

Regulation of nucleocytoplasmic protein transport and nuclear stress response

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【 Outline of survey 】

One of the most important features of eukaryotic cells is the presence of intracellularly distinct compartments, organelles, such as the nucleus and mitochondria. In the nucleus, which contains genetic information, gene expression is regulated and genes are replicated, while in the cytoplasm, proteins are synthesized in accordance with the genetic information transcribed in mRNA. In eukaryotic cells, therefore, cell functions are maintained through the continuous traffic of various macromolecules between the nucleus and the cytoplasm through the nuclear pores that penetrate a double membrane, the nuclear envelope. The molecular mechanism of nucleocytoplasmic protein transport has recently been demonstrated. On the other hand, although an important part of the cellular stress response involves the translocation of stress-responsible factors from the cytoplasm to the nucleus, how these factors are translocated into the nucleus in response to stress or how the nuclear transport pathways are regulated in stressed cells is unclear. Therefore, we are trying to elucidate how the nucleocytoplasmic protein transport machineries are regulated in response to cellular stress and how the nucleus functions under the stress conditions, in order for cells to protect themselves from the stress. Accordingly, this project will develop a novel research field, “ nuclear stress response ”.

【 Expected results 】

It is expected that this project will provide a new aspect on the fundamental mechanism of cell homeostasis and maintenance. It is also expected that the data obtained in this study will lead to the understanding of stress-induced pathogenesis, because the destruction of nuclear stress response may be relevant to a variety of degenerative diseases.

【 References by the principal researcher 】

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【 Term of project 】 FY 2004 - 2008

【 Budget allocation 】 80,400,000 yen

【 Homepage address 】

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