# Mechanism of externalization of phagocytosis markers in apoptotic cells



# 2001 Fiscal Year Final Research Report Summary

## Mechanism of externalization of phagocytosis markers in apoptotic cells

Research Project

### Project/Area Number

12680630

### Research Category

Grant-in-Aid for Scientific Research (C)

### Allocation Type

Single-year Grants

### Section

一般

### Research Field

Functional biochemistry

### Research Institution

Kanazawa University

### Principal Investigator

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### Project Period (FY)

**2000 – 2001**

### Keywords

Apoptosis / Phagocytosis / Phosphatidylserine / Golgi apparatus / Monoclonal antibody / Ribosome

### Research Abstract

Mechanism of phosphatidylserine externalization in apoptotic cells
In order to elucidate the mechanism by which the membrane phospholipid phosphatidylserine (PS) translocates from the inner to the outer leaflet of the membrane bilayer and serves as a phagocytosis marker, we examined changes in the amount and activity of candidate enzymes responsible for the localization of PS in apoptotic cells. We have cloned a gene coding for presumed amino phospholipid translocase and obtained other candidate enzymes, but all of them turned out to be unrelated to the aimed enzymes. We thus gave up this project.
Analysis of candidate novel phagocytosis marker
We generated a monoclonal antibody named PH2 that inhibits macrophage phagocytosis of apoptotic cells. The antigen recognized by PH2 was thus considered to be a novel phagocytosis marker. We then characterized the PH2 antigen and found that it consists of protein and is localized to the membranous structures in normal cells. Furthermore, some fractions of the antigen was detectable in trans-Golgi. These results suggest that the PH2 antigen undergoes membrane vesicle transport and is exposed to cell surface upon apoptosis induction.
Externalization of ribosomal proteins in apoptotic calls
We determined structural change of ribosomes during apoptosis. When 28 out of 79 kinds of human ribosomal proteins were analyzed, 3 proteins were found to be

degraded and released from ribosomes in apoptotic cells. In addition, 6 ribosomal proteins became detectable on cell surface upon apoptosis. These results suggest that some ribosomal proteins move from the ribosome to cell surface during apoptosis and serve as phagocytosis markers.

## Research Products (16 results)

All | Other

All | Publications


[Publications] A.Koji, T.Hishikawa, H.Ando, Y.Nakanishi, N.Kobayashi: "Expression of Fas and Fas ligand in normal and ischemia-reperfusion testes : involvement of the Fas system in the induction of germ cell apoptosis in the damaged mouse testis"Biology of Reproduction. 64. 946-954 (2001)

[Publications] A.Stephanou, T.M.Scarabelliら7名: "Induction of apoptosis and Fas receptor/Fas ligand expression by ischemia/repeprfusion in cardiac myocytes requires serine 727 of the STAT-1 transcription factor but not tyrosine 701"Journal of Biological Chemistry. 276. 28340-28347 (2001)

[Publications] C.Fujii, A.Shiratsuchi, J.Manaka, S.Yonehara, Y.Nakanishi: "Difference in the way of macrophage recognition of tratget cells depending on their apoptotic states"Cell Death and Differentiation. 8. 1113-1122 (2001)

[Publications] Y.Maeda, A.Shiratsuchi, M.Namiki, Y.Nakanishi: "Inhibition of sperm production in mice by annexin V microinjected into seminiferous tubules : possible etiology ofphagocytic clearance of apoptotic spermatogenic cells and male infertility"Cell Death and Differentiation. (印刷中). (2002)

[Publications] J.Nishida, A.Shiratsuchi, D.Nadano, T.Sato, Y.Nakanishi: "Structural change of ribosomes during apoptosis : degradation and translocation of ribosomal proteins in doxorubicin-treated Jurkat cells"Journal of Biochemistry. (印刷中). (2002)

[Publications] 白土明子, 中西義信: "食細胞によるアポトーシス細胞貧食の分子機構と意義"実験医学. 19. 1684-1689 (2001)

[Publications] Fujmioto, I., Pan, J., Takizavva, T., and Nakanishi, Y: "Virll clearance through apoptosis-dependent phagocytosis of influenza A virus-infected cells by macrophages."J. Virol. 74. 3399-3403 (2000)

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[Publications] Shiratsuchi, A., Kaido, M., Takizawa, T., and Nakanishi, Y.: "Phosphalidykerine-mediated phagocytosis of influenza A virus-infected cells by mouse peritoneal macrophages."J. Virol. 74. 9240-9244 (2000)

[Publications] Koji, T., Hishikawa, Y., Ando, H., Nakanishi, Y., and Kobayashi, N.: "Expression of Fas and Fas ligand in normal and ischemia-reperfusion testes : involvement of the Fas system in the induction of germ cel apoptosis in the damaged mouse testis."Biol. Reprod. 64. 946-954 (2001)

[Publications] Stephanou,A, Scarabelli, T. M., Brar, B. K., Nakanishi, Y., Malsumura, M., Knight, R. A., and Latchman, D. S.: "Induction ofapoptosis and Fas receptor/Fas ligand expression by ischemia/reperfusion in cardiac myocytes requires serine 727 of the STAT-1 transcription factor but not tyrosine 701."J. Biol. Chem. 276. 28340-28347 (2001)

[Publications] Fujii, C., Shiratsuchi, A., Manaka, J., Yonehara, S., and Nakanishi, Y.: "Difference in the way of macrophage recognition of target cells depending on their apoptotic states."Cell Death Differ. 8. 1113-1122 (2001)

[Publications] Maeda, Y., Shiratsuchi, A., Namiki, M., and Nakanishi, Y.: "Inhibition of sperm production in mice by annexin V microinjected into seminiferous tubules : possible etiology of phagocytic clearance of apoptotic spermatogenic cells and male infertility."Cell Death Differ. (in press). (2002)

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