm looking forward to sharing my own cutting edge science with you all in Orlando. And if you encounter these novelties in next year's medical thriller featuring Temperance Brennan or Kay Scarpetta, be dead sure that it was in Orlando that you heard it first!

Modified from a column "Cutting edge science…" previously published in *SPC*, October 2004

Chapter 26

A License to Kill?

Oh no, he has been watching James Bond movies again over his midterm holidays. Actually, nothing could be further away from the truth. I admit to have seen a few movies but Harry Potter is a lot more popular with my children than secret agent 007. If this column is not a film review, what is it then about? This column is about patents, cosmetic patents. But what have patents got to do with a license to kill? Just wait…

What is the reason for filing a patent? In return for twenty years of (commercial) exclusivity on a technology, a process, a chemical or whatever else is patented, the inventor shares his or her findings with the scientific community at large. Instead of keeping the invention to him or herself, which would allow only a few people to gain and therefore only a little money to be gained from the benefits of his or her creative thinking, the inventor publishes the innovation in return for twenty years of exclusivity in a much wider community, leading to increased profits. But at the same time, his or her competition can learn the latest and find ways around the existing patent to use this to his or her own advantage. In this way, everybody wins: sharing creative steps with colleagues in the industry leads to new creativity and at the end, all favor. This is, I think,

Let's therefore continue to do creative research and patent our findings for the benefit of all, ourselves, our competition and foremost our customers.

what was meant at the time that the patent was invented. Thinking of it, who patented the patent?

Based on the above, keeping abreast with novel patents would be just as important as keeping up with the scientific literature and there are many examples of trade magazines that review the latest patents. But some of us see patents as scientific publications whereas others don't. Some patents are technologically outrageous, albeit technically completely valid. There is the famous example of a patent attorney who, in an attempt to explain to his son what Daddy was doing all day in the office, filed a patent on a sideways moving swing, an idea proposed by his son who attentively listened to what Daddy was saying while sitting on an ordinary swing. To their amazement, the patent for this crazy idea was granted, as this invention was indeed novel, albeit completely useless. The concept of a sideways moving swing would, however, very likely not be accepted by any scientific journal. One could therefore argue that the invention was scientifically not up to the mark. And there are many of such patents that would not be accepted by a reputable scientific journal but then, patents serve a different purpose. They are typically characterized by the usage of words like "surprisingly" and "unexpectedly", whereas we all know that (in the majority of inventions) the unexpected outcome was exactly what the inventor was hoping to achieve. And cosmetic patents are not different from or better than the average patent.

So, if the majority of cosmetic patents contain unexpectedly surprisingly little real cosmetic science, why could they then be a license to kill? Many patents nowadays are no longer filed to share our inventiveness with the community at large in exchange for twenty years of exclusivity and increased profits but just to prevent others from entering a market without even an intention from the inventor to do so him or herself. This can be a very valuable manner of maintaining competitive leadership. Rather than earning a profit from the implementation of a valid invention, the inventors now create their benefit by preventing others from making money in adjacent fields they do not want to necessarily pursue themselves. A common example is a manufacturing firm filing combination patents using a new ingredient creating an extra barrier to entry into the

market for his competitors with that new chemical. In principle, this should not hamper creativity, but, unfortunately, in reality it does, because our industry often reacts to such patents by simply ignoring the new ingredient. Although these patents may be commercially very viable, scientists effectively chose the simple route and go for something else, which in my definition of creativity equals to hampering progress of cosmetic science.

As Craig Venter and William Haseltine (CEOs of The Institute for Genomic Research and Human Genome Sciences, respectively) can confirm, one of the commercially most valuable types of patents is the gene patent. In the early 90s, they patented any gene they could put their hands on. According to the co-discoverer of the structure of DNA, 1962 Nobel Prize winner for Physiology and Medicine James Watson, in his book *DNA*, they "blindly patented sequences without knowledge of what they do." As an example, he mentions the CCR5 gene for which they filed a patent in 1995. Its preliminary sequence analysis suggested that the gene encoded a cell-surface protein in the immune system. It was worth "owning" since such proteins may potentially serve as targets for drugs affecting the immune system. A year later, in 1996, scientists discovered the role of CCR5 in the pathway by which HIV, the virus that causes AIDS, invades the immune system's T cells. CCR5 was and remains clearly destined to play an important role in combating HIV. But if someone succeeds, Human Genome Sciences stands to profit enormously from simply having got its hands on the gene first. In Haseltine's own words: "If someone uses this gene in a drug discovery program after the patent has been issued… and does it for commercial purposes, they have infringed the patent. We'd be entitled not just to damages, but to double and triple damages." Although statements such as triple damages only apply to the United States, this speculative gene patenting can create a terrible drag on medical research and development, leading in the long run to fewer and poorer treatment options. After all, would you enter such a science field? In this sense, the pharmaceutical industry is not different from the cosmetic industry.

