Young killer cells protect against infectious mononucleosis

19 December 2013

More than 90 percent of all adults are carriers of the oncogenic Epstein-Barr Virus (EBV). Primary infection with this herpes virus as a young child is generally not linked to any symptoms, and usually offers life-long protection from its cancer-causing effect. However, for people who do not become infected with the virus until adolescence, the infection often leads to infectious mononucleosis (commonly known as glandular fever).

Our immune systems can generally fend off this disease after a period of between one and several months. However, there is an increased risk of developing Hodgkin lymphoma at a later stage, a cancerous tumor of the lymphatic system. Immunologists from the University of Zurich have now discovered a risk factor that is in part responsible for the outbreak of infectious mononucleosis in young people.

Young natural killer cells combat primary infection

The researchers used an animal model to show that the loss of innate immune control by young natural killer cells can lead to infectious mononucleosis. "Young natural killer cells, which small children in particular have in abundance, seem to be especially suited to killing off the cells that multiply EBV", according to Christian Münz, Professor of Experimental Immunology at the University of Zurich. "This weakens the primary infection and infectious mononucleosis does not break out".

Without the defense of the natural killer cells, EBV multiplies so dramatically during the primary infection phase that the aggressive response of the adaptive immune system – chiefly of the T killer cells – makes the infected person sick with infectious mononucleosis. "In the animal model we also observed weight loss and the increased occurrence of EBV-associated lymphomas. Consequently, natural killer cells seem to play a key role in the development of the primary infection with Epstein-Barr Virus". This is how Christian Münz explains the results of the study.

Young people could benefit from a vaccination

Adolescents who are not yet carriers of EBV are at an increased risk of developing infectious mononucleosis. Christian Münz's work group is currently examining vaccinations that could protect against EBV infection. This could prevent the outbreak of infectious mononucleosis and reduce the related risk of developing Hodgkin lymphoma.

More information: Obinna Chijioke, Anne Müller, Regina Feederle, Mario Henrique M. Barros, Carsten Krieg, Vanessa Emmel, Emanuela Marcenaro, Carol S. Leung, Olga Antsiferova, Vanessa Landtwing, Walter Bossart, Alessandro Moretta, Rocio Hassan, Onur Boyman, Gerald Niedobitek, Henri-Jacques Delecluse, Riccarda Capaul and Christian Münz. Human Natural Killer Cells Prevent Infectious Mononucleosis Features by Targeting Lytic Epstein-Barr Virus Infection. *Cell Reports*. December 19, 2013.

Provided by University of Zurich