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AC ExoVitalize

BioAuthentic Exosome
Cellular Energy
Wake Up the Skin

Active Concepts

VEGAN

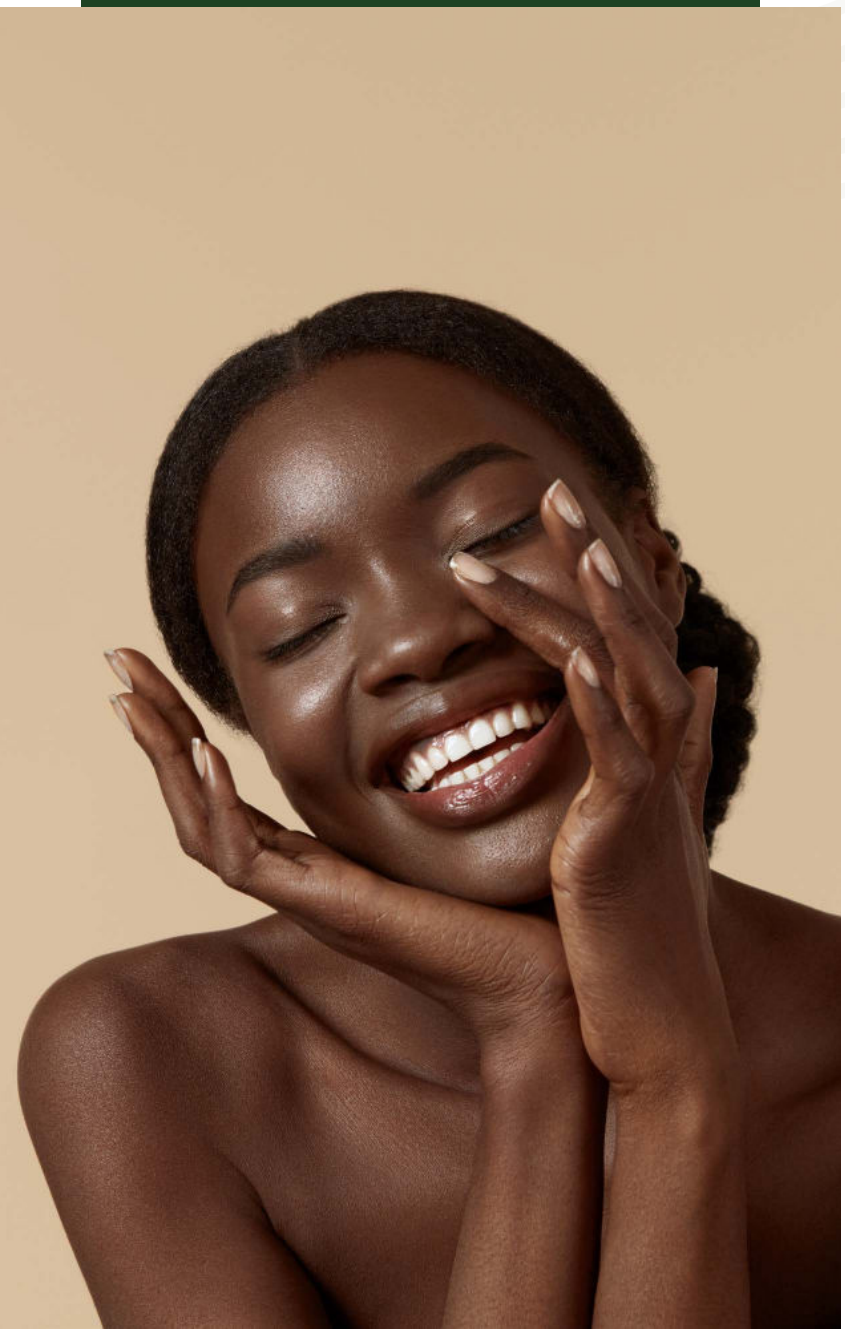
SEPHORA CLEAN

CREDO CLEAN

GLOBALLY COMPLIANT

COSMOS COMPLIANT

ISO 16128



THE FEATURES.

