Epidemiology–based Immunology in Exercise Science

Ryoichi Nagatomi
(Tohoku Univ. Grad. School of Biomed. Engineering)

Although progresses in modern immunology made essential contributions to biology providing specific tools to identify proteins, common diseases such as viral protection and allergy, remain unsolved, because majority of the so-called biomarkers of the immune system are based on animal or cellular studies without clinical validation. Natural killer (NK) cell has been extensively investigated as an antigen independent cell of the innate immune system confronting viral infection and malignant neoplasms. We often encounter notions stating an immunological benefit having more NK cells in the circulation with higher \textit{in vitro} killing activity, and the products and methods with such effect benefit your health. There are basically 2 ways to elucidate how NK cells benefit us in the real world; epidemiological studies and studies of NK deficiency patients. A cohort study of 11 years revealed that those with lower NK cell killing activity had almost twice as high incidence of cancer. NK cell deficiency patients suffer from life-threatening infection of Herpes group viruses, such as cytomegalovirus (CMV), herpes simplex virus (HSV), Epstein-Barr virus (EBV) and Papilloma virus, but not from other common viruses. Recent progress in the recognition mechanisms of NK cells have revealed that they have a limited range of virus recognition mentioned above. Since only a limited range of immunological findings have been validated in epidemiological studies with clinical outcomes, not simply the relationship with previously established markers, we need more effort in testing clinical hypotheses in population studies.