

## Biophysical characteristics of proteins and living cells exposed to the polyphenol

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### Abstract

**Introduction:** Traditional medicines and Herbs have been applied for thousands of years, but researchers started to study their role of action at the molecular and cellular levels only in last years. Here investigate the molecular scale interactions of proteins and polyphenols with special focus on its limited stability and antioxidant properties. Here observed biophysical effects of different polyphenols on various cell lines and cultures. The changes of cell adhesion, motility, migration, stiffness, apoptosis, proliferation as well as the different efficacy on normal and cancer cells are all covered here.

**Methods:** Cell motility and cell stiffness are closely related to metastatic activity of cancer cells. Studies on cell stiffness using atomic force microscope (AFM). Here we study on the effects of polyphenols on cell motility, cell stiffness, and expression of vimentin and Slug, which are molecular phenotypes of epithelial–mesenchymal transition (EMT). Indicating that polyphenols induces inhibition of EMT phenotypes by alteration of membrane organization. Human tumor necrosis factor (TNF) is a critical mediator of inflammatory chronic diseases, which play key role in combination with polyphenols.

**Results and discussion:** Results strongly indicate that membrane organization directly reflects cell motility and cell stiffness. Also polyphenols treatment resulted in a dose-dependent (i) inhibition of cell growth, (ii) G0/G1-phase arrest of the cell cycle, and (iii) induction of apoptosis.

**Conclusion:** Polyphenols has been shown to inhibit spontaneous metastasis of cancer cell. Polyphenols can suppress TNF- $\alpha$  activated inflammatory pathways both in vitro and in vivo.

**Keywords:** Biophysical characteristics, Cancer, Polyphenols, Proteins, TNF, EMT

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