Anticarcinogenic Effects of \( \alpha \)-Mangostin: A Review

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Fig. 1S Biochemical basis of α-MG as a cancer chemopreventive agent. Carcinogenesis is a multistep process that initiates with cellular transformation of normal cells into initiated cells, progresses to preneoplastic cells, and culminates in complete malignant metastatic cells. As a chemopreventive agent, α-MG intervenes in multistages of carcinogenesis: (i) obstructing the initiation phase through modulation of phase I and II enzymes, antioxidant activity, or attenuation of inflammation (blocking agent); (ii) retarding the promotion and progression phases through the induction of cell cycle arrest and/or apoptosis, as well as the suppression of angiogenesis, invasion, and metastasis (suppressing agent). Arrow headlines indicate that these molecules are upregulated by α-MG, whereas blunt headlines indicate a decrease or inhibition.
Fig. 2S α-MG acts as a cancer-blocking agent obstructing cancer initiation. The major causes of cancer initiation include carcinogen attack, oxidative stress, and chronic inflammation. α-MG blocks the initiation of carcinogenesis by (i) modulating phase I and phase II enzymes to inhibit metabolic activation of carcinogens and stimulate detoxification of carcinogens; (ii) counteracting oxidative damage via directly scavenging free radicals, inhibiting the activity of aSMase, and increasing the activity/expression of antioxidant enzymes; and (iii) attenuating inflammatory response and accompanied oxidative damage. Arrow headlines indicate that these molecules are upregulated by α-MG, whereas blunt headlines indicate a decrease or inhibition.
Fig. 3S α-MG acts as a cancer-suppressing agent retarding cancer promotion and progression. Carcinogenesis involves aberrant and disrupted intracellular signaling networks, which result in the dysfunction of key cellular proliferation control, apoptosis regulatory proteins and checkpoints, or even promote the angiogenic, invasive, and metastatic potential. α-MG induces cell cycle arrest through modulating the levels of p53, p21, cyclins, and CDKs. It also induces apoptosis through both extrinsic and intrinsic pathways by modulation of proapoptotic and antiapoptotic proteins. α-MG inhibits cell proliferation, angiogenesis, invasion, and metastasis by modulating MAPKs, PI3K/Akt, NF-κB, STAT3, and AP-1 pathways. Arrow headlines indicate that these molecules are upregulated by α-MG, whereas blunt headlines indicate a decrease or inhibition.