O76
(-)Epigallocatechin-3-gallate (EGCG), a Polyphenolic Compound in Green Tea, Protetcs Against Endothelial Cells Inflammation via Oxidized LDL

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Background Atherosclerosis is an inflammatory disease . Oxidized low-density lipoprotein (oxLDL) is a major risk factor for accelerating atherogenesis. (-)-Epigallocatechin-3-gallate (EGCG), the main catechin in green tea, has been well known about its benefits of anti-oxidant effects. However, its protective effects inhibit oxidized LDL-induced endothelial cell dysfunction and inflammation still unclear. Objective In this study, we examined whether EGCG prevents oxidized LDL-induced human umbilical vein endothelial cells and to investigate the potential mechanisms. Methods Primary human umbilical vein endothelial cell cultures (HUVECs) incubated with oxLDL(130 mg/ml) to induce endothelial cytotoxicity and inflammation. EGCG supply to confer the protective effects of oxidized LDL-induced oxidative stress. Inflammatory protein expression of NF-κB, IκB phosphorylation was observated by western blot assay and immunohistochemistry. Adhesion molecule expression of intercellular adhesion molecule (ICAM), E-selectin , vascular cell adhesion molecule (VCAM) were investigated by flow cytometry. Proinflammatory cytokine release such as interleukin-8 (IL-8) and Endothelin-1(ET1) were investigated by Enzyme-Link Immunosorbent Assay(ELISA). Finally, observated for mRNA expression of ET1, VCAM and ICAM by Real-time PCR. Results EGCG attenuated the endothelial cytotoxicity and inflammation via oxidized LDL in evidence. EGCG could against inflammatory protein expression, including NF-κB and IκB phosphorylation. EGCG inhibits adhesion molecule expression further to contribute adherence of monocytic THP1 cells and proinflammatory cytokines release. EGCG knocks down inflammatory mRNA expression advantageously. Conclusion Our study confirm the EGCG possessed the activity to prevent oxidized LDL-induced cytotoxicity in endothelial cells, implying that EGCG has a potential role in the prevention of atherosclerotic vascular disease.

O77
Dunaliella salina Induced Apoptosis and Cell Cycle Arrest in Human Leukemia HL-60 Cells

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Dunaliella salina (D. salina) is a unicellular biflagellate green alga. Some reports demonstrated that D. salina exhibited antioxidant activity and liver protection. In this study, the extract of D. salina had a dose- and time- dependent cytotoxic effects on various human leukemia cell lines, including HL-60, KG-1, K-562, MOLT-4 and Jurkat T cells but not normal peripheral blood mononuclear cells (PBMC). D. salina extract could dramatically reduce the viability by inducing the apoptosis in HL-60 cells as demonstrated by morphological changes, DNA fragmentation and flow cytometry. The D. salina extract-induced apoptosis of HL-60 cells was associated with activation of caspase-9 and caspase-3 and the addition of a pen caspase inhibitor, Z-VAD-FMK, partially inhibited D. salina extract-induced apoptosis. In addition, mitochondrial membrane potential was decreased which was associated with a shift in Bax/Bcl-2 and Bad/Bcl-xL ratio. Moreover, D. salina extract treatment of HL-60 cells resulted in G1 arrest in cell cycle progression which was associated with decrease in the protein expression of cyclin A, D1, and E and their activating partner CDK2, 4 and 6 with concomitant induction of WAF1/p21 and KIP1/p27. This is first reported that D.salina has anti-leukemia effects by caspase-dependent apoptosis through mitochondrial pathway and blocking cell cycle progression via CDK inhibitors. Although analysis of these two pathways should be clarified further, the applicant of D.salina may be considered as a potential therapeutic agent.

O78
Gallic Acid Induced Cell Cycle Arrest at G2/M Phase via Regulating Checkpoint Kinase 1-Mediated Phosphorylation of Cdc25C in Bladder Cancer Cell

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Phenolic acids were studied on prevention or therapy in human malignancies including bladder cancer. However, the molecular mechanism on anticancer effects of phenolic acids is not yet elucidated. Here we addressed the effect of gallic acid (GA) on cell cycle modulation in human bladder transitional cell carcinoma (TCC, TSGH-8301 cells). TSGH-8301 cells treated with GA showed cell cycle arrest at G2/M phase and represented decreases in cyclin-dependent kinase and cyclins but a significant increase in Cip/p21. The results showed GA decreases the protein levels of cdc25A, cdc25B, cdc25C, cyclin B1 and cdc2. GA treatment also demonstrated in a sustained phosphorylation of cdc25C at Ser-216 to bind to 14-3-3β leading the translocation of cdc25C from the nucleus to the cytoplasm. Furthermore, GA also resulted the activation of checkpoint kinase 1 (Chk1) as a DNA damage response evidenced by increased phosphohistone 2AX (H2A, X). In conclusion, these findings indicated that Chk1-mediated phosphorylation of cdc25C plays a major role in irreversible G2/M arrest by GA in human TCC cells.