

Anti-Apoptotic Effect of Silkworm Hemolymph and Its Mechanism in Animal Cell Systems

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In this study, the anti-apoptotic effect of silkworm hemolymph (SH) and its anti-apoptotic mechanism were investigated. SH inhibited baculovirus-induced insect cell apoptosis and also enhanced the production of recombinant β -galactosidase and other viral proteins. SH inhibited insect cell apoptosis induced not only by baculovirus but also by chemical inducers, which indicates that SH contains anti-apoptotic components that work directly in insect cell apoptosis without any booster expression of baculoviral genes. Moreover, the inhibitory effect of SH works in a further upstream step than the Sf-caspase-1 activation step. For the mechanism study, staurosporine-HeLa cell system was used. SH and 30Kc6 protein did not directly inhibit caspase-3 activities in cell-free reaction. Cytochrome c release and Bax translocation was blocked by SH. 30K protein penetrated into the cells and bound with Bax. We presume that 30K protein-Bax complex interrupts apoptosis signal transmission to mitochondria by inhibiting Bax conformational change. SH and its 30K proteins may lead to new approaches to the maximization of protein production during commercial animal cell culture and the pharmaceutical and the medical applications.