

Evaluating the use of aqueous rooibos tea extracts as inhibitors of inflammation in UVB-irradiated skin keratinocytes

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Overexposure to UVB has been associated with up to 90% of skin cancer cases with the two most common being; basal and cutaneous squamous cell carcinoma. These malignancies result from the persistent exposure to UVB leading to neoplastic transformation of the pre-cancerous lesions (actinic keratosis) in skin keratinocytes. Previous studies have explored the potential use of botanical-derived polyphenolic products as anti-inflammatory agents and possible cancer prevention modalities. In these studies, herbal tea extracts such as *Cyclopia intermedia* and *Aspalathus linearis* (rooibos) tea extracts were shown to modulate inflammatory signals and aid in the removal of UVB-damaged skin keratinocytes by apoptosis, thereby potentially preventing cancer initiation and promotion. The current study evaluates the anti-inflammatory and cancer preventative properties of unfermented (AqRgU) and fermented (AqRgF) aqueous rooibos tea extracts. Sub-lethal doses of tea extracts were assessed for the ability to remove UV-damaged cells by apoptosis and act as inhibitors of the expression of known inflammatory markers. Our results showed comparable IC50 values across the cell lines tested with selectivity indices of >1 in normal (CRL7761 and HaCaT) versus the cancer cell line (CRL7762), in addition, tea extracts were successful in removing damaged cells by apoptosis. The data show that tea extracts were able to inhibit UVB-induced COX-2 mRNA expression after 4 hours and IL-1 α mRNA expression at 4 and 24 hours. Interestingly, both AqRgU and AqRgF inhibited UVB-induced COX-2 protein expression after 24 hours with AqRgU showing inhibition from 4 hours. Future work will assess protein levels of other inflammatory markers. This work will aid in determining the molecular events that underpin the anti-inflammatory and cancer preventative properties of rooibos tea extracts whilst also serving as a proof of concept for the more extensive, highthroughput biomarker discovery studies.

Keywords: UVB, inflammation, skin keratinocytes, COX-2, rooibos tea, cancer prevention