

Improved Proliferation and Collagen Synthesis Augmentation in Primary Human Fibroblasts Treated with Teosyal Redensity 1 (RD1) Hyaluronic Acid Solution for Skin Quality

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Objectives

Hyaluronic acid (HA) is a naturally occurring polysaccharide in the human body and is widely used in aesthetic treatments. Teosyal Redensity 1 (RD1) is a non-crosslinked 15 mg/mL high molecular weight (HMw) HA combined with several nutrients such as amino acids, and antioxidants (Teoxane SA, Geneva, Switzerland) typically injected into the dermis for skin rejuvenation. Yet, its direct effect on fibroblasts, the main dermal cells responsible for the production of collagen, remains unclear. This study aims to develop an *in vitro* model comprising the use of cell strainer inserts (CSI) mimicking gel diffusion into skin to evaluate rejuvenation effects of RD1 in terms of human skin fibroblast proliferation and collagen synthesis.



Methods

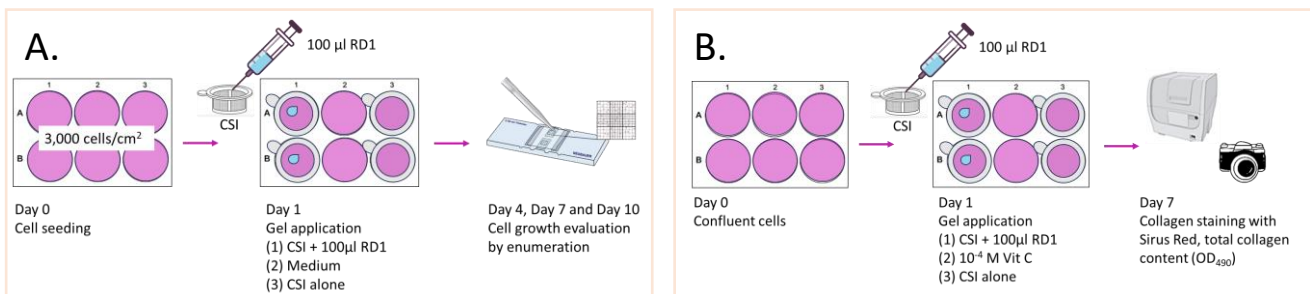


Figure 1: Experimental plan for cellular growth (A.) and collagen production (B.) Fibroblasts from polydactyly finger skin (DAL Biobank, BB_029). CSI: Cell Strainer Insert 100 µm, (Falcon #352360).

Results

Results showed that Cell Strainer Inserts have a negative impact on cellular growth probably by reducing gas exchanges (Figure 2). RD1-treated primary skin fibroblasts exhibited a drastic increase in cell number compared to the control (Figure 2).

