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*LETTERS TO THE EDITOR*

# Inactivation of digestive proteases: Another aspect of gut bacteria that should be taken into more consideration

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## TO THE EDITOR

Protein has been one of the main components of our diet, and a large amount of digestive proteases is released into the gut for their digestion. However, these proteases can digest not only the proteins we eat, but also the structural proteins built in our body. To protect against this damage, our body has taken a variety of measures. For instance, these digestive proteases are stored and secreted in the form of zymogen and only activated in gut lumen[1]. These luminal digestive proteases are further prevented from direct contact with epithelial cells by the mucus layer that is incessantly secreted by the goblet cells in gut mucosa[2]. In addition, large quantities of protease inhibitors are produced in the body to inactivate the digestive proteases that have entered the body[3]. Despite these measures, the protection seems still weak and can be easily compromised. For instance, studies have well shown that pancreatic proteases play a critical role in mucosal damage induced by hemorrhagic and endotoxic shock[4,5], ischemia-reperfusion[6,7], stress[5], acute radiation[8], or agents such as indomethacin[9], ibuprofen[10], or oleic acid[11]. Gut damage can be greatly alleviated by inhibition of these digestive proteases[4,6], ligation of the pancreatic duct[12,13], or pancreatectomy[14]. Conversely, intraluminal injection of trypsin aggravates the lesion of the mucosa[15]. Therefore, a prompt inactivation of these digestive proteases may play an important protective role against this digestive damage. Under conventional condition, digestive proteases are effectively inactivated at the lower intestine, which depends on certain kinds of bacteria in the gut[16,17]. An inhibition of gut bacteria by factors such as saccharin, and the resulting impairment in protease inactivation and over-digestion of the mucosa may play a causative role in IBD[18,19]. It may also contribute to the increased intestinal permeability and the development of many other autoimmune and allergic diseases such as multiple sclerosis, type I diabetes, asthma, and atopic dermatitis, which seem to be associated with improved hygiene condition and reduced bacteria exposure[20]. Therefore, besides the immune regulatory and toxic effect of gut bacteria on the host, the role of gut bacteria in protease inactivation would be another aspect that should be taken into consideration.

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