Active Concepts aims to evolve the modern incarnations of cosmetic delivery systems through the use of BioAuthentic Exosomes. While exosomes currently available in the market are typically sourced from animal or human stem cells, primarily targeting anti-aging benefits, Active Concepts pioneers a natural approach to delivery systems while broadening the spectrum of benefits. Introducing AC ExoVitalize, a natural exosomal delivery system that encapsulates watermelon and grapefruit extract, utilizing their essential amino acid content to enhance the cellular processes of glycolysis and oxidative phosphorylation. Two cellular functions that rapidly increase ATP production, this ingredient allows our skin to wake up on a cellular level.

***INCI**: Water & Citrus Paradisi (Grapefruit) Fruit Extract & Citrullus Lanatus (Watermelon) Fruit Extract & Phospholipids*

TECHNICAL DATA SHEET.

AC ExoVitalize

THE STORY.

At the intersection of beauty and science, delivery vesicles ensure the effective delivery of cosmetic actives to consumers in their personal care products. However, to stay competitive in the ever-changing industry, Active Concepts has evolved modern incarnations of well-known delivery systems. While conventional delivery systems rely on synthetic means, our company proudly champions green chemistry and sustainability. As is our signature approach, we turned to nature for the answer to craft a solution that harmonizes with both the skin and the planet.

Adding to our delivery system technology platform, Active Concepts introduces BioAuthentic Exosomes — natural vesicles that are functionally identical to exosomes, extracted from natural sources, and target specific benefits. AC ExoVitalize is intended to wake up the skin on a cellular level. By encapsulating grapefruit and watermelon extract, this ingredient directly provides our skin with the essential amino acids required to push forward the cellular functions of glycolysis and oxidative phosphorylation. Following the mechanical processing of grapefruit and watermelon, the plant materials are individually extracted with water and dispersed in phospholipids. Once the natural antimicrobial, *Lactobacillus* ferment is added, the solution is homogenized to form exosomes.

THE SCIENCE.

By definition, exosomes are the smallest forms of extracellular vesicles and are natural, membrane-derived particles.[1] They are shed by most cells in response to intracellular and extracellular stimuli. With their ability to increase cell-to-cell contact and intracellular communication, exosomes are efficient at enhancing the delivery and bioavailability of actives to intended cells.[2] As an active area of research, exosomes are mainly used in the pharmaceutical space. Exosomes are emerging in the personal care industry as well, however, they are only being marketed towards skin rejuvenation, anti-aging, and are derived from human or animal stem cells. As Active Concepts realizes most brands are not a one-stop shop, our BioAuthentic Exosome line offers a significant advance in delivery system innovation by providing naturally derived vesicles with a broad range of targeted benefits, setting brands apart through differentiation as well as sustainability. Exosome concentration was determined using a Horiba LA-300 by generating a volume-based particle size distribution. Light scattering measurements were converted from particle volume to estimated particle number by applying spherical geometry and density corrections appropriate for lipid-based vesicles, enabling calculation of exosome concentration 6.18×10^{12} exosomes per milliliter.

AC ExoVitalize enhances the cellular processes of glycolysis and oxidative phosphorylation. Glycolysis is a metabolic pathway that occurs in the cytosol of cells and is an anaerobic energy source that oxidizes glucose molecules, the most crucial organic fuel in animals, plants, and microbes.[3] In anaerobic conditions, pyruvate converts to lactate, resulting in the production of two adenosine triphosphate (ATP) molecules. This process is the essential first step in cellular respiration. Oxidative phosphorylation and electron transport also serve as a major source of cellular energy and occur within the mitochondria. During oxidative phosphorylation, electrons derived from NADH and $FADH_2$ combine with oxygen and the energy released is used to drive the synthesis of ATP.[4] It is important to note that the mechanism by which energy is derived from these processes is fundamentally different. In the final reaction of glycolysis, the high-energy phosphate of phosphoenolpyruvate is transferred to ADP, yielding pyruvate plus ATP. This direct transfer of high-energy phosphate groups doesn't occur in oxidative phosphorylation, but rather the energy derived from the electron transport is coupled to the generation of a proton gradient across the mitochondrial membrane. This potential energy stored in this gradient is harvested by a fifth protein complex, which couples the favorable flow of protons back across the membrane to the synthesis of ATP.[4]

THE TECHNICAL DETAILS.

