The green tea polyphenol (−)-epigallocatechin gallate and green tea can protect human cellular DNA from ultraviolet and visible radiation-induced damage

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**Background:** Antioxidant compounds in green tea may be able to protect against skin carcinogenesis and it is of interest to investigate the mechanisms involved. A study was therefore conducted to determine whether the isolated green tea polyphenol (−)-epigallocatechin gallate (EGCG) could prevent ultraviolet radiation (UVR)-induced DNA damage in cultured human cells. This work was then extended to investigate whether drinking green tea could afford any UVR protection to human peripheral blood cells collected after tea ingestion.

**Methods:** The alkaline comet assay was used to compare the DNA damage induced by UVR in cultured human cells with and without the presence of EGCG. The same assay technique was then employed to assess UVR-induced DNA damage in peripheral leucocytes isolated from 10 adult human volunteers before and after drinking 540 ml of green tea.

**Results:** Initial trials found that EGCG afforded concentration-dependent photoprotection to cultured human cells with a maximal activity at a culture concentration of 250 μM. The cells types tested (lung fibroblasts, skin fibroblasts and epidermal keratinocytes) demonstrated varying susceptibility to the UVR insult provided. The *in vivo* trials of green tea also demonstrated a photoprotective effect, with samples of peripheral blood cells taken after green tea consumption showing lower levels of DNA damage than those taken prior to ingestion when exposed to 12 min ultraviolet A (UVA) radiation.

**Conclusion:** The studies showed that green tea and/or some constituents can offer some protection against UV-induced DNA damage in human cell cultures and also in human peripheral blood samples taken post-tea ingestion.

**Key words:** antioxidants; comet assay; green tea; skin cancer; ultraviolet radiation.