But as always, what has this got to do with cosmetic science? At the 2004 IFSCC Congress in Orlando, we saw gene chips entering the

cosmetic science arena. Gene chips allow the investigator to identify which genes are switched on by a specific chemical and because the number of human genes in the human genome is relatively small, only some 21,000, you can quickly identify what type of activity a new molecule, if any, might have. If your active ingredient accidentally works on one of the genes patented by Venter and Haseltine, I think you know what will happen. Gene chips is a beautiful technique but it may take till the gene patents have elapsed before we could pick the benefits. As long as Haseltine's gene patents are valid, they are a license to kill.

I have to stress here that, as always, I am deliberately exaggerating to make my point. In reality, patents also have to provide evidence of the invention and unreasonable scopes of claims are not often accepted unless substantiated. With any new technology there are potential difficulties with breadth of claim. It takes a few years for the patent offices to understand the technology and get a feel for reasonable scope of claim to be granted. Thus, the benefit of being in early is potential broad claims. But, just because they have been granted does not mean that they will be upheld in court. In addition, selection patents allow creative scientists to go around existing broad patent claims. Let's therefore continue to do creative research and patent our findings for the benefit of all, ourselves, our competition and foremost our customers. Do sexy research if you want to play Bond, James Bond. He may be licensed to kill, but I do not remember him killing anyone deliberately. Unless his fatal attraction to women that he is killing with kindness also counts of course. Now, is that is a broad claim or not?

Modified from a column "A license to kill" previously published in *SPC*, April 2005

Chapter 27

Less is More...

It's something we hear more and more often. Colleagues are made redundant and you simply have to do more work with fewer people. Oh yes, less is more. As I write this, I am sitting in a plane and just seeing the enormity of size of carry-on luggage being put into the overhead lockers, I conclude the same. There may be fewer items but they are getting bigger by the minute. Oh yes indeed, less is more.

I could go on giving you examples of the validity of this statement, but you are all very smart readers and I do not need to repeat myself. The message will even be stronger if I don't. After all, all examples are more or less evidence of the fact that we do too much in too little time. More haste, less speed.

But as usual with my introductions, you may start to wonder what this has got to do with cosmetic science. In that case, just think about cosmetic formulations and turn the package around to find the INCI list. How long can it physically be? We cosmetic formulators always add the latest magical ingredient to our existing formulation in an attempt to make the latest "new and improved" version. We do not take ingredients out but we add more and more, one by one. By now, you should probably know which direction I am going in this column. But let's start reasonably and assess first

Think about the manufacturing advantages of such a simple formulation! Fewer ingredients can definitely mean more money!

what the advantages and disadvantages are of adding without taking away.

We have been trained to assess the benefits of additions. You only have to think about the typical study design: a placebo formulation is tested against the same formulation to which the wonderful new ingredient has been added. So, it is only logical to add things. But by the time it is your turn to add a new ingredient, your cosmetic formulation already has a lifetime history. All your predecessors have added one or more of their favorite goodies. And by taking something out, you run the risk of bringing the formulation back to ancient times when it was still not that good.

Let me try to convince you that this approach is scientific nonsense. My colleagues and I have measured many marketed cosmetic formulations for their skin feel. We also made simple base formulations—as a start formulation for further development by you, the cosmetic formulator—consisting of only water, an emollient, an emulsifier and if necessary a little bit of thickener, and also measured their sensory profile. In one example, we were able to reconstruct the exact skin feel of a marketed formulation containing fifty-one cosmetic ingredients with only four ingredients, one of which was water. Keep it stupid and simple! Think about the manufacturing advantages of such a simple formulation! Fewer ingredients can definitely mean more money.