INCI. Water & Citrus Paradisi (Grapefruit) Fruit Extract & Citrullus Lanatus (Watermelon) Fruit Extract & Phospholipids
CAS. 7732-18-5 & 8016-20-4 & 90244-99-8 & 123465-35-0 (OR) 8002-43-5
EINECS. 231-791-2 & N/A & 290-802-9 & N/A (OR) 232-307-2
Origin. Botanical/Bacteria
Natural Antimicrobial. Lactobacillus Ferment
Preservatives. None
Solvents Used. Water
Appearance. Liquid Exosomal Dispersion, Light Beige to Tan
EUROPE. Compliant at Suggested Use Levels
USA. Compliant
CHINA. Compliant

THE FORMULATION TIPS.

pH Stability. 4 - 7
Temperature Stability. Do not freeze. Product may change appearance if exposed to cold temperatures. If this happens, gently warm to 45-50 °C and mix.
Use Level. 1 - 10%
Ionic State. Cationic
Alcohol Compatibility. 10% of active is compatible with up to 10% alcohol.
Solubility. Water Dispersible
Pro Tips. It is recommended that this product is added to the batch in cooldown to maintain appearance

AC ExoVitalize

THE BENEFITS OVERVIEW.

Cellular Energetics *Glycolysis*

Oxidative Phosphorylation

Reduce Cellular Senescence *SA-Beta-Gal Analysis*

Wake Up the Skin *Undereye Study*

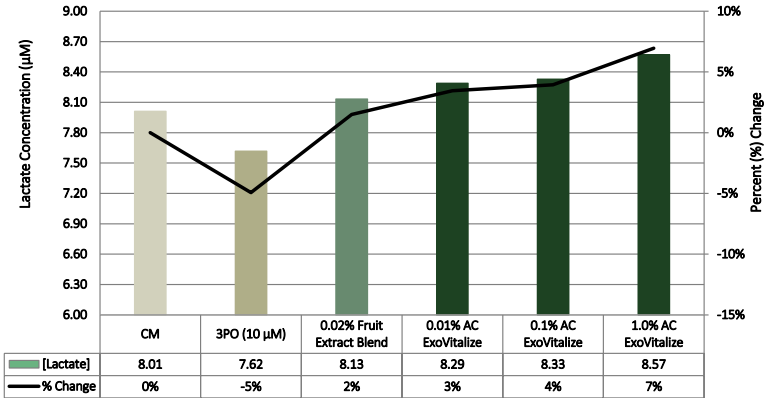
Undereye Mechanism *Endothelial Permeability*

THE EFFICACY.

Cellular Energetics

An L-Lactate Assay was conducted to assess the *in vitro* effect of AC ExoVitalize to stimulate glycolysis in dermal fibroblasts. Lactate is a by-product of glycolysis and the amount produced by cells is directly proportional to the rate of glycolysis. Activating this biological process maintains cellular homeostasis, vitality, and can be critical during cellular stress. The key active ingredients in AC ExoVitalize, *Citrus paradisi* (Grapefruit) Fruit Extract and *Citrullus lanatus* (Watermelon) Fruit Extract, were tested to demonstrate the superior nature of BioAuthentic Exosomes as a delivery system.

