Calcium release through IP3 receptors (type 2 and 3) is essential for exocrine function

The Japan Science and Technology Agency and the Brain Development Research Group (Group Director: Dr. Katsuhiko Mikoshiba), RIKEN Brain Science Institute, have elucidated the essential roles played by inositol triphosphate (IP3) and its receptors-type 2 and type 3 IP3 receptors-in the exocrine function in organs such as the salivary glands and the pancreas.

Calcium is not only an important constituent element of our skeletons, but also plays a key role in intracellular signal transduction, and regulates a variety of physiological activities. IP3 receptors are said to have an intimate relationship with calcium-mediated signal transduction in exocrine cells, but which of the three genetic subtypes of IP3 receptor (subtypes 1-3) play the key roles, and their importance under physiological conditions, have remained elusive questions.

In this research, mouse models lacking type 2 and 3 IP3 receptors were developed, through which it was found that mice lacking both subtypes of receptor had inadequate exocrine function in organs such as the salivary glands and the pancreas, with consequent impairment in the intake and digestion of food. Because this research demonstrated for the first time the physiological roles of type 2 and type 3 IP3 receptors, it is anticipated that there will various medical applications in areas such as the understanding or prevention/treatment of various exocrine function-related human diseases (diseases caused by hyposecretion of saliva, pancreatic fluid, and digestive enzymes, etc., and abnormalities of the lacrimal glands (as characterized by dry eye) and sweat glands, etc.).

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