Opinion Article

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Interacting with Hair Growth Cycle Regulation Molecules

Maryanne Makredes*

Department of Medicine, University of Toronto, Toronto, Canada

Corresponding author: Maryanne Makredes, Department of Medicine, University of Toronto, Toronto, Canada, E-mail: Maryanne@gmail.com

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Description

All cells release Extracellular Vehicles (EVs) as a form of intercellular communication. Broadly, EVs have been classified into two categories dependent on their mechanism of biogenesis. Ectosomes or macrovesicles are EVs that are released via blebbing of the cellular membrane. These vesicles can range in size from 50 nm to 1 µm and serve a wide array of functions microvesicles, oncosomes, and apoptotic bodies. The other subcategory, called exosomes, is generated via inward budding Exosomes can affect hair growth by targeting transport of molecular signals to HF components and interacting with hair growth cycle regulation molecules. The molecular effects of exosomes on hair regeneration are not completely understood and may vary widely based on exosome source. Results from animal studies may also not be representative of human hair regeneration but adds to the basic knowledge of hair growth regulation. Furthermore, the variation of components within exosomes. To date there are no FDA-approved exosome therapies on the market for use in hair growth and regeneration. Despite lack of approval, clinics providing cosmetic use of exosomes are numerous. Both the Centers for Disease Control and Prevention and FDA have produced numerous public warnings that stem cell and exosome therapies are unapproved for use in the United States for hair loss treatment, following reports in 2019 of patients experiencing illness and serious infection after receiving One of the authors, Dr Rappaport, has treated several AGA patients with exosomes. The experiences described here are personal observations from the author's private practice after receiving informed consent they are not clinical trials. Medical decisions are based on the clinical conditions of each patient, resulting in a different treatment plan for each patient. In most cases, a patient approaches the authors for nonsurgical treatment for hair loss, ranging in severity Ludwig Norwood types.

Green Chemistry

It is known that drug abuse jeopardizes economic and social development. Toxicological analyses can guide prevention and treatment strategies in rehabilitation facilities. The current greatest challenge is finding easily adaptable and less costly sensitive methods that meet the principles of green chemistry. Hair, as a biological matrix, has several advantages, and its ability to detect consumption for longer periods keeping the matrix stable and unaltered stands out. This manuscript addresses the use of a miniaturized technique in an alternative matrix, by making use of a reduced amount of solvents to quantify amphetamines, aiming to guide prevention and treatment strategies in rehabilitation facilities. A hollow fiber liquid-phase Micro extraction technique for extracting amphetamines from hair samples with gas chromatography-mass spectrometry was validated, adapted, and applied to ten samples from patients of a rehabilitation facility. The technique proved to be sensitive, accurate, precise, and not affected by interference from the biological matrix and the linear range for the analyses. The three analyses were quantified in the samples analysed. It is worth stressing that the patients were young. The technique complied with the principles of green chemistry, and proved to be a sensitive technique, adaptable to the routine of common laboratories. Validation in the analysis phase with authentic samples, thus, showed that it can be an important tool for preventing and controlling drug addiction. In normal condition human hair growth occurs through three phases, anagen (growth phase included about 85% of hairs, last from 2 to 6 years), catagen (transitional phase lasting up to 2 weeks) and telogen (resting phase which last from 1 to 4 months). Natural dynamics of the hair growth process can be impaired by several factors, such as genetic predisposition, hormonal disorders, aging, poor nutrition or stress, which can lead to the slowdown in the growth of hair or even hair loss. The aim of the study was to assess the hair growth promotion effect of marine-derived ingredients, hair supplement and its raw components (marine protein complex, shark and oyster extract). Cytotoxicity, production of alkaline phosphatase and glycosaminoglycans, as well as expression of genes involved in hair cycle-related pathways were investigated using dermal papilla cells, both immortalized and primary cell lines. Tested marine compounds showed no evidence of cytotoxicity under in vitro conditions. Significantly increased proliferation of dermal papilla cells. Moreover, tested samples stimulated cells to produce alkaline phosphatase and glycosaminoglycans. Increased expression of hair cell cycle-related genes was also observed. The obtained results indicate that marine-derived ingredients stimulate hair growth through anagen activation.

Hair Transplantation Surgery

One of the main concerns of patients who undergo hair transplantation surgery such as follicular unit strip surgery is scar

widening on surgical sites. Until now, trichophytic suture, double-layer suture, tattoos, follicular unit transplantation on scars are suggested as a solution. A 23-year-old man with frontal hair loss underwent follicular unit strip surgery. To reduce hair donor area scarring, we tried a new trichophytic suture method. After surgery, the patient's hair loss degree was corrected with about C1 in the basic and specific classification. Also, there was less scar in the columnar trichophytic suture part, compared with almost 7 mm of scar widening in the simple primary closure part. This study highlights that a columnar trichophytic suture may be useful for patients undergoing scalp surgery for cosmetic purposes. Hair has recently emerged as a biospecimen for characterizing the long-term chemical exposome in biomonitoring investigations spanning several months, as chemical compounds circulating in the bloodstream accumulate in hair. Although there has been interest in using human hair as a biospecimen for exposome studies, it has yet to be widely adopted compared to blood and urine. Here, we applied a High-Resolution Mass Spectrometry (HRMS)-based suspect screening strategy to characterize the long-term chemical exposome in human hair. Hair samples were collected from 70 subjects and cut into 3 cm segments, which were then mixed to prepare pooled samples. The pooled hair samples underwent a sample preparation procedure, and the hair extracts were further analyzed using an HRMS-based suspect screening approach. An in-house chemical suspect list containing 1227 chemical entries from National Report on Human Exposure to Environmental Chemicals (Report) published by the U.S. CDC and the Exposome-Explorer 3.0 database developed by the WHO was subsequently used to screen and filter the suspect features against the HRMS dataset. Overall, we matched 587 suspect features in the HRMS dataset to 246 unique chemical formulas in the suspect list, and the structures of 167 chemicals were further identified through a fragmentation analysis. Among these, chemicals such as mono-2-ethylhexyl phthalate, methyl paraben, and 1-naphthol, which have been detected in the urine or blood for exposure assessment, were also identified in human hair. This suggests that hair reflects the accumulation of environmental compounds to which an individual is exposed. Exposure to exogenous chemicals may exert adverse effects on cognitive function, and we discovered 15 chemicals in human hair that may contribute to the pathogenesis of Alzheimer's disease. This finding suggests that human hair may be a promising biospecimen for monitoring long-term exposure to multiple environmental chemicals and perturbations in endogenous chemicals in biomonitoring investigations.