Before you tell me that the marketed formulation was sold for completely other reasons than its sensory profile that were not provided by our four-ingredient formulation, I want to add that the marketed product did not contain any of the so-called active ingredients. If we start to include these, we have new, and scientifically and marketing-wise, much more valid reasons for not eliminating an existing active from your formulation. Here the favorite argument for adding more and more different active ingredients is the chance of obtaining synergy whilst at the same time reducing the possibility of side-effects such as irritancy. You see this in skin whitening products, especially if the working mechanisms of the ingredients are different. “Not a lot you can argue about that!” you would say, but think again. At the end of the day, the efficacy of an active ingredient does not

only depend on its intrinsic activity, but equally on the capability of a formulation to deliver the active ingredient to the site of action in the skin. And this capability depends on the polarity of the formulation relative to the polarity of the active ingredient. The mechanism of the various active ingredients may be different but this does not mean that the theoretical synergy is also obtained in reality, as the polarity of the formulation cannot be optimized for all active ingredients at the same time. That is, unless they all have the same polarity or your formulation has the polarity of the stratum corneum, one of the two preferred formulation polarities of every active ingredient. But at that polarity, the solubility could be extremely low and then you are still delivering a high percentage of more or less nothing. So, if you are adding many active ingredients to your formulation to enhance the length of the INCI list in an attempt to impress your customer ("with 10 active ingredients, it simply must be efficacious") or to justify the price of your product, just think that you could have had the same activity from only the one and only active ingredient for which the polarity of the formulation and therefore the skin delivery was (accidentally?) optimized. The additional active ingredients have increased production and registration costs (think about the product information package) without adding any efficacy benefit because they are not delivered to the site of action in the skin. And if the only reason for the addition was purely a marketing reason, then you better identify which active is actually delivered so that the concentrations of the others can be reduced to mere marketing proportions. In that case, fewer active ingredients will result in a higher profit for the company. As I said: less is more, but you need to know how to formulate for efficacy.

I am running out of positive reasons for including more and more ingredients in cosmetic formulations. A better understanding of the underlying science would make it much easier to create cosmetic formulations that contain only the ingredients needed to achieve the desired results. Science matters. Not more or less, it simply matters! Applying a more scientific approach to cosmetic formulations will result in fewer ingredients in our products. Now that is a little less

than frightening thought if you are working for a supplier of cosmetic ingredients! Nonetheless, I dare to say that less is more.

If you want to learn the latest that cosmetic science has to offer, attend the IFSCC Conference in Florence that will be held September19-21, 2005. Undoubtedly new cosmetic ingredients will be discussed, but with the science behind it, you will at least know which ones to include and which ones to eliminate from your formulation. I hope to see you all, for once rather more than less.

(Post-publication note 2010: Indeed, there is now an emerging trend in cosmetic formulating to create simpler formulas, not only from the point of view of active ingredients but also emollients, etc.).

Modified from a column "Less is more…" previously published in *SPC*, July 2005

Chapter 28

High Resolution Resolutions

It's that time of year again. Last week the Netherlands was covered for the first time under a blanket of snow, and I expect the first Christmas cards or Seasonal Wishes to arrive within the next two weeks. Another year has gone by in what felt considerably less than a year, without leaving a trace apart from some more grey hairs.

It is also that time of year when we make our New Year's Resolutions. We decide that from that eagerly awaited stroke of midnight, we will stop smoking, will spend more time at home with our families, will start writing that long-promised article or whatever else you fancy. Most of these resolutions, however, are expressions of how we would like our world ideally to be, but they often have little relevance for the reality of our daily lives. In case you doubt what I mean by the latter, try to remember how many of your former resolutions really materialized, but please answer honestly. What I would like to do in this column is to address a cosmetic dilemma that I have seen in our industry where commercial desire and technical reality greatly deviate. Commercially I know that "money makes this world go round," but I also know technically that "money does not make happiness." Both sayings, however, are a fact of life. So, how far do we go in our attempts to create shareholders value? Will we allow ourselves to deviate from our scientific principles or even our

...sharing creative steps with colleagues in the industry leads to new creativity and at the end, all flavor.

social norms and intrinsic values in order to make money? Let me give you a current cosmetic example.

