Lecithin-Retinol Acyl Transferase in Squamous Cell Carcinoma: The Relationship between Oncology and Wound Repair

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Squamous cell carcinoma (SCC) is an invasive type of skin cancer that lacks expression of lecithin-retinol acyl transferase (LRAT), a protein implicated in wound healing and cancer progression. It is purported that cancer exploits healthy cellular mechanisms like wound repair processes in order to pose a threat to the human body through metastasis and bulk tumor formation. The purpose of this study was to explore the molecular mechanisms by which LRAT can affect cancer and wound repair with the eventual goal of improved patient treatment. This in vitro study utilized two previously established SCC cell lines, namely SCC13 suppressing LRAT expression (control) and SCC13 expressing LRAT. A scraping assay and RT-PCR were used respectively to assess the effect of LRAT production on sheet formation and downstream gene regulation. This study also analyzed the potential of a recurring substrings algorithm to accurately predict protein functionality based on nucleotide sequence. LRAT production promoted formation of intact, cohesive skin sheets as opposed to the fragmented sheets formed by SCC13-Control. By two-weeks post-confluence, SCC13-LRAT differently regulated the transcription of genes implicated in invasion, intercellular cohesion, and coagulation. Additionally, the recurring substrings algorithm exposed segments of the LRAT sequence that exhibited homologies to sequences within wound repair mechanisms. Opportunities to improve wound healing in burn victims and halt malignant tendencies will be explored as the mechanisms of LRAT activity and its physiological applications are further studied.

Awards Won:
Fourth Award of $500