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## Study of high glucose-induced apoptosis in PC12 cells: Role of bax protein

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## Abstract

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Hyperglycemia, which occurs under the diabetic condition, induces serious diabetic complications. Diabetic neuropathies, affecting the autonomic, sensory, and motor peripheral nervous system, are among the most frequent complications of diabetes. Little is known about the direct toxic effect of high glucose concentrations on neuronal cells. Therefore in the present study, glucose-induced toxicity was studied in PC12 cells as an in vitro cellular model for diabetic neuropathy using the MTT assay. The possible role of apoptosis was also investigated in this toxicity. The result showed that a 3-fold increase in optimum glucose concentration for PC12 cells (13.5 mg/ml) significantly reduced cell viability after 48 h. In Western blot analysis, the ratio of Bax/Bcl-2 protein expression in cells treated with high glucose was significantly increased compared to controls. Additionally high glucose could induce a DNA ladder pattern in PC12 cells, a hallmark of apoptosis indicating nuclear fragmentation. From our present results, it may be concluded that high glucose can cause PC12 cell death, in which apoptosis plays an important role possibly by the mitochondrial pathway through higher expression of Bax proapoptotic protein. ©2007 The Japanese Pharmacological Society.

## Reaxys Database Information

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## Author keywords

Apoptosis; Glucose; PC12; Toxicity

## Indexed Keywords

EMTREE drug terms: glucose; protein Bax; protein bcl 2

EMTREE medical terms: animal cell; animal model; apoptosis; article; cell nucleus; cell strain; cell viability; concentration (parameters); controlled study; diabetic neuropathy; experimental model; mitochondrion; neurotoxicity; nonhuman; protein expression; protein function; rat; Western blotting

MeSH: Animals; Apoptosis; bcl-2-Associated X Protein; Blotting, Western; Cell Survival; DNA Fragmentation; DNA, Neoplasm; Glucose; PC12 Cells; Proto-Oncogene Proteins c-bcl-2; Rats; Tetrazolium Salts; Thiazoles  
Medline is the source for the MeSH terms of this document.

Chemicals and CAS Registry Numbers: glucose, 50-99-7, 84778-64-3; protein bcl 2, 219306-68-0; bcl-2-Associated X Protein; DNA, Neoplasm; Glucose, 50