

Novel Anti-Cancer Properties of Gold Lotion in Human Cancer Cells and Animals via Autophagy and Apoptosis

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A mixed citrus peel product known as Gold lotion (GL) is made from the peels of six citrus fruits available in Japan including navel oranges, Citrus hassaku, Citrus limon, Citrus natsudaikai, Citrus miyauchi and Satsuma, has been demonstrated to have antioxidant, anti-inflammatory and immunomodulatory effects. GL is safe and non-toxic for oral and topical applications as demonstrated by independent study from Huntington Research Center, UK. GL is rich in flavonoids including a high percentage of polymethoxyflavones (PMF) and was initially used in Japan as a cosmetic to protect skin from UV radiation. In a mouse skin cancer model, the topical application of GL effectively inhibited molecular markers of skin inflammation and skin tumor formation by reducing the tumor incidence and tumor multiplicity of papillomas at 20 weeks of treatment. These in vivo data indicate that GL can be used as an effective antitumor agent capable of preventing inflammation associated with skin tumorigenesis. Topical application of GL also prevented TPA-induced skin inflammation and tumor formation. GL also have demonstrated potent anti-cancer efficacy against melanoma, prostate and lung cancer in cultured cancer cells as well as in animal models. Oral administration of GL protected mice against azoxymethane-induced aberrant crypt foci in colonic tissues. GL administration induced programmed cell death (apoptosis) in CL1-5 lung cancer cell line. GL also induced late autophagy in CL1-5 cells. Furthermore, GL inhibited CL1-5 luciferase tumor growth in vivo. GL treatment was also able to shrink prostate tumor significantly. Together, the above studies demonstrate that GL has broad spectrum safety and anti-cancer, anti-angiogenic and anti-tumor properties. Thus, GL may have new therapeutic option for colon and prostate cancer without any adverse event. The therapeutic mechanism of GL may include inhibition of inflammation, proliferation, angiogenesis and induction of apoptosis.