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Protective effects and mechanisms of Alaska pollock skin derived collagen peptides on intestinal mucosal barrier function

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Statement of the Problem: Intestine, a tightly regulated barrier responsible for nutrients absorption and defense against noxious molecular and organisms, has been recognized as a key factor involved in the pathogenesis of food allergy, inflammation bowel disease, celiac disease and development of immune and organ dysfunction after burn and critical illness. Thus, the protection of intestinal barrier function is regard as a pivotal target for health and improve the prognosis of critically ill patients. Collagen peptides (CPs) have been shown to have broad spectra of physiologic and pharmacological properties and confirmed as a safe nutritional supplement for the development of functional food by many international organizations.

Purpose: The purpose of this study is to investigate the protective effects of CPs on intestinal barrier function in vitro and in vivo.

Findings: Collagen peptides derived from Alaska pollock skin could attenuate TNF- α induced barrier dysfunction of Caco-2 cells and burn induced intestinal barrier disruption of mice via inhibiting the NF κ B and MAPKs-mediated MLCK pathway with associated reorganization and decreases of tight junction protein ZO-1 and occludin.

Conclusion & Significance: This study first systematically studied and elucidated the protective effect of Alaska pollock skin derived collagen peptides on intestinal mucosal barrier function and its mechanism. It not only provides a theoretical basia for the development of CPs supplemented functional foods, but also offers a new strategy for the patients suffering from intestinal barrier dysfunction.

Recent Publications

- 1. Turner J R (2009) Intestinal mucosal barrier function in health and disease, Nature Review Immunology 9: 799–809.
- 2. Mittal R, Coopersmith C M (2014) Redefining the gut as the motor of critical illness. Trends in molecular medicine 20, 214–223.
- 3. Groschwitz K R Hogan S P (2009) Intestinal barrier function: molecular regulation and disease pathogenesis. Journal of Allergy and Clinical Immunology 124: 3-20.
- 4. Silva T H, Moreira-Silva J, Marques A L, Domingues A, Bayon Y, Reis R L (2014) Marine origin collagens and its potential applications. Marine drugs 12: 5881-901.
- 5. Shen L, Black E D, Witkowski E D, Lencer W I, Guerriero V, Schneeberger E E, Turner J R (2006) Myosin light chain phosphorylation regulates barrier function by remodeling tight junction structure. Journal of Cell Science 119: 2095-106

Biography

Qianru Chen has her passion and expertise in food science and nutrition. She is committed to the study of the health benefits of bioactive collagen peptide derived from marine materials. Her research on the relationship of fish skin derived collagen peptides and intestinal barrier function provides a potential therapy for improving gut health and a new way in collagen peptides based functional food development.

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