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Unlocking the Future of Individualized Cosmetics and Reconstructive Plastic Surgery: Concepts and Future Prospects through the Precision Medical Armamentarium Tailored to the Personalized DNA

Abstract:

A new systems approach to diseased states and wellness result in a new branch in the healthcare services, namely, personalized and precision medicine (PPM). Since traditional approaches based on clinical (including dermatological) symptoms and signs, and a few classic biomarkers can only provide incomplete information on disease or defects-related manifestations. The move to personalized preventive, therapeutic or rehabilitative treatment would require the large-scale unbiased analysis of molecular and cellular characteristics of individuals experiencing defined skin disease conditions to identify reliable patient-specific biomarkers linking genotypes, molecular profiles, disorder or defects disorder progression and fundamental datasets and to process them computationally to identify personalized biomarkers.

Well, problems in cosmetic and plastic medicine and surgery: dozens of cosmetics and skin care products are suspected to provoke allergic reactions. Or some of the products are believed to not be suitable for skin, based either on intolerance and/or lack of efficacy. This ambiguity encourages the development of particular tools to assist in product individualization, which has thrived among cosmetic companies. Usually cosmetic companies create health, wellness and beauty products for consumers, based on its proprietary genome-, phenome- and exposome-based testing.

For instance, developed by the L'Oréal, the Perso smart skincare system is capable of providing individualized skincare solutions via a four-step process taking into account the specificities of the user's skin, local weather conditions, and the user's product preferences. According to L'Oréal, the device is also able to make custom formulas for lipstick and foundation.

L'Occitane en Provence is also betting on personalized beauty with Duolab, an innovation comprising a device, a range of capsules - including three moisturising bases and five targeted concentrates - and a skin predictive diagnostic tool. The tool assesses individually the customer's skin requirements and generates a personalized care protocol.

Amorepacific presented a 3D face mask printing system coupled with the 3D printing sys-

tem developer Lincsolution. The latter uses a smartphone app to instantly measure individual users' facial dimensions and print a personalized hydrogel mask that caters to individual facial features and skin conditions.

P&G Ventures, the startup studio within Procter & Gamble, returned to CES 2020 to showcase the development of Opte Precision Skincare System. This personalized handheld ink-jet printer can instantly make the appearance of skin's hyperpigmentation disappear and fade spots over time. Meanwhile, Opte's digital camera scans the skin and instantly analyzes each image using a proprietary algorithm to detect tonal imperfections not visible to the human eye. The device then precisely deposits droplets of Spot Optimizing Serum on target areas until there is a perfect color match with the surrounding skin tone.

Neutrogena relaunched their Skin360 app, eliminating the need for a separate skin analysis tool. The selfie analysis is now provided by lightning fast analysis for a broad range of skin parameters including wrinkles, fine lines, dark under-eye circles, dark spots and smoothness.

Envision a world where your face cream is tailor-made for your DNA, your hair mask knows you got highlights the last 5 years, and your serum has a better handle on your likes, your dislikes - even what you had for breakfast - than your partner. Innovators from the worlds of precision biotech and unique beauty are dreaming up those personalized beauty products right now, and they'll be in our hands soon.

To utilize PPM resources and optimize the response to targeted therapies, molecular, clinical, genetic, and epigenetic factors will need to be taken into consideration in future research trials. With the emergence of novel preventive rehabilitative safety therapies from current clinical trials, dermatologists will be able to implement them into their daily practice and switch from a generalized "one-drug-fits-all" approach to more personalized "client-specific" management.

For now, most of the companies only offer common serums, and it creates customized formulas based on a thorough evaluation of the skin including the skin at different stages of the life. As we get older or are exposed to the sun, for example, certain genes flip on - they trigger enzymes that break down collagen, causing wrinkles and sagging. But if a person-at-risk realizes that's happening on a molecular level, the one could use prescription ingredients to quiet the overactive genes and normalize the skin. The effects mentioned would be secured by the biopharma developing new precision drugs to individually up-regulate and downgrade overactive or underactive genes in the skin.

And just like that, the key to truly smooth skin could be written in the client's DNA. Some companies, like HomeDNA and Skintelli, have already started recommending existing skincare ingredients and products for users based on molecular profiling and testing. They claim to give insight into how quickly your skin cells turn over or the quality of your collagen. So, the individualized molecular profiling and analysis could also tell you what kinds of foods to eat for younger, more radiant skin.

Based on all of these measurements, you'll get targeted product recommendations (across brands) for your skin's unique needs, down to different products for specific areas of your

face, skin and body as a whole.

In the wellness sphere, precision tests are also used to define slow or fast metabolizers. While genomic-based customized nutrition is already being implemented, PPM-based diets might lack sufficient evidence for full integration into the full-set cosmetic setting. The concept of PPM-based nutriogenomics is to provide accurate nutritional recommendations for an individual to obtain a healthier lifestyle. Those advances are paving the way for the design of innovative strategies for the control of chronic diseases and obesity, in particular. PPM-based nutrition has the huge potential to maintain health and wellness, as a result of a rigorous nutrigenomic analysis whilst considering the genetic makeup of an individual. This will be made possible by large genetic biobanks that are designed to capture genetic diversity.

So, in a more distant future, the new cosmetic and nutritional brands like would create unique shampoos, conditioners, masks and personalized diets based on your individualized answers and data being harvested from your genetic passport.

The capacity to measure, capture and interpret multiple sources of data using personal devices and sensors opens up new opportunities for preventive skin monitoring, securing individualized skin care and active health management. However, the long-term nature and frequent need for ongoing monitoring of skin conditions and health state provide an opportunity to develop personalized, patient-centered care delivered through digital devices, assisted by IT technologies.

Dermatology and cosmetology require doctors to make treatment decisions based on patient self-reporting, which poses challenges including patient recall or recognition of exacerbating factors, leading to a trial-and-error approach to management and additional consultations.

Meanwhile, a lack of particular medical guidelines has been identified by the majority of responders as the predominant barrier for adoption, indicating a need for the development of best practices and guidelines to support the implementation of PPM.

Implementation of PPM requires a lot before the current model “physician-patient” could be gradually displaced by a new model “medical advisor-healthy person-at-risk”. This is the reason for developing global scientific, clinical, social, and educational projects in the area of PPM to elicit the content of the new branch.

Biography

Dr. Sergey V. Suchkov, MD, PhD, comes from a family of medical professionals in Astrakhan, Russia. He earned his MD in 1980 and his PhD in 1985. Dr. Suchkov held significant positions in clinical immunology and served as Secretary-in-Chief of the Editorial Board for Biomedical Science. Currently, he is a Professor at the Russian University of Medicine and holds memberships in esteemed organizations like the New York Academy of Sciences and the American Heart Association, reflecting his commitment to global medical research.