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RIKEN Brain Science Institute(BSI)
Brain Development Research Group
The laboratory for Development Neurobiology
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Discovery of a Redox Sensor Protein Capable of Recognizing the Oxidation Stress of Organisms and Elucidation of Part of the Stress Control Mechanism

The laboratory for Development Neurobiology(Laboratory Head: Dr. Katsuhiko Mikoshiba), Brain Development Research Group, RIKEN Brain Science Institute(BSI), in joint research with the Japan Science Technology Agency (JST), discovered a protein capable of recognizing oxidation and reduction (redox) condition, and has succeeded in clarifying part of the mechanism controlling oxidation stress.

Organisms have a mechanism to transmit information to the inside of the body by adjusting the calcium concentration in cells in response to external stimuli. However, many points remain unclear on its relations with the calcium signal transmission mechanism in redox controlling mechanism in cells. Importantly, oxidation stress is considered to be the cause of diabetes, aging, and cell death (apoptosis).

The research group noticed a small organ called the endoplasmic reticulum that stores calcium in cells, and found a protein called "ERp44" that combines with IP₃ receptor, which is located in the endoplasmic reticulum, from the endoplasmic reticulum lumen side. They found that "ERp44" plays the role of recognizing the redox condition of the IP₃ receptor involved in calcium transmission, and suppresses cell death by maintaining the reduction condition of the calcium channel of IP₃ receptor that is opening under oxidation condition. They also found that "ERp44" suppresses cell death when it is expressed in cells.

This is the first discovery of a factor that plays the role of controlling the redox condition in the endoplasmic reticulum, and this study also correlates for the first time oxidation

stress with calcium transmission. The research results were published in the U.S. science journal "*Cell*" dated January 14.

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