# Effect of ellagic acid on human dermal fibroblasts Elastogenesis

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S**tatement of propose:** Elastic fibers are critical connective tissue components providing elasticity and resilience to skin and other tissues. Aging in humans is marked by progressive loss in elastin, which leads to stiffening of blood vessel walls and loss of lung capacity. Elastin also plays a role in maintaining healthy skin and skin wrinkling and sagging occurs with age due to loss of elastin. Tropoelastin (TE) is the precursor monomer of elastin, and it is thought that the production of TE does not change during the aging process[1]. However, extracellular tropoelastin crosslinking to create mature elastic fibers diminishes with age. Based on previous literature, we hypothesize that polyphenols, due to its elastin binding property, may coacervate cell-secreted TE and thus increase insoluble elastin in human dermal fibroblasts (HDFs). To test this, we treated HDFs with Ellagic acid. Ellagic acid, a polyphenol found in fruits and vegetables including blackberries, raspberries, strawberries, cra nberries, walnuts, pecans, pomegranates, wolfberry, and other plant foods[2]. It possesses antioxidant, antimutagenic, and anticancer properties. We treated HDFs with 2µg/ml ellagic acid and this led to increased collagen and elastin deposition in the cell cultures.

**Materials and Methods:** P2-P4 of adipose tissue-derived stem cells (hASCs) from (ScienCell Research laboratories, Carlsbad, CA) were used for cell cultures. Cells were plated in T75 culture-treated flasks with approximately 1 million cells per flask, and culture media was changed every 3-4 days for the duration of the culture. The treated groups were treated with Fresh medium containing 2µg/ml Ellagic acid (ELA), retinoic acid (RA) or both(ELA-RA). The control group was treated with the same volume of DMSO that was added to the treated groups as a vehicle, while the volume of DMSO never exceeded 0.5% of the culture media. The cells were kept for 14, 21 and 28 days. Total deposited insoluble elastin, extra and intracellular soluble monomeric tropoelastin were quantified using a Fastin assay kit (Accurate Scientific and Chemical Corporation, Westbury, NY).

**Results and Discussion:** To test if polyphenols increase insoluble matrix elastin in cell cultures, we measured insoluble elastin. HDF cells showed almost no deposition of insoluble elastin at day 3 in any group as expected. At day 7, HDF cells treated with Ellagic acid and RA showed significant increase in insoluble elastin compared to control. By day 21, ELA-RA had the highest increased deposition of crosslinked insoluble elastin.

**Conclusions:** This study calls for further research in the matrix protein regeneration potential of this polyphenols. Further research is needed to show the applicability of this method in vivo to improve skin strength and elasticity.

**References:**

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