

Effects of (-)-epigallocatechin-3-*O*-gallate on expression of gluconeogenesis-related genes in the mouse duodenum and in human colonic carcinoma Caco-2 cells

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Green tea has been shown to have many beneficial health effects. We have previously reported that dietary (-)-epigallocatechin-3-*O*-gallate (EGCG), the major polyphenol in green tea, caused reduced gene expression of gluconeogenic enzymes, glucose-6-phosphatase (G6Pase) and phosphoenolpyruvate carboxykinase (PEPCK) in the normal mouse liver [Koyama, Y., Abe, K., Sano, Y., Ishizaki, Y., Njelekela, M., Shoji, Y., Hara, Y., Isemura, M. (2004) Effects of green tea on gene expression of hepatic gluconeogenic enzymes *in vivo*. *Planta Med.* 70, 1100-1102.]. In the present study, we examined the effects of intragastrical administration of EGCG on the expression of gluconeogenesis-related genes in the mouse intestine. The results of experiments with the semi-quantitative reverse transcription-polymerase chain reaction indicated that EGCG at 24 mg/kg caused reduced expression of G6Pase, PEPCK, hepatocyte nuclear factor 1alpha (HNF1 α), and HNF4 α . Experiments using the quantitative real-time polymerase chain reaction confirmed EGCG's effects. We also examined the effects of EGCG using human colon carcinoma Caco-2 cells stimulated with dexamethasone and dibutyryl cAMP. The results were generally consistent with those from the experiments *in vivo*. Suppression of gluconeogenesis-related enzymes may contribute to prevent diabetes, since the disease is associated with enhanced glucose production in the post-absorptive state. Although the role of PEPCK in intestinal glyceroneogenesis has not been clearly defined, the suppression of PEPCK by EGCG may lead to less synthesis of triglycerides in the tissue. This might result in a change in the homeostasis of fat metabolism. EGCG is also a candidate for a chemopreventive agent, since HNF4 α was proposed as a target for the inhibition of colorectal cancer. Thus, the present findings suggest EGCG to contribute to the beneficial effects of green tea on diabetes, obesity, and cancer by modulating gene expression in the intestine.