Department of Allergology

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General Summary

Our research concerns the biological significance of immunoglobulin E (IgE) and mechanisms of protection against parasites.

Research Activities

Protection against reinfection with Vampirolepis nana *eggs*

Vampirolepis nana, dwarf tapeworm, is a human parasite that also infects mice. Oral infection with eggs of *V. nana* induces strong protection against reinfection with eggs in the small intestine of mice. The protection is induced within 2 days after primary infection through innate immunity and 1 week after primary infection through acquired immunity. The mechanisms of protection were examined in innate and acquired immunity. Our previous study indicated that CD4T cells are responsible for protection in innate immunity. In addition, collaboration of CD4 bearing αβT cells and γδT cells are essential, and costimulatory signals from inducible T-cell costimulatory ligand (ICOSL) are required. Cytokines, such as interleukin (IL)-4 and IL-13, but not interferon γ and IL-12, are involved in innate immunity. Protection through innate immunity is induced by complicated interaction between cells and molecules within a very short period of time. Although innate immunity generally acts against primary infection, the protection against *V. nana* eggs acts against secondary infection, but not to primary infection. These findings suggest a novel innate immune system in the small intestine. On the other hand, an experimental system was established to evaluate protection against reinfection with eggs through acquired immunity. Mice were reinfected with eggs 4 weeks after primary infection. The protection through acquired immunity is induced by CD4-bearing αβT cells. Acquired immunity is known to depend on CD4-bearing memory T cells. Moreover, signals from ICOSL, IL-4, and IL-13 are not required. Different mechanisms are considered between acquired and innate immunity in the phase of protection against larvae from eggs.

Publications

***Velasquez CV*[1], *Roman AD*[1], *Lan NTP*[2], *Huy NT*[1], *Mercado ES*[3], *Espino FE*[3], *Perez ML*[4], *Huong VT*[2], *Thuy TT*[5], *Tham VD*[6], *Nga CT*[6], *Ha TT*[2], *Bilar JM*[4], *Bajaro JD*[4], *Baello BQ*[4], *Kikuchi M*[1], *Yasunami M*[1], *Morita K*[1], *Watanabe N, Karbwang J*[1], *Hirayama K*[1] (*[1]Nagasaki Unv, [2]Pasteur Inst, [3]Res Inst Trop Med, [4]Philippine Child Med Ctr, [5]Hosp No. 2, [6]Ctr Prev Med).** Alpha tryptase allele of *tryptase 1 (TPSAB1)* gene associated with dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) in Vietnam and Philippines. *Hum Immunol*. 2015; **76:** 318-23. Epub 2015 Mar 20.

Reviews and Books

Watanabe N. Parasitic diseases (in Japanese). In: Arakawa Y, Kamiya S, Yanagi U, editors. Medical microbiology. Tokyo: Tokyo Kagaku Dojin; 2014. p. 215-20.