ABSTRACT

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COMPANY: EMD Performance Materials

JOB TITLE: Director, Technical Services Cosmetics

Podium Title: *A Gene Profiling Study and Potential Application to Develop Personalized Skin Care Products*

Background information (Short introduction)

Each person has some genetic variation known as single nucleotide polymorphisms (SNPs). SNP gene profiling is currently being used to develop more effective treatments in medicine. We conducted a gene profiling study on 44 human volunteers to evaluate the feasibility of developing personalized skin care products based on genetic profiling, and evaluation of each volunteer's phonotype by an expert grader.

Objective

Conduct a gene profile for 44 human volunteers equally divided between Fitzpatrick skin type II or III. Half of the volunteers resided in Italy and the other half in France. A DNA microarray was used to obtain a gene profile of each volunteer. An expert grader at each facility evaluated the phenotype of each person and took Chromameter readings for comparison. Our aim was to compare phenotype to genotype and compare our observations with relevant data available in scientific publications.

Methodology

A trained, expert grader using a sterile swab collected saliva from each volunteer. The DNA samples were prepped using a Biomek(R) FXp extractor (ThermoFisher). The DNA was amplified with a GeneAmp (R) PCR 9700. To evaluate the SNPs a customized gene chip, Axiom(R) custom gene array obtained from Affymatrix was designed. Allels found in the SNPs were determined on an ABI Prism (R) gene analyzer from Applied Biosystems. Chroma Meter readings, skin tone, eye color and hair color/ texture evaluations were recorded for data comparison

Results

We obtained over 84,000 SNPs from each individual. We selected 27 SNP's that scientific literature associated with pigmentation. A statistical analysis was conducted on the allelic combinations we obtained, correlating with the Chroma Meter reading and phenotypic evaluation. All 27 SNP's were statistically significant with respect to pigmentation as measured by the Chroma Meter for ITA and L*a*b* readings. The genes associated with pigmentation

included not only know genes for regulating pigmentation, also antioxidant genes, and genes for inflammation.

Conclusion

The data we obtained correlated well with many publications. Although we had 84,000 SNPs on our array, our customized gene chip did not have all the potential genes for pigmentation reported in the literature. Our study only involved Fitzpatrick skin type II and III, given we believe the data to be potentially useful for predicting product success, future evaluation should be conducted with other Fitzpatrick skin types. It was interesting to note that of the three antioxidant genes associated with pigmentation, we found 5 allelic variations among the volunteers. Beyond the pigmentation gene, we now have obtained data to explore technologies for wrinkles, inflammation and skin/care

Why is this important to the industry?

These studies provide new insights to potentially make good products better. The data may be useful to marketing to predict products that may work best for populations globally based on SNP variations and similarities in different regions of the globe.

Given molecular biology is new to the cosmetic chemist and the inevitable increase of use of this this discipline in the cosmetics industry, chemists, marketing and salespeople should have the opportunity to be exposed to such presentations.

Howard Epstein is Director of Technical Services for EMD Performance Materials Corporation, Philadelphia, PA., an affiliate of Merck KGaA, Darmstadt, Germany. He was a scholar in residence at the University of Cincinnati department of dermatology and received his Ph.D. in Pharmacognasy from the Union Institute & University in Cincinnati, Ohio during that time. He has been in the cosmetics industry for many years since he began his career formulating cosmetics for Estee Lauder, Maybelline, Max Factor, Bausch & Lomb and Kao Brands. In addition to his interest in botanicals Howard previously served as editor of the Journal of the Society of Cosmetic Science and is a member of the International Academy of Dermatology. He is on the editorial board of the dermatological journals Clinics in Dermatology and SKINmed representing the cosmetics industry to dermatologists. Howard has authored chapters in various cosmetic technology textbooks including various chapters in Harry's Cosmeticology, and holds eight patents and two patent applications.