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The Effect of Green Tea Catechin Consumption on DNA Damage Markers in Healthy Human Skin after UVR Insult – A Double-Blinded Randomised Controlled Trial

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Consumption of green tea catechins (GTC) is reported to protect against ultraviolet radiation (UVR)-induced skin carcinogenesis in mice, while topical application prior to UVR exposure reduces UVR-induced DNA damage in human skin. We aimed to determine whether GTC ingestion can protect against direct and oxidative DNA damage, i.e. cyclopyrimidine dimers (CPD) and 8-hydroxy-2'-deoxyguanosine (8-OHdG), following UVR challenge of healthy humans *in vivo.* Volunteers (skin type 1/2, n=49, age range 18-65) were recruited and randomised to receive 1080mg GTC with 100mg vitamin C, or identical-appearing control capsules, daily for twelve weeks. Compliance was assessed by urinary catechin metabolite analysis. Buttock skin biopsies were taken from unexposed skin and skin 24h post-exposure to 3x minimal erythema doses of UVR (290-400nm) pre- and post-supplementation. Damage biomarkers were assessed by immunohistochemical staining of frozen skin sections (5μm). A primary antibody dilution of 1:100 for CPD and 1:200 for 8-OHdG was used, with a Vector Impress secondary mouse antibody. Slides were imaged under light microscopy and number of positively stained nuclei per 1000μm^2 counted. Statistical analysis was by Student's t-test. Data were available for 21 control and 19 active subjects. Due to high level of baseline 8-OHdG staining in all subjects, no data could be generated for 8-OHdG. Pre-supplementation, CPD increased following UVR, from 0.17 cells/1000μm^2 to 3.69 cells/1000μm^2, $p<0.01$, while no significant difference was found between groups post-supplementation, $p=0.96$, estimated difference 0.13 cells per 1000μm^2, CI -0.07 to 0.34. Hence, there was no evidence of a protective effect of oral GTC against the direct DNA damage remaining in skin cells at 24h post UVR challenge in humans *in vivo*. More detailed assessment of impact on DNA damage and repair is ongoing.