HOKKAIDO UNIVERSITY

Title	Recent Topics of Rabies Epidemiology and Researches
Author(s)	MIFUNE, Kumato
Citation	Japanese Journal of Veterinary Research, 45(1), 23-24
Issue Date	1997-05-30
Doc URL	https://hdl.handle.net/2115/2595
Type	departmental bulletin paper
File Information	KJ00002398327.pdf

Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP

the former is prepumed to kill the cells producing viruses, and the latter inhibits viral spread by reducing viral expression and infectivity.

References

1. Walker, C. M., Moody, D. J., Stites, D. P. and Levy, J. A. 1986. CD8-lymphocytes can control HIV infection *in vitro* by suppression virus replication. *Science* 264 : 1563–1566.
2. Kannagi, M., Masuda, T., Hattori, T., Kanoh, T., Nasu, K., Yamamoto, N. and Harada, S. 1990. Interference with human immunodeficiency virus (HIV) replication by $CD8^+$ T cell in peripheral blood leukocytes of asymptomatic HIV carriers in vitro. *J. Virol.* 64 : 3399–3406.
3. Nixon, D. F., Broliden, K., Ogg, G. and Bloriden, P-A. 1992. Cellular and humoral antigenic epitopes in HIV and SIV. *Immunology* 76 : 515.
4. Mackewicz, C. E., Ortega, H. and Levy, J. A. 1994. Effect of cytokines on HIV replication in $CD4^+$ lymphocytes : lack of identity with the $CD8^+$ cell antiviral factor. *Cellular Immunology* 153 : 329–43.
5. Kannagi, M., Nakamura, T., Akari, H., Kuroda, M. J., Fujii, M., Oka, S., Iwamoto, A., Kurata, T., Higashi, D. and Harada, S. Dual phasic suppression of viral replication following de novo human immunodeficiency virus type 1 (HIV-1) infection in lymphocytes of asymptomatic HIV-1 carriers. *Leukemia* (in press).

Recent Topics of Rabies Epidemiology and Researches

Kumato Mifune

Department of Microbiology Oita Medical University
Hasama-machi, Oita 879–55

After brief introduction of the recent emergence of bat and human rabies in England and Australia and of the recent topics of rabies researches such as the success of the construction of infectious cDNA of rabies virus, our study on the mechanisms of protection against rabies virus conferred by vaccine was introduced and discussed. The results of our studies so far obtained were summarized as follows.

(1)While the mechanism of protection by pre-exposure vaccination could be explained only by the presence of virus-neutralizing (NT) antibodies, prophylaxis of rabies by post-exposure vaccination (PET) could not be achieved only by the NT antibodies produced by vaccine and required additional mechanisms such as T cell contribution.

(2) Transfer of CTL clone, recognizing the glycoprotein (G) of rabies virus with H-2K determinant of the MHC, 2 to 3 days after virus infection, protected approximately 50% of the mice which were lethally infected with the ERA strain of rabies virus and treated with cyclophophamide. Greater protection was obtained in mice receiving both anti-rabies NT antibodies and CTL cells.

(3) Inactivated rabies vaccine induced CTL response in mice against the G protein but not for other internal structural proteins of rabies virion.

(4) In the PET, the interferon produced by vaccinations accerelated and enhanced the IgM and IgG antibody responses to rabies virus.

(5) Mice vaccinated either with a recombinant vaccinia expressing the G (rVacG), N (rVacN) or with phosphoprotein (rVacNS) showed strong resistance to peripheral lethal infection with street rabies virus.

(6) Mice vaccinated with rVacN developed

strong anti-N antibody response, however, no virus-NT activity was detected.

(7) Mice vaccinated with rVacN developed $CD4^+$ and $CD8^+$(CTL) T cell responses, however, prior treatment of the mice with anti-CD4 or CD8 MAbs before challenge infection did not affect the outcome of infection.

(8) Passive transfer of anti-N polyclonal or monoclonal antibodies (MAb) to mice prior to challenge resulted in a significant protection, although more than 10 times the amount of anti-N antibodies as that of anti-G antibody is required achieve the same protection.

(9) The epitopes which can be recognized by anti-N antibodies were not expressed on the surface of virus-infected cells, although CTL epitopes were expressed.

(10) By post-exposure vaccination in which mice were first infected with rabies virus and subsequently vaccinated ip with a recombinant, rVacG conferred protection but rVacN failed to confer protection even with higher doses of the virus.

(11) Anti-N antibodies can be taken up by cultured cells in a dose-dependent manner when the cells are incubated with lower dilutions of MAb. Rabies virus replication was inhibited in the cells preincubated with MAb.

(12) The rate of antibody uptake was significantly enhanced in a virus dose-dependent manner when the cells are incubated with rabies virus in the presence of anti-N antibody.

(13) Positive reactions were observed in an immunoelectronmicroscopic study on the surface of rabies virions being budded from virus-infected cells when stained with anti-rVacG or with anti-rVacN antibodies.

(14) Although preliminary, hemagglutination of human erythrocytes by rabies virus was not inhibited in the presence of anti-N antibodies, however, subsequent hemolysis after exposure of the erythrocytes to acid environment was inhibited by the antibodies.