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Influence of epigallocatechin gallate on artificial lipid membranes

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Abstract:

Epigallocatechin gallate (EGCG) is a natural flavonoid from the tea plant (*C. sinensis*), with reported antioxidant and other health beneficial effects. The Black Lipid Membranes (BLM) method has been used to examine the interaction between EGCG and artificial lipid bilayers, as reflected by recorded changes of the membrane electrical parameters (capacitance and conductance). Experiments were performed at constant EGCG concentrations in the BLM cuvettes and at increasingly higher concentrations, applied on both sides of the membrane. At constant EGCG concentrations, a statistically significant difference ($p < 0.05$) has been noticed between insertion slopes at 5 mM and 20 mM, but not between the 20mM and 50mM EGCG concentrations. This might suggest saturation of insertion at higher EGCG concentrations.

In the presence of increasing EGCG concentrations the conductance showed non-significant statistical fluctuations, a possible clue to a non-disruptive insertion of EGCG in the lipid bilayer (different from results reported for other flavonoids). The biphasic capacity curve had an initial decrease followed by a slight increase and a plateau. While the descendent phase is probably more dependent on the membrane geometry, the ascendent phase could reflect competition between antagonistic effects on capacitance of the increasing membrane thickness and changes of the dielectric constant.

Our results suggest concentration-dependent effects of EGCG on lipid membranes, to be accounted for the usage of EGCG as a dietary supplement.

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