

Effect of fermented papaya preparation on dermal and intestinal mucosal immunity and allergic inflammations

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A variety of food factors including natural antioxidants affect mucosal immunity, autonomic nervous system and neuro-endocrine system. Perturbation of these systems often increases the generation of reactive oxygen species (ROS) and affects gastrointestinal functions thereby inducing mucosal allergic reactions and inflammatory bowel diseases. Allergic reactions, such as hay fever and contact dermatitis, increased rapidly during the last 50 years and became one of the major issues in Japan, suggesting the marked changes in the reactivity of mucosal immunity and neuro-immune network. Previous studies by Mori et al revealed that fermented papaya preparation PS501 decreased ROS generation and effectively inhibited oxidative stress-induced GSH decrease in neuronal cells and protected them from apoptosis through antioxidant- and bax/bcl-2-sensitive pathway(s). We hypothesized that PS501 may have activity to modulate mucosal neuro-immune network. To test this hypothesis, we studied the effect of PS501 on the type IV allergic reactions in the skin and intestine. Th1-dependent type IV and Th2-dependent mucosal allergic reactions were elicited in the skin and intestine of male ICR mice by repeated sensitization with FITC and oxazolone, respectively. Oral administration of PS501 inhibited the allergic reaction elicited by FITC and oxazolone in the skin and mucosa in the large intestine with concomitant suppression of the increase in plasma levels of IL-2 and IL-10. Based on such observations, we will discuss the mechanism by which PS501 modulated the mucosal immunity and suppressed allergic inflammation in the skin and intestine.