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The Effect of Melanin Concentration on Collagen Accumulation in Keloid

Abstract

This research arises from the revelation that colored-skin people have a high incidence of keloid, in contrast to albinos who never experience this entity. Keloid is an abnormal scar, characterized by collagen accumulation. Melanin is the most important pigment determining skin color variations in humans. The correlation between increased melanin concentration and collagen accumulation was assumed to be linked to pH. An experimental laboratory research was performed, employing the principle of biochemical reaction between collagen and collagenase, to observe pH in various concentrations of melanin, and collagen-collagenase reactions under various pH and in different concentrations of melanin (n=73). A cross sectional observational research was performed on keloid, evaluating tissue pH, melanin concentration and collagen concentration (n=30). Research data were analyzed using t-test and regression statistical methods. The results of this research demonstrated that there was a significant difference between the results of absorbance under pH≤7.2 and pH>7.2 (p<0.05). Melanin concentration increased in proportion to its decreased pH (p<0.05). Decreased pH led to decreased collagen degradation (p<0.05). Increased melanin concentration gave no effect on collagen degradation (p>0.05), due to the effect of assay buffer used. All keloid tissues possessed a pH of ≤7.2. Melanin increased in proportion to its decreased pH (p<0.05). Decreased pH caused increased collagen concentration (p<0.05). Increased melanin concentration led to increased collagen concentration (p<0.05). Increased melanin concentration and decreased pH progressively increased collagen concentration (p<0.05). This research concludes that melanin plays a role in collagen accumulation by decreasing the pH that eventually disrupts collagen degradation process.

Keyword : keloid, melanin, pH, collagen, synthesis, collagen, degradation, collagenase, 

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