

Effects of Corticosterone, cAMP, cGMP, Ca²⁺, and Protein Kinase C on Apoptosis of Mouse Thymocytes Induced by X-ray Irradiation¹

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Objective To observe the effects of signal factors of corticosterone (CS), cAMP, cGMP, Ca²⁺ and protein kinase C (PKC) on lymphocyte apoptosis in mouse thymus induced by X-rays of 4 Gy *in vitro*. **Methods** The DNA lytic rate for thymocytes was measured by fluorospectrophotometry. **Results** The DNA lytic rate for thymocytes 4-8 hours after irradiation with 2-8 Gy was significantly higher than that in the control ($P<0.01$). As compared with the control, the DNA lytic rate for thymocytes treated with 0.01 $\mu\text{mol/L}$ CS ($P<0.01$), 50 ng/mL cAMP ($P<0.01$), 0.05-0.4 $\mu\text{g/mL}$ ionomycin (Iono, $P<0.05$ or $P<0.01$) or 0.05-0.4 ng/mL phorbol myristate acetate (PMA, $P<0.05$ or $P<0.01$), respectively, was significantly increased, while the rate for thymocytes treated with 50 ng/mL cGMP was not significantly increased. The DNA lytic rate for thymocytes treated with 0.01 $\mu\text{mol/L}$ CS ($P<0.01$), 50 ng/mL cAMP ($P<0.01$), 0.2 and 0.4 $\mu\text{g/mL}$ Iono ($P<0.05$), and 0.2 and 0.4 ng/mL PMA ($P<0.05$) plus 4-Gy irradiation, respectively, was significantly higher than that treated with single 4-Gy irradiation, while the rate for thymocytes treated with 50 ng/mL cGMP plus 4-Gy irradiation was not increased. When both 0.4 $\mu\text{g/mL}$ Iono and 0.4 ng/mL PMA acted on the thymocytes, the DNA lytic rate for thymocytes was significantly higher than that in the control ($P<0.01$), the DNA lytic rate for thymocytes treated with both 0.4 $\mu\text{g/mL}$ Iono and 0.4 ng/mL PMA plus 4-Gy irradiation was significantly higher than that treated with single 4-Gy irradiation ($P<0.05$), but was not significantly higher than that treated with 0.4 $\mu\text{g/mL}$ Iono plus 4-Gy irradiation or 0.4 ng/mL PMA plus 4-Gy irradiation. **Conclusion** CS, cAMP, Ca²⁺, and PKC signal factors can promote thymocyte apoptosis induced by larger dose X-rays.

Key words: Corticosterone; cAMP; cGMP; Ca²⁺; PKC; X-ray irradiation; Lymphocyte; Apoptosis

ACKNOWLEDGEMENTS

This study was supported by a grant from the National Natural Science Foundation of China (391702750).

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¹This study was supported by a grant from the National Natural Science Foundation of China (No. 391702750).

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(Received April 5, 2006 Accepted October 3, 2007)