Harnessing Anti-Inflammatory and Immunomodulatory Potentials from Nature for Cancer Therapy

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Inflammation plays crucial roles in tumorigenesis. Cancer cells evade immune surveillance by recruiting myeloid-derived suppressor cells and T-regulatory cells, releasing inflammatory mediators, and activating immune inhibitory checkpoint molecules on T cells. Despite significant cancer immunotherapy success, with multiple checkpoint inhibitor approvals, drug resistance and therapy associated immune-related adverse events (irAEs) are rising. Thus, novel immune modulating drugs possessing antioxidant, anti-inflammatory, immune activating, and anti-cancer potency with manageable irAEs are desirable. My project characterizes the immunomodulatory potentials of 12 crude plant extracts. Anti-oxidation assay showed significant antioxidant activity in Scutellaria and Paeoniae. Eucommia, Angelica, and Astragalus had high anti-inflammatory activity in the albumin denaturation assay. Certain extracts, single or combined, significantly ($p<0.01$) and dose-dependently inhibited yeast growth in anti-microbial tests. Chaenomelis, Scutellaria, and Paeoniae extracts showed time, dose-dependent, and combinatorial cytotoxic effects in brine shrimp bioactivity assay. Eucommia, Angelica, and Astragalus extracts significantly ($p< 0.05$) and dose-dependently inhibited TGF-b1 expression in lipopolysaccharides-treated lymphocytes, a novel finding. Only Eucommia reduced the TNFa release. Scutellaria, Eucommia, Angelica, and Astragalus extracts dose-dependently inhibited growth of cancer cells. In summary, extracts from 12 plants showed antioxidant, anti-inflammatory, and anti-proliferative potency. These results warrant active ingredient identification that can reduce inflammation and enhance immune and anti-cancer functions, used as adjuvants, monotherapy, or in combination, for cancer therapy.