【Biological Sciences（Agricultural sciences）】

Physiological substances and functions of ABC proteins involved in lipid transport

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【Outline of survey】

Lipids, such as cholesterol, are essential components of the body. However, their aberrant accumulation due to an excess intake, etc., causes fatal disorders such as atherosclerotic vascular lesions. Dietary lipids are absorbed from the small intestine, transported throughout the entire body via the liver, and play important roles. Recently, many members of ABC proteins, an ATP-dependent transporter family, were revealed to be involved in lipid circulation in the body and play important roles in lipid homeostasis. However, despite extensive studies, their functions and mechanisms of regulation remain unclear due to difficulties in studying large membrane proteins.

We have been intensively investigating ABC proteins for about 20 years after we identified MDR1, the first of the ABC protein genes in eukaryotes. In this project, we will reveal the physiological substances and functions of physiologically important ABC proteins on the basis of our achievements in biochemical studies on them.

【Expected results】

The functional defects of 48 human ABC proteins can lead to a variety of pathological conditions, including cardiovascular diseases, diabetes, senile blindness, respiratory failure of infants, and skin diseases. Our research on ABC proteins will contribute to human health by exploring the cause of such diseases and finding ways to prevent them. The identification of food-realted factors and chemicals affecting the functions and regulation of ABC proteins will be useful to maintain lipid homeostasis and prevent disease.

【References by the principal investigator】

- Nagao, K., Takahashi, K., Hanada, K., Kioka,N., Matsuo, M., and Ueda, K., Enhanced apoA-I-dependent cholesterol efflux by ABCA1 from sphingomyelin-deficient CHO cells. J Biol Chem. 282, 14868-74, 2007
- ABC proteins (edited by Ueda, K), Japan Scientific Societies Press, 2005

【Term of project】 FY2008－2012	【Budget allocation】 123,900,000 yen (direct cost)

【Homepage address】 http://www.biochemistry.kais.kyoto-u.ac.jp/