In cosmetic marketing terms, natural is big, cool and absolutely necessary nowadays. Special issues of cosmetic trade magazines have been dedicated to this theme and I have seen creative use of language, such as "going nuts about naturals." From a marketing point of view, everything natural is good, safe and healthy, albeit predominantly for the selling party's bank account. Anything not natural is—unspoken implicit yet very understandably—bad. However, in a more technically oriented cosmetic publication you will luckily find that cosmetic scientists have not gone completely nuts on the natural subject, but despite their arguments they are not winning this battle. Let's have a look at technical sales people of naturals who are caught in the middle.

At a recent conference in South Africa, I listened to a speaker introducing a definition of "naturals," which originated from France. Although I did not manage to quickly write it down (and may therefore be misquoting this person on details), it was something like: *"A natural product is a product that consists of at least 90% (or 95%) natural ingredients."* Of course, you can argue whether this means 90% (or 95%) of the *number* of cosmetic ingredients should be natural or the combined weight of the natural ingredients in a final formulation should be at least 90% (or 95%) of a natural origin. For the latter interpretation isn't it great that there is so much "natural" water in our products? But there still is the issue of what is a natural origin. This definition therefore does not really help us a lot in the quest for truth in naturals.

Cosmetic marketers seem to orient themselves much more on this origin of naturals and therefore have a completely different yet unspoken definition of naturals. According to them, anything created willingly by man (i.e., with human intervention such as chemical synthesis) is not natural, but anything made spontaneous by plants or animals is natural. This definition implies that although we as humans are natural, everything we willingly create is unnatural and that is almost everything we do (apart from creating offspring in the natural way, but rest assured, I will resist the temptation to discuss

IVF here, some of us might suddenly feel unnatural or artificial for no good reason at all!). Our marketing colleagues probably mean that anything created without human intervention is natural, so a plastic cannot be natural because many styrene molecules put together will never spontaneously form polystyrene. According to this definition, dinosaurs died a natural death because it was not one of us that threw the meteorites! The meteorites fell spontaneously from the sky, the dinosaurs fell dead (albeit forced) on the ground and were covered with rocks and fossilized on the spot. Despite the fact that we call this section of science Natural Sciences, fossilized materials such as petrochemicals are considered by the true natural freaks to be not natural. I don't think that either dinosaurs or complete forests opted to fossilize spontaneously, but for mineral oil to be unnatural in this unwritten definition, it requires an intervention of one of us that forced pre-historical life to turn into petrochemicals!!

Clearly, this marketing definition is also not helping us to create a story for naturals that works both in marketing and in technical terms. After the abovementioned speaker in South Africa had sung his own praises about the excellent performance of his latest new ingredient—it was so good, simply because it was natural!—I asked him to help me with a little hypothetical experiment. In one hand, I had a bottle with natural glycerin and in the other a bottle with synthetic glycerin. But unfortunately I had forgotten which one was in which hand and which experiment would he recommend me to find out? The speaker remained terribly quiet, whilst the audience was audibly enjoying themselves. But the answer that finally came was shocking, at least to me! Technically, he said, there may not be a difference, but isn't it in our cosmetic industry that we merely sell hope in a bottle, so we just give our customer what they want, even if we know it to be complete rubbish? Not only did he disgrace his own presentation but such a response is in my belief damaging to our whole industry. We should have the guts to not give our customers what they want if we know what they ask for is technically completely nonsense and the perceived benefits are misleading. In the long run, giving in to such temptation always backfires on our whole industry,

therefore on all of us. For me, this is an example of selling your scientific principles for a quick buck.

Until the time that a better definition for natural is found, I would like you to offer my personal (definitely temporary) one: *"Every molecule comes from a plant, either a botanical plant or a chemical plant. Everything is therefore natural!"* Human beings and other animals are also nothing else but chemical plants.

Enough, it's almost midnight and time to make our New Year's Resolutions. I hope you make such ones that can live up to your own ethical and social scrutiny and ones that are not blurred in any way. In short, it is time to make High Resolution Resolutions and I hope that you will be successful in achieving them. I wish you all a Happy New Year and an inventive and successful 2006. And enjoy the break! Until next year…

Modified from a column "High resolution resolutions" previously published in *SPC*, December 2005

Chapter 29

Indecent Proposal...