Glycolysis



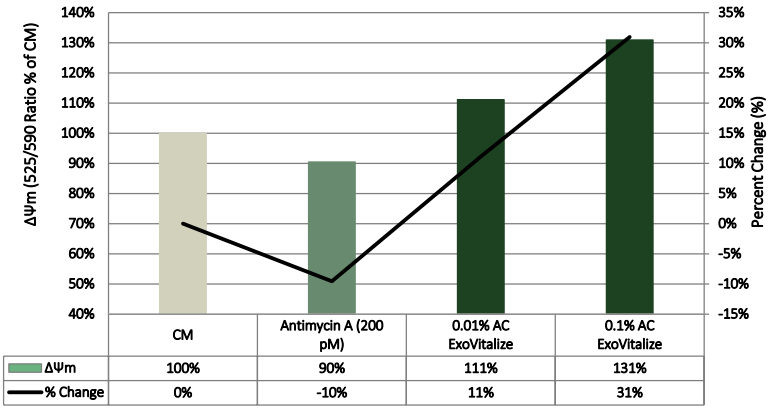
	CM	3PO (10 µM)	0.02% Fruit Extract Blend	0.01% AC ExoVitalize	0.1% AC ExoVitalize	1.0% AC ExoVitalize
[Lactate]	8.01	7.62	8.13	8.29	8.33	8.57
% Change	0%	-5%	2%	3%	4%	7%

Increased glycolysis activity by +4%

Cellular Energetics

A Mitochondrial Membrane Potential Assay was conducted to assess the in vitro effect of AC ExoVitalize to stimulate oxidative phosphorylation in dermal fibroblasts. One driving force of oxidative phosphorylation is the mitochondrial membrane potential (ΔΨm) which represents the transmembrane potential of hydrogen ions. Maintaining ΔΨm is necessary as the proton flux from cytosol to the matrix is harnessed to generate ATP.

Oxidative Phosphorylation



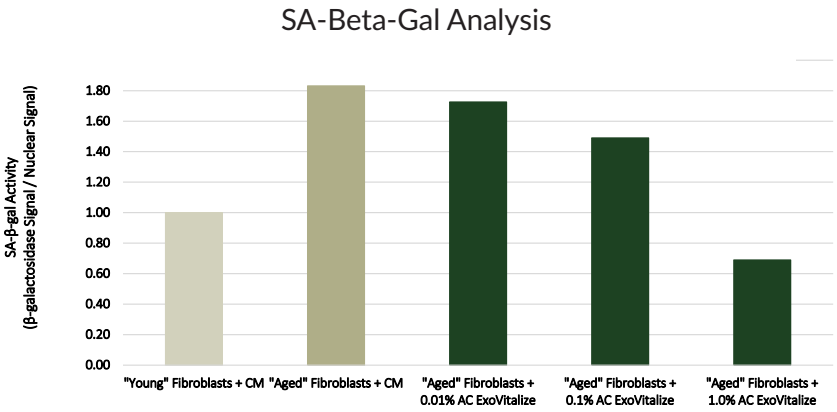
	CM	Antimycin A (200 pM)	0.01% AC ExoVitalize	0.1% AC ExoVitalize
ΔΨm	100%	90%	111%	131%
% Change	0%	-10%	11%	31%

Increased mitochondrial activity by +31%

THE EFFICACY CONTINUED.

Reduce Cellular Senescence

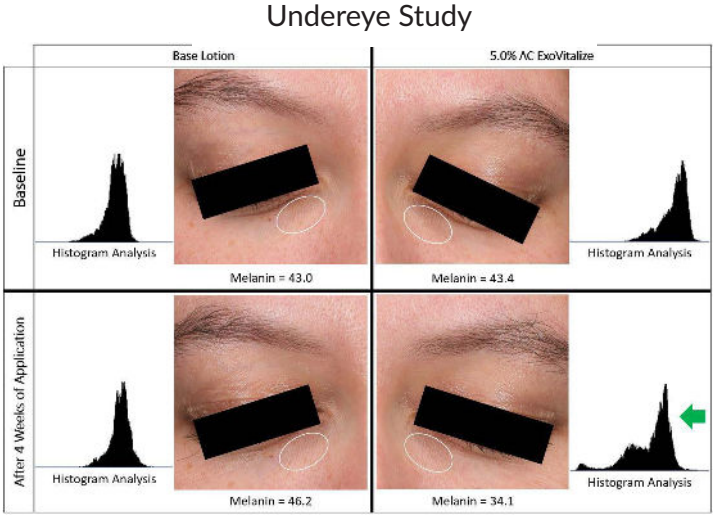
A cellular aging model was developed to assess the in vitro effect of AC ExoVitalize to reduce SA-Beta-gal activity in “aged” fibroblasts. Cellular senescence is a state of permanent cell cycle arrest that accompanies aging and contributes to a decline in normal skin function and physiology. SA-Beta-gal is the gold standard biomarker to identify senescence in vitro as the enzyme beta-galactosidase explicitly accumulates in the lysosomes of senescent cells.



