

## **A NOVEL ENCAPSULATED STABILIZED VITAMIN A (RETINOIC ACID) FOR COSMETIC APPLICATIONS (BIRAD)**

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### **The Problem**

All-trans retinoic acid, the most active form of vitamin A, is known to be highly beneficial in dermatology and other biomedical applications.

However, all-trans retinoic acid is extremely sensitive when exposed to ultraviolet (UV) light, due to the conjugated double bonds that comprise its chemical structure.

### **The Solution**

Our cutting-edge invention is a nano/micron-sized retinoic acid-filled hollow proteinoid particle composed of polymerized para-amino benzoic acid (a UV blocker) and polymerized amino acids. This non-toxic biodegradable particle may contain up to 20% trans-retinoic acid, protecting it from light-degradation for over 24h, while free RA degrades within only 3h of light exposure under same conditions.

### **The Commercial Benefit**

Our all-trans retinoic acid is protected from light-dependent degradation, keeping patients safe from any harmful exposure to light

The nanoparticles degradation opens up the ability to achieve slow controlled release of retinoic acid

The encapsulation keeps the nanoparticles dry, and redispersing them upon use

### **Market Potential**

Retinoic acid has a steadily growing market expected to reach a 6.6% year-over-year growth by 2020 -

Retinoic acid is the most well-studied ingredient used in a large variety of cosmetic preparations designed to provide:

Preempt skin aging by inducing the biosynthesis of collagen in the skin

Counteract photo aging by impeding the UV-induced synthesis of collagen-reducing enzymes

Prevent oxidative stress

Control cutaneous bacterial flora

### **Target Markets/Industries**

Dermatology product manufacturers

Biomedical product manufacturers

Cosmetics product manufacturers

### **Intellectual Property**

Status: Patent Pending

Patent Name: PROTEINOID COMPOUNDS, PROCESS OF PREPARING SAME AND USES THEREOF

Publication number: 20170042827

Abstract: Proteinoid compounds characterized by a molecular weight (Mw) of at least 15,000 Da, processes of preparing such compounds and methods of use thereof, are provided. Type: Application

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### **Team: Primary Inventor**

Prof. Shlomo Margel

Faculty of Chemistry, Institute of Nanotechnology and Advanced Materials

Professor Margel received his Ph.D. from the Department of Materials Science, at the Weizmann Institute

He completed his postdoctoral studies at the California Institute of Technology (CALTECH),

Department of Inorganic Chemistry

He served as a senior scientist at the Jet Propulsion Laboratory at CALTECH

Professor Margel worked as an associate Professor, at the Department of Materials Science, the Weizmann Institute

He was a visiting scientist at DuPont, Central Research and Development at the Polymer Section, University of Ulm, Germany, at the Department of Physical Electronics, Tokyo Institute of Technology, Japan at the Institute for Soldiers' Nanotechnologies, MIT, Cambridge, MA

He acted as the Dean of the Faculty of Exact Sciences of Bar-Ilan University.

Shlomo Margel was nominated by the Israel Academy of Sciences as Chairman of the National Committee of Chemistry towards IUPAC

Professor Margel published more than 170 publications, has been awarded 29 patents and he is the author of a few chapters in several books

### **Future Research**


We plan to:

1. Finalize the work with the qPCR to demonstrate the activity of the protected vitamin A compared with free vitamin A exposed to UV
2. Deepen our knowledge on the release kinetics of vitamin A from the nano/micro-capsules
3. Demonstrate the activity of the protected vitamin A compared to vitamin A on the skin

### **The Opportunity**

Cosmetics companies are invited to license our patent through a licensing agreement, either with or without sponsored research

### **Contact for more information:**

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