Imagine this. There are 100 Euros on the table and there are two people. You are one of them. One of you will be making a proposal how this sum of money will be divided and the other person will be the acceptor. A toss of a coin will decide whether you are the proposer or the acceptor. If the acceptor agrees to the proposal made by the proposer, then both proposer and acceptor will get the proposed share of the 100 Euros. But if the proposer does not accept the proposal, then none of you gets anything. There are no negotiations, but both the proposer and acceptor know the total amount of money involved. You do not know each other and you will never meet again. So far the rules, now the money… But before you continue to read on, answer me the following questions. Actually write them down, as you will be amazed about yourself. Question 1: Would you rather be the proposer or the acceptor? Question 2: If you were the proposer, which split of the 100 Euros would you propose? And once you have written down the answer to this question, answer question 3, what minimum amount of Euros you would still accept as the acceptor?

Whilst you are wondering what this has to do with cosmetic science, let me tell you that you would rather be the proposer than the acceptor. At least 90% of people opt for being the proposer. In this way, you can control things and we like to be in

Unfair play often provokes costly acts of revenge and as consequence, we behave more fairly than predicted.

control, especially when money is involved. If you are indeed the proposer, there is a high probability that you would go for a fair split, somewhere between 50/50 to 60/40. The average score for typical Western-type civilizations is 45% to be given to the other party. Why? Because most people have a built-in mechanism of fairness, it is one of the characteristics of what theoretical economists call *Homo emoticus*. If you were the acceptor, I bet that you would accept a lot less than the 45%, maybe as little as 20%. Was I right or not? But if there would be a proposed 90/10 split, would you rather prefer nothing to getting 10 Euros? Why would you punish yourself? After all, you will never see the proposer again! These are typical statements that the *Homo economicus* would make to justify his or her 90/10 split. This person, a rational individual relentlessly bent on maximizing a purely selfish reward, is another postulation of theoretical economists. By now, you should know whether you are a *Homo emoticus* or a *Homo economicus*. I hope you are not disappointed!

But now the cosmetic variant of the Ultimate Game as the scenario described above is called in experimental economics. Imagine you are a supplier of cosmetic ingredients and your latest innovation is an exceptional one. You go to your customers and offer your product at a given price. Who is the proposer? Clearly you as the supplier as you are bringing something new to the table from which all could benefit. And therefore, the customer must be the acceptor. (S)he can accept or reject your offer, albeit that this offer came about after various rounds of negotiations. So far, everything is good, you are the proposer and you make a fair proposal, if you as the supplier are the *Homo emoticus*, like most of us are.

Then, all of a sudden and just when you are about to finalize the deal, you hear the word “exclusivity” being mentioned. In doing so, your partner in the negotiations is changing the game dramatically. First of all, as the proposer you know that you are in a winning situation as you have something good to offer. Why would the acceptor ask for exclusivity if (s)he did not think the product was excellent? A 50/50 split is no longer justified or fair. An 80/20 split might now be justified and you’re gradually changing to being a *Homo economicus*. But are you really? By asking for ‘exclusivity’, the acceptor is trying to reverse the roles. Your customer is trying to become the proposer,

and there is nothing left for you as the supplier but to sit and wait and accept (!) or decline. Yes, you might obtain a higher price for the innovation than you would get otherwise, but how much influence have you left on the volume of sales and degree of exposure? You are no longer in the driving seat and you simply will have to accept what your customer is doing with the innovation, be it a lot or nothing at all. Are you still the one that is winning here, even with an 80/20 split? And listen, now (s)he is saying that 80 is a bit over the top. Where is the fairness gone?

In experimental economics, people have been puzzled why humans have this in-built mechanism of fairness as players of the Ultimate Game are often more generous than predicted by game-theory analysis, which assumes that people selfishly seek to maximize their personal gains. But unfair play often provokes costly acts of revenge and as a consequence, we behave more fairly than predicted. Humans could have evolved this feeling for fairness during the millions of years that we lived in small groups. Such emotions prompted us to behave in ways that would have benefited either our group or us in the long run. Asking for 'exclusivity' in the cosmetic context is a move towards *Homo economicus*, a situation that does not benefit the group, i.e. the cosmetic industry, in the long run.

But that is not the end of it. There's a lot more to come in next month's cosmetic science column. Actually, I have another indecent proposal to make, exclusively for you…

Modified from a column "Indecent proposal" previously published in *SPC*, March 2006

Chapter 30

Written Exclusively for You!