Reduced SA-Beta-gal activity by -62%

Wake Up the Skin

Dark circles and discoloration can influence the appearance of aging and fatigue under the eye. An in vivo study was conducted over a period of six weeks to evaluate the effect of AC ExoVitalize on undereye skin pigmentation to determine its effect of reducing discoloration. Participants applied specific products to particular undereye areas twice a day for four weeks with measurements collected once a week, followed by a two week regression period. Photographs were taken using the VISIA Complexion Analysis System and pigmentation measurements were obtained via the DermaLab Combo handheld probe to assess undereye melanin levels.

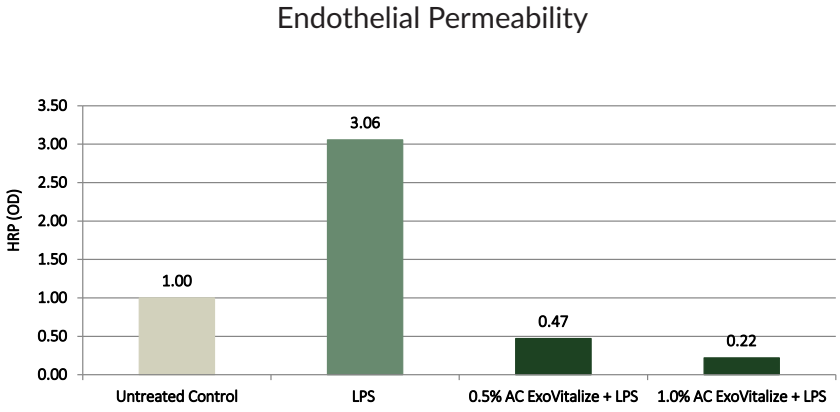


Decreased undereye pigmentation by -15%

THE EFFICACY CONTINUED.

Undereye Mechanism

On a cellular level, endothelial function modulates vascular integrity. In particular, endothelial cell permeability plays a fundamental role in the formation of dark circles as increased permeability leads to a pooling of deoxygenated blood under the eye, resulting in discoloration and the appearance of aging. The relationship between dermal fibroblasts and dermal endothelial cells is vital to maintaining vascular integrity. Specifically, fibroblasts synthesize the extracellular matrix, which provides an anchor point for endothelial cells and greatly reduces endothelial permeability. Accordingly, an Endothelial Permeability Assay was conducted to assess the *in vitro* effect of AC ExoVitalize to reduce endothelial permeability via fibroblast-released signaling molecules. Complete media treated with lipopolysaccharides (LPS) was used to stimulate an inflammatory environment, representing the positive control. Each solution was then treated with streptavidin-horseradish peroxidase (HRP) for a colorimetric reaction. Optical density (OD) was read at 450nm to measure the amount of permeability.



Decreased endothelial permeability by -93%

References:
1. Kalluri R, LeBleu VS. The biology, function, and biomedical applications of exosomes. Science. 2020 Feb 7;367(6478):eaau6977. doi: 10.1126/science.aau6977. PMID: 32029601; PMCID: PMC7717626.
2. Hannafon BN, Ding WQ. Intercellular communication by exosome-derived microRNAs in cancer. Int J Mol Sci. 2013 Jul 9;14(7):14240-69. doi: 10.3390/ijms140714240. PMID: 23839094; PMCID:
PMC3742242.
3. Chaudhry R, Varacallo M. Biochemistry, Glycolysis. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov
books/NBK482303/

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