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A proprietary fertilized chicken egg extract significantly upregulates proliferation and migration of cultured human dermal fibroblasts and their deposition of new collagen, elastin and fibronectin

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Statement of the Problem: Fertilized avian egg extracts are used previously as a food supplement. However, their final composition and activity varied, due to chicken diet, egg incubation time, and final processing techniques. Here we report the pilot study on skin regenerative effects of the fertilized egg extract prepared from chickens fed with high quality grains (LifePharm Inc., Lake Forest, CA) and not exposed to any chemicals.

Methodology & Theoretical Orientation: The 0.5-1% solutions of this extract, prepared with our proprietary method and not exposed to heat, were added to primary cultures of dermal fibroblasts, isolated from skin biopsies derived from 6 healthy 24-43 year old women. Then, the 3 and 7 day-old cultures, maintained in the presence and absence of our egg extract were assessed with quantitative immuno-fluorescence for their ability to proliferate, migrate and produce the new extracellular matrix (ECM), containing collagen, elastin and fibronectin, as previously described.

Findings: Results showed that dermal fibroblasts incubated with 0.5-1% of the egg extract revealed a statistically significant up-regulation (60-70%) in their proliferation rate (immuno-detection of the Ki67-proliferative antigen), duplication of their migration abilities (cell culture scratch assay), as well as 2-4 times higher synthesis of fibronectin and deposition of the mature (cross-linked) elastin and collagen, as compared to untreated controls. Analysis of parallel cultures incubated with several specific inhibitors of biologically active factors that would positively modulate fibroblast proliferation and synthesis of major ECM components; revealed that our egg extract contained the active Platelet-Derived Growth factor (PDGF-BB), Transforming Growth Factor β-1 and a natural matrix cross-linker, Lysyl oxidase (LOX), but not metabolic steroid hormones or major kinases, which would potentially induce well known side effects and prohibit its use for tissue regeneration purposes.

Conclusion & Significance: In summary, we conclude that our egg extract does not induce any cytotoxic effects on the matrix-producing fibroblasts and that its described beneficial effects encourage its topical application for regeneration of the damaged skin and for the treatment of the hard-healing wounds.

Biography

Kimberly Purdy Lloyd, BS (Pre-med), MS (Welch Scholar) utilizes her expertise in Applied Biochemistry and Immunology to gain deeper understanding of how naturally derived ingredients may support health benefits. She collaborates and helps design protocols with scientific experts in basic and clinical research to understand functionality, safety and efficacy of novelty ingredients and product formulations. She is Executive Research and Development Scientist for LifePharm Inc., Lake Forest, CA, providing the liaison between academia and the company to bring quality scientific knowledge towards formulation and testing ingredients that may prove beneficial in cosmetic, medical device and dietary supplement formulations. She provides interpretation of scientific discoveries and studies for educational purposes for consumers, health-care professionals and the business community to enhance their understanding of ingredient information, use and benefit when merited.

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