Last time I wrote about an indecent proposal. You were asked to split 100 Euros in any ratio and we learned that most of us prefer to be the proposer, that we, as *Homo emoticus*, typically propose a 55/45 split, but that we would accept a lot less than the offered 45 Euros, maybe even as low as 10 to 20 Euros if we are the acceptor. I made the comparison to the price negotiations between a supplier and his/her customer, where you think you are in the driving seat until your customer all of a sudden asks for exclusivity. Although you may ask more, you have lost all control. Is all lost?

Luckily, there is another game that may give us a solution to this issue of exclusivity. In this variant of the Public Game there are four players seated around a table. Each player receives 100 Euros and has to decide independently from the others, how much money (s)he will put on the table. The combined money on the table will be counted and doubled and divided equally over the four players irrespective of their contribution. This procedure is repeated ten times. So, if all four players will put 100 Euros on the table, they will all get 200 Euros in return. If all four put forward their full capital every time, then they will all double their assets every round. You could all have a staggering 102,400 Euros at the end of ten rounds. What a great game this is!

To prevent people from turning traitor, all parties should be able to impose sanctions on the defecting party if they do not stick to the deal.

However, if one or two players decide not to put money on the table, they earn money from the doubled contributions of the other three or two. For instance, your neighbor and yourself, the good guys, did put in 100 Euros, but your other neighbor only submitted 50 Euros, and the person opposite you even nothing at all! That makes only a miserable 250 Euros and therefore two times 250, i.e., 500 Euros is equally split between the four of you. That's only 125 Euros for a 100 Euros investment, although your partner opposite you is laughing up his sleeve, he got 125 Euros without any investment at all! What kind of partner is that? You can easily understand what will happen. In the next round, the contributions of most players will decrease and at the end of the game, nobody is investing any longer. In real life situations, this happens on average in the fifth round. From the point of view of the profit-minded *Homo economicus*, this is not logical at all. We have access to a guaranteed way of making money, but will not do this just to have more than others for a short while whereas we know that this will damage us in the long run.

Recently, a way has been found to make all players behave fairly again in this Public Game. If the option of punishing your co-players is introduced, the level of defection goes down whereas the willingness to put money on the table increases and so do the profits. In the above example with only 250 Euros on the table, you and your good neighbor could pay 10 Euros each into a separate fund, but the traitors then would have to pay tenfold (200 for 2 x 10 Euros from the good guys) that amount for paying nothing or five-fold for paying only 50% of the maximum. This money also goes into a separate fund, and not back to the table. If defectors are severely punished in this way, the contributions will remain high till the very last round of the game.

Evolutionary economists have tried to explain such behavior by pointing out its fitness-of-the-species advantage. Societies with an above-average share of punishers are better able to survive events that threaten the whole group. The altruistic act of punishing a defector will help the species to survive. In the animal kingdom, we see such behavior predominantly between close relatives, but humans seem to be controlled by economic rather than genetic ties.

Now back to the issue of 'exclusivity' of cosmetic ingredients. To change from the impact of the Ultimate Game situation to that of the Public Goods game situation, one should change the 'exclusivity' concept from a deal between only two parties (one supplier and one customer with one proposer and one acceptor albeit with unclear roles) to a deal between at least four parties (one supplier and three customers). To prevent people from turning traitor, all parties should be able to impose sanctions on the defecting party if they do not stick to the deal. As in evolutionary economics, the group, in this case the cosmetic industry, will favor from this approach. It may sound rather radical, but I am sure that you can recall a situation where an "exclusivity" deal led to reduced profits. The supplier did put his or her money on the table but the customer did not. How would this situation be if there were three customers? Based on evolutionary economics, we should see an increased need for sticking together, especially in these bad economic times - a metaphor for the events that threaten a biological group.

Will it work? I honestly do not know. After all, I am only a theoretical evolutionary cosmetic scientist reading a book on economic games wanting to try a behavioral-sociological experiment. One thing, however, I do know for sure, I wrote this column exclusively for you! And that was 'exclusivity' in its new definition. My last question to you is, Will you now put your money on the table? Only then you will discover the answer to your equally fairly justified question whether I will put my money where my mouth is.

And for those of you that thought I was serious in my exclusivity suggestions, please be informed that any form of price deals is illegal. After all, it all started with an indecent proposal…