

【Grant-in-Aid for Young Scientists(S)】

Biological Sciences (Medicine, dentistry, and pharmacy I)



Title of Project : Molecular basis for immunological “risk management” through lectin receptors

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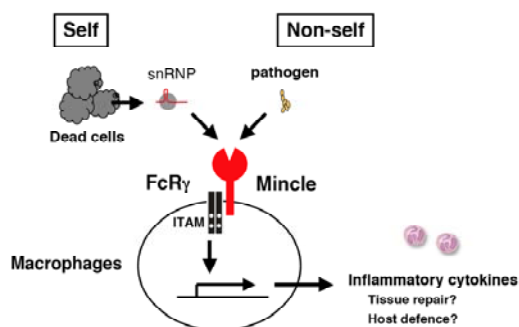
Research Area : Medicine, dentistry, and pharmacy

Keyword : Antigen recognition, Immune surveillance

【Purpose and Background of the Research】

Our body is continuously exposed to “danger” which is derived from both self and non-self, i.e. tissue damages or invading pathogens. However, the receptor(s) that senses such “risk” remains unidentified. We have recently found that C-type lectin Mincle, a stress-inducible lectin receptor, is an activating receptor that senses both damaged self and pathogenic fungus.

The aim of this study is to understand physiological advantages and potential risk caused by sensing “danger” through lectin receptors.



【Research Methods】

We will investigate the physiological role of immune responses elicited by “danger” in tissue repair and fungus infection using genetically engineered lectin-deficient mice.

We have found that Mincle-Tg mice shows lethal disorder. We will elucidate the cause and trigger of these diseases through pathological and genetical approach.

We will identify the molecular mechanism for the discrimination of “damaged self” and “non-self” through structure biological analysis as to both ligands and receptors.

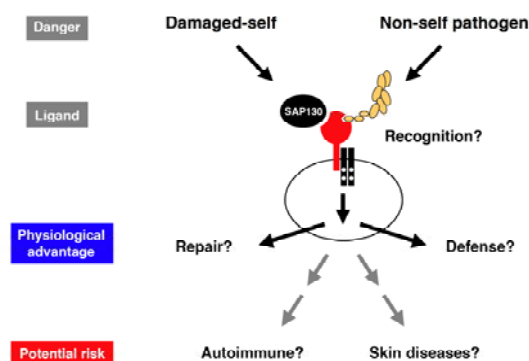
【Expected Research Achievements and Scientific Significance】

Lectin-mediated inflammation caused by damaged self may lead to a “beneficial inflammation” that eventually promotes tissue repair through clearance of debris or tissue

remodeling. Elucidation of “endogenous repair machinery” will provide novel aspect to the field of regenerative medicine.

“Deregulated” expression of lectin receptors may leads to several disorders such as autoimmune diseases. Indeed, we found that Mincle-Tg mice causes lethal disorder, which may shed light on the development of a novel therapy for such diseases.

The ability of self and non-self discrimination would have been acquired by lectin receptors, which are likely to be much primitive than TCR and BCR. This finding may change the current paradigm of immune receptors and their recognition.



【Publications Relevant to the Project】

- Yamasaki, S., et al.
Mincle is an ITAM-coupled activating receptor that senses damaged cells.
Nat. Immunol. 9: 1179-1188, 2008.
- Yamasaki, S., et al.
C-type lectin Mincle is an activating receptor for pathogenic fungus, *Malassezia*.
Proc. Natl. Acad. Sci. USA.
106:1897-1902, 2009.

【Term of Project】 FY2009-2013

【Budget Allocation】 49,800 Thousand Yen

【Homepage Address and Other Contact Information】

<http://www.bioreg.kyushu-u.ac.jp>