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Professor Chang-Duk Jun's research team identifies the regulatory factors for the generation of T lymphocytes that eliminate virus-infected cells

□ GIST (Gwangju Institute of Science and Technology) School of Life Sciences Professor Chang-Duk Jun's research team discovered and identified NSrp70 (Nuclear Speckle-related protein 70) as a new key factor that controls the development of T lymphocytes that attack and remove virus-infected cells and cancer cells, and their mechanism of action were investigated.

◦ NSrp70 was the first 70 kDa protein that Professor Chang-Duk Jun's team discovered in the form of spots in the nucleus of a cell and named this gene 'a shiny protein in the nucleus.' It was registered with the National Center for Biotechnology Information (NCBI). NSrp70 performs the function of creating more diverse proteins than the number of genes through alternative splicing* when proteins are made from genes.

* alternative splicing: a process of producing proteins of various structures from a single gene.



- T lymphocytes are very important immune cells for the immune response, accounting for more than 70% of the total lymphocytes, and have recently attracted attention as a key research subject for gene therapy and cell therapy.
 - In particular, T lymphocytes play a decisive role in killing cells infected with viruses such as COVID-19, so it is not an exaggeration to say that it is the key to the success or failure of a vaccine.
- The research team analyzed the genome of NSrp70-deficient T lymphocytes and, for the first time in the world, revealed that a number of gene regulatory proteins were affected by the selective splicing function of NSrp70.
 - NSrp70 deficiency causes T lymphocytes to fail to mature normally in the thymus organ and die. For this reason, it was confirmed that the immune system loses its anticancer and antiviral capabilities due to lymphopenia.
- It was found that the expression and signaling of T cell receptors, which are important for T lymphocyte development and activation, decreased due to these altered gene-regulating proteins, while cell proliferation-related genes were significantly increased. As a result, it was found that NSrp70 deficiency causes T lymphocytes to fail to develop normally and die due to abnormal cell proliferation along with abnormal T cell receptor expression.
- Professor Chang-Duk Jun said, "The result of this study revealed a new key gene that regulates the development of T lymphocytes and is expected to be a new milestone in unlocking the secrets of the birth and death of immune cells. Future follow-up studies plan to establish a new immunotherapy strategy that uses NSrp70 gene therapy to inhibit cancer growth or promote the growth of T lymphocytes that can respond to specific viruses."
- This research was conducted by GIST Professor Chang-Duk Jun's research team with support from the Creative Research Initiative Program funded by the National Research Foundation, the National R&D Program for Cancer Control funded by the Korea and the Ministry of Health and Welfare, and the GIST Research Institute and was published online on May 25, 2021, in *Nucleic Acids Research*, a top 5% paper in biochemistry & genetics.

