

Caspase-3-dependent cell death in B lymphocyte caused by *Pseudomonas aeruginosa* pyocyanin

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Abstrak

Pseudomonas aeruginosa is a Gram negative bacterium that can cause fatal infection in immunocompromised patient. This is an opportunist pathogen which is associated with some dental infections. *Pseudomonas aeruginosa* produces pyocyanin that functions as an important virulent factor in bacterial invasion. It can be identified in the lesion tissue and capable to induce cellular damage in endothelial cell, respiratory, neutrophil, and lymphocytes. B lymphocyte plays a significant role in the immune response of periapical infection; however, its cellular and molecular response to pyocyanin is unclear.

Objective: To investigate cellular responses of B lymphocyte to the exposure of pyocyanin and the role of caspase-3 in its molecular mechanism.

Methods: B lymphocytes (Raji cells) were cultured, and in five replications were exposed to various concentrations of pyocyanin for 24 h. MTT assay was performed to analyze the cytotoxicity effect of pyocyanin. Cell morphological analysis using phase contrast microscope were done in separate experiments. Immunocytochemical analysis was carried out for the identification of active caspase-3 protein expression, to study the mechanism involved in pyocyanin induced cellular damage.

Results: It showed that cell viability was decreased in pyocyanin-treated groups. Pyocyanin induced cell death on B lymphocyte in a dose-dependent manner. Statistical analysis using ANOVA demonstrated significant difference between groups with $p=0.000$. Nuclear fragmentation was observed in pyocyanin-induced cell death; furthermore, caspase-3 was expressed clearly in cell cytoplasm after 24 h incubation.

Conclusion: Pyocyanin is capable of inducing cell death on B lymphocyte. Caspase-3 may play an important role in the molecular mechanism of pyocyanin-induced cell death.