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ASIA EDITION

Japanese scientist inch closer to Toxoplasma vaccine discovery

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Tokyo: *Toxoplasma gondii* is a common parasite which causes the development of fatal encephalosis or pneumonia in immunodeficient patients under treatment of AIDS or cancer.

Pregnant women who are infected may suffer a miscarriage or the newborn child may suffer from a congenital disease. Currently, a toxoplasma vaccine for humans is not available. Using experimental animals such as mice, basic research for developing an inactivated vaccine is underway.

A group of researchers led by Masahiro Yamamoto, Professor at Research Institute for Microbial Diseases and the Immunology Frontier Research Center at Osaka University found that p62, a host molecule, played an important role in exerting immune effects of an experimental pathogenic parasite toxoplasma-inactivated vaccine. This group's achievement is expected to offer strategies for developing a toxoplasma-inactivated vaccine targeting p62 for treating toxoplasmosis, whose case reports have been on the rise in Japan in recent years.

From a prior study which found that the antigens derived from the toxoplasma emitted within the parasitophorous vacuole become the major antigens for the killer T cells, Professor Yamamoto's group investigated the activation of killer T cells when the toxoplasma-infected cells were stimulated by interferon-Ã?Å½Ã?Â³ (IFN-Ã?Å½Ã?Â³). As a result, it was found that the activity of antigen-specific killer T cells in infected cells that were stimulated by IFN-Ã?Å½Ã?Â³ was dramatically higher than in non-stimulated infected cells.

This robust activation of killer T cells seen when these infected cells undergo IFN-Ã?Å½Ã?Â³ stimulation was significantly reduced in mice with p62 deficiencies. Even on an individual level, when compared with wild-type mice, there was a sharp decrease in antigen-specific killer T cells in p62 deficient mice when administered the toxoplasma-inactivated vaccine.

These findings clarified that IFN-Ã?Å½Ã?Â³-dependent p62 has the unique role of gathering in the parasitophorous vacuole of toxoplasma through IFN-Ã?Å½Ã?Â³ stimulation and activating the antigen-specific killer T cells released within the parasitophorous vacuole, a world first.