Green tea epigallocatechin-3-gallate reduces atherosclerosis exacerbated by P. gingivalis
Yu Cai, Tomomi Hashimura, Ryuki Kobayashi, Tomoko Kurita-Ochiai and Masafumi Yamamoto
Nihon University School of Dentistry at Matsudo (Oral Immunology)

Key words: Epigallocatechin-3-gallate, Porphyromonas gingivalis, Atherosclerosis

Objective: Porphyromonas gingivalis has shown to be an important risk factor for cardiovascular disease, such as atherosclerosis. Dysfunctions of adherence and invasion of P. gingivalis to the endothelial cells are caused by several factors such as low density lipoprotein (LDLc), oxidized low density lipoprotein (ox LDLc), free radicals and nitric oxide (NO). Furthermore, tissue injury and inflammatory cells induce inflammatory cytokines or other cardiovascular risk factors cause the accumulation of atherosclerosis. Green tea is one of the most popular beverages worldwide. Catechins extracted from green tea have many functions, including anti-inflammatory, anti-oxidative, anti-atherosclerotic, and anti-tumor activities. In particular, (1) Epigallocatechin-3-gallate (EGCG) has shown variety of pharmacological functions and biological effects.

In this study, we have investigated the effects of EGCG on the P. gingivalis-induced atherosclerosis using mouse model.

Materials and Methods: ApoE-deficient Ldlr-/-KO mice were divided into diet and diet plus P. gingivalis three times a week over 16 weeks. After the infection, serum and livers were collected for examination of atherosclerosis-related molecules.

Results and Discussion: P. gingivalis infection remarkably increased atherosclerotic plaque accumulation in ApoE-/-K0 mice. However, EGCG treatment showed a significant reduction of the lesion areas. Protein array analysis revealed that inflammatory cytokines, chemokines and other factors related to atherosclerosis were decreased in ApoE-/-K0 mice given EGCG. In contrast, CRP and ox LDL levels were decreased only slightly. Real-time PCR analysis showed that the expression of CRP, PAI-1 and Hagem were not altered when given EGCG. These results suggest that EGCG decreases the production of inflammatory cytokines and chemokines which lead to the reduction of P. gingivalis-accelerated atherosclerosis.