

Green tea catechins exhibit protective effects against UVR-induced skin inflammation *in vivo* and in relation to reduced levels of 12-HETE

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Green tea catechins (GTC) have shown protective effects against ultraviolet radiation (UVR)-induced skin inflammation. However, the majority of these findings are based on experimental models and there is a limited number of human studies. Furthermore, the cutaneous bioavailability of GTC is not known and the mechanism of photoprotection has not been fully investigated.

Here, we report an oral interventional study in which healthy human volunteers (n=14) took 550 mg GTC with 50 mg vitamin C daily for 12 weeks. Pre- and post-supplementation, skin was exposed to a UVR dose range and resultant erythema quantified with a reflectance instrument. Skin blister fluid and biopsy samples were taken from unexposed and UVR-exposed skin at 24h following a pro-inflammatory UVR challenge (3 minimal erythema doses). Urine and skin samples were analysed for catechin content, and blister fluid for eicosanoid production, by liquid chromatography coupled to electrospray ionisation tandem mass spectrometry.

Urine GTC analysis confirmed the compliance of the participants. Results showed that GTC were taken up by the skin whilst a reduction in UVR-induced erythema was observed: erythema index at the highest UVR dose fell from 100.2 ±21.4 pre- to 81.2±23.2 post- supplementation (p=0.006). The pro-inflammatory eicosanoids PGE₂ and 12-HETE were significantly up-regulated by UVR (p=0.003, p=0.0001, respectively); however, after GTC, UVR-induced 12-HETE was reduced (64.4 ±42.2 to 41.3 ±32.2 pg/μl; p=0.01), while PGE₂ was unchanged.

These results show that GTC intake may contribute to protection against sunburn inflammation whilst the reduction in the tumour promoter 12-HETE may justify their role as chemopreventive agents.