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**Protective effect of Choto-san and its related constituents on hydrogen peroxide-induced cell damage in NG108-15 cells.**

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**[Introduction]** Oxidative stress plays an important role in the pathogenesis of various neurodegenerative diseases due to the reactive oxygen species. It has been reported that Choto-san has an effect on treatment of vascular dementia in clinical study and also show a protective effect on transient cerebral ischemia induced cognitive impairment in mice. In order to investigate the role of Choto-san in protecting neuron from degeneration, we used NG108-15 cell line as a model system to study the protective effect of Choto-san and its related constituents against hydrogen peroxide induced cell damage.

**[Result and Discussion]** Treatment with  $H_2O_2$  (100-750  $\mu M$ ) significantly induced cell death in a concentration dependent manner. Incubation of the cells together with  $H_2O_2$  (500  $\mu M$ ) and Choto-san (250-1000  $\mu g/ml$ ), Chotoko (250-1000  $\mu g/ml$ ), Choto-san without Chotoko (500-1000  $\mu g/ml$ ), epicatechin (200  $\mu M$ ), caffeic acid (200  $\mu M$ ), or quercetin (200  $\mu M$ ) significantly increased cell viability in a concentration dependent manner compared with exposure to hydrogen peroxide only. Pretreatment with Chotoko (500-1000  $\mu g/ml$ ) or epicatechin (200  $\mu M$ ) 1.5 hours before  $H_2O_2$  exposure significantly increased cell viability. However, no significant increased in cell viability were seen in pretreatment with Choto-san (62.5-1000  $\mu g/ml$ ), Choto-san without Chotoko (62.5-1000  $\mu g/ml$ ), caffeic acid (25-200  $\mu M$ ), or quercetin (25-200  $\mu M$ ). The present results suggest that Choto-san and its related constituents have a protective effect on hydrogen peroxide-induced cell damage in NG108-15 cells and this effect may at least partly result from its antioxidant and free radical scavenging properties. They may react with hydrogen peroxide or free radicals derived from hydrogen peroxide in the culture medium and then prevent free radicals reaching the cells. The protective effect of pretreatment of the cells with Chotoko or epicatechin on cell viability show that these compounds may be taken up by the cell and elicit some changes that protect them from hydrogen peroxide toxicity.