Elucidation of the Docking Mechanism of Hormone Granules to the Plasma Membrane

Fukuda Initiative Research Unit (Initiative Research Scientist: Dr. Mitsunori Fukuda) has identified a new docking mechanism that tethers hormone granules to the plasma membrane. Hormones are synthesized in specific cells called endocrine cells, such as pancreatic β-cells or adrenal medullary chromaffin cells, and are stored in small vesicles (called hormone granules). These hormone granules are retained inside the plasma membrane, and the balance inside the body is sustained through the quick release of hormones from hormone granules against stimulation from outside.

The mechanism by which hormone granules are docked to the plasma membrane had not previously been identified. In an experiment of this study using a PC12 cell line derived from rat chromaffin cells, it has been clarified that proteins called "Rab27A", "SNAP-25", and "Rabphilin" are involved in this mechanism, and that these molecules form the complex. To be more specific, it has been clarified that Rab27A present on the hormone granule of endocrine cells interacts with Rabphilin , and this complex further interacts with SNAP-25 on the plasma membrane, and thus hormone granules are tethered to the plasma membrane. The development of a drug able to control the activities of these molecules will contribute to a new therapy against diseases caused by the abnormality of hormone secretion.

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