Roles of guidance factors in immune regulation

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【Outline of survey】

Semaphorins, which were originally identified as axon guidance factors, play critical roles in development of not only the nervous system but also of other organ systems. Recent studies from the principal investigator's laboratory have also revealed that several semaphorins and their receptors are critically involved in regulation of immune responses. This study will be carried out in order to determine the mechanisms how semaphorins regulate immune responses, by 1) analyzing immune responses of gene targeted mice that are deficient in semaphorins or their receptors, 2) analyzing signals of semaphorins in immune cells and 3) analyzing effects of recombinant semaphorins or antibodies against semaphorins on various experimental animal models of immunological diseases.

【Expected results】

It is likely that semaphorins play roles in regulation of immune responses in the ways quite different from those used by known immunoregulatory molecules such as cytokines and co-stimulatory molecules, this study may reveal a novel mechanism of immune regulation. In addition, this study is expected to reveal new therapeutic molecular targets of various immunological disorders.

【References by the principal investigator】

- Suzuki, K., A. Kumanogoh, and H. Kikutani. Semaphorins and their receptors in immune cell interactions. Nat. Immunol., 9:17-23, 2008.
- Suzuki, K., T. Okuno, M. Yamamoto, R.J. Pasterkamp, N. Takegahara, H. Takamatsu, T. Kitao, J. Takagi, P.D. Rennert, A.L. Kolodkin, A. Kumanogoh, and H. Kikutani. Semaphorin 7A initiates T cell-mediated inflammatory responses through α1β1 integrin. Nature, 446:680-684, 2007.

【Term of project】 FY2008－2012	【Budget allocation】 159,300,000 yen (direct cost)

【Homepage address】 http://www.biken.osaka-u.ac.jp/