【Biological Sciences（Agricultural sciences）】

Studies on the phased immune-barrier systems in gut-liver axis focusing on immune responses of mesenchymal cells

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【Outline of survey】

Gut facing directly external environments and liver directly connected to this organ possess highly developed immune systems. “Gut-Liver Axis” has recently been proposed because these organs mutually defend against the external interferences. Many of the previous studies have focused on professional immune cells. However, it still remains unknown how mesenchymal cells, distributed around the immune cells with much larger size, behave against the interferences. In this study, we attempted to hypothesizes that mesenchymal cells provide not only the spatial environment for immune cells but also play critical roles to provide immune responses after having initial activation with professional immune cells in the “Gut-Liver Axis”.

【Expected results】

In this study, we are focusing on the phenotypic changes and acquiring immune activity of mesenchymal cells (smooth muscle cells, myofibroblasts, endothelial cells, interstitial cell of Cajal etc. which line in the Gut-Liver Axis) after the inflammatory stimuli. We will produce new evidences that these mesenchymal cells might contribute to immune response by synthesizing broad range of inflammatory mediators and signaling proteins by communicating with professional immune cells. The results will provide newer strategies for the treatment of diseases characterized by inflammation of gastrointestinal tract and liver, such as inflammatory bowel disease (ulcerative colitis and Crohn’s disease: IBD), functional gastrointestinal diseases, virus hepatitis, alcoholic hepatitis, nonalcoholic steatohepatitis (NASH), and cirrhosis. The results will also pose useful method for the nutritional management and the treatment of chronic gastrointestinal diseases of domestic animals.

【References by the principal investigator】

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- **Ohama T, Hori M, Momotani E, Elorza M, Gerthoffer WT, Ozaki H (2007)** IL-1β inhibits intestinal smooth muscle proliferation in an organ culture system: Involvement of COX-2 and iNOS induction in muscularis resident macrophages. **Am J Physiol** 292: G1315-G1322.
- **Oka T, Hori M, Ozaki H (2005)** Microtubule disruption suppresses allergic response through the inhibition of calcium influx in the mast cell degranulation pathway. **J Immunology** 174, 4584 - 4589

【Term of project】 FY2008－2012

【Budget allocation】 **117,300,000 yen** (direct cost)

【Homepage address】 http://www.vm.a.u-tokyo.ac.jp/yakuri/kiban-s/