

Molecular mechanism of cytokine signal and immune regulation

Akihiko Yoshimura

(Kyushu University, Medical Institute of Bioregulation, Professor)

【Outline of survey】

Hematopoietic growth factors, cytokines and their cytokine receptors have been identified, and intracellular signal transduction pathways have also been clarified. However, regulatory mechanism of signaling of cytokines remains to be investigated. We have found the CIS/SOCS family and the Sprouty/Spred family, which are deeply involved in the regulation of immune system and hematopoiesis. In this study, we will uncover the molecular mechanism of cytokine signaling regulation as well as its relationship to disruption of immunological homeostasis. We will also investigate the molecular mechanism for diseases cause by the disruption of homeostasis, and discover a novel mechanism for immune regulation, signal transduction and immune regulation.

【Expected results】

(1) We will define the relationship between cytokine signal regulation and immunological tolerance. We will find an effective therapeutic for autoimmune diseases and allergic diseases which are caused by disruption of such immunological tolerance.

(2) We will discover the molecular basis and a new therapeutic for inflammatory diseases and cancer.

(3) We will define the relationship between metabolic and neurological diseases and immune systems, which have not been clearly understood as immunological disorders.

【References by the principal researcher】

• Taketomi T, Yoshiga D, Taniguchi K, Kobayashi T, Nonami A, Kato R, Sasaki M, Sasaki A, Ishibashi H, Moriyama M, Nakamura KI, Nishimura J, Yoshimura A. Loss of mammalian Sprouty2 leads to enteric neuronal hyperplasia and esophageal achalasia. *Nature Neurosci.* 2005 8, 855-857

• Yasukawa H, Ohishi M, Mori H, Murakami M, Chinen T, Aki D, Hanada T, Takeda K, Akira S, Hoshijima M, Hirano T, Chien KR, and Yoshimura A; IL-6 induces an anti-inflammatory response in the absence of SOCS3 in macrophages *Nature Immunol.* 2003; 4, 551-556

【Term of project】 FY2006 - 2010

【Budget allocation】 27,200,000 yen

【Homepage address】

<http://homepage2.nifty.com/yoshi1212/bosyu.html>