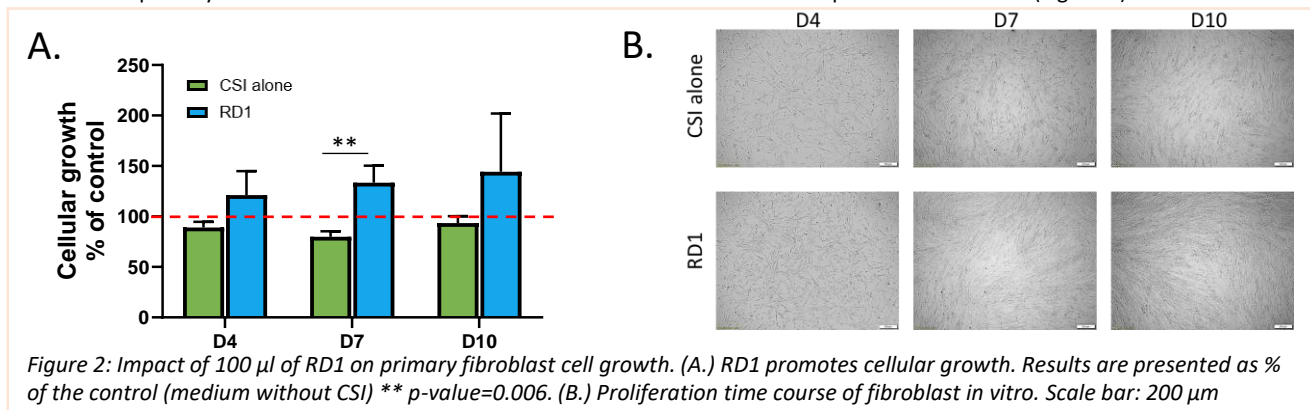


Figure 2: Impact of 100 µl of RD1 on primary fibroblast cell growth. (A.) RD1 promotes cellular growth. Results are presented as % of the control (medium without CSI) ** p-value=0.006. (B.) Proliferation time course of fibroblast *in vitro*. Scale bar: 200 µm

RD1 was as effective as Vitamin C as promoting collagen synthesis, which was markedly increased versus the untreated control (Figure 3). We confirm the ability of RD1 to act on skin quality by promoting cell proliferation and collagen production.

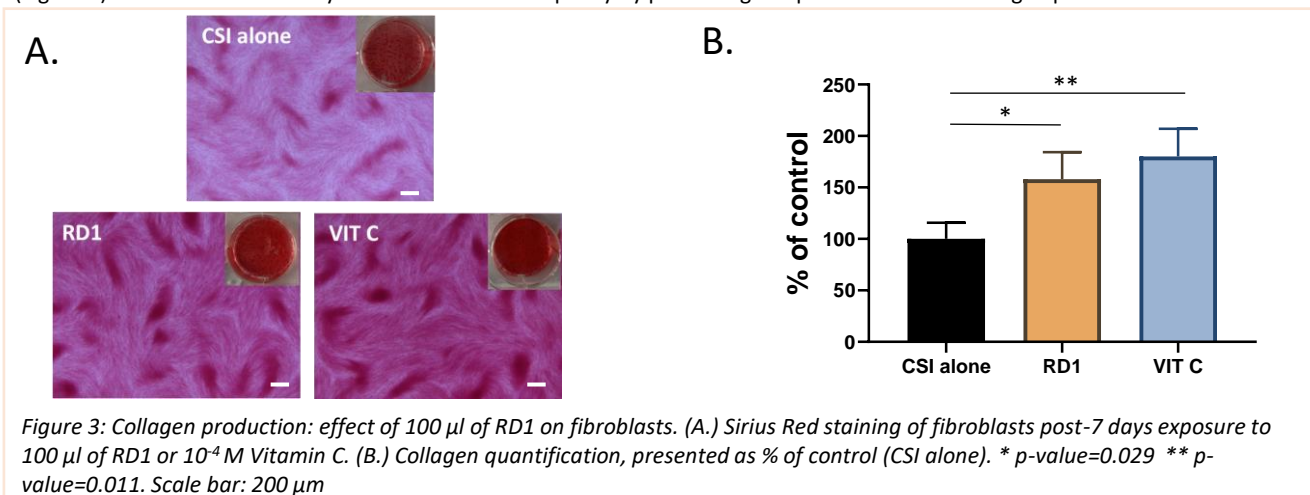


Figure 3: Collagen production: effect of 100 µl of RD1 on fibroblasts. (A.) Sirius Red staining of fibroblasts post-7 days exposure to 100 µl of RD1 or 10⁻⁴ M Vitamin C. (B.) Collagen quantification, presented as % of control (CSI alone). * p-value=0.029 ** p-value=0.011. Scale bar: 200 µm

Conclusion

We validated the use of Cell Strainer Inserts as a diffusion method to assess clinical doses of injectable products. Overall, Teosyal Redensity 1, a non-crosslinked HMw HA filler supplemented with nutrients was shown to promote both cellular growth and collagen production in human fibroblasts and this specific methodology could provide important screening parameters for injectables for skin care.