

Abstract of Presentation

Note: This paper should be typed in “Times New Roman” of 12pt.

Name (Underline the family name)

Tsutomu Nakayama

Presentation Title(Should be no more than 20 words):

Chemical Biology of Tea Catechins

Abstract :

Tea is the second highest drink consumed in the world, next to water. The research on tea and health has been conducted worldwide. Green tea is well known for its various physiological effects, and much research has focused on tea catechins, but there are few studies that relate the mechanism of the biological activities of the catechins to their chemistry. Recently the importance of chemical biology, a domain of science of biological systems through the application of chemical techniques and tools, is recognized. In Japan recent researches on chemical biology of tea catechins have produced excellent results to clarify the interaction of these compounds with biological substances such as proteins, lipids and nucleic acids. The following are some examples of the studies proceeded in our laboratory.

Among tea catechins, (-)-epigallocatechin-3-gallate (EGCg) has been reported to have beneficial properties including chemopreventive, anticarcinogenic and antioxidant actions. The interaction of EGCg with proteins may be related to its functions. Using HPLC and quartz crystal microbalance, it is clarified that EGCg shows high affinity for proteins such as human serum albumin.

Interaction between tea catechins and phospholipids has been investigated by various methods and consistent results have been obtained. The difference in their chemical structures is correlated with their affinity for phospholipid membranes and incorporated amounts into liposomes. The equivalent results were obtained by HPLC with an immobilized artificial membrane column.

Molecular-level insights into how tea catechins interact with lipid membranes were acquired using NMR spectroscopy. Isotropic bicelles and liposomes were used as model of phospholipid membranes for solution and solid-state NMR spectroscopy, respectively. Based on these studies it is proposed that epicatechin gallate (ECg) and EGCg interact with the surface of lipid membranes via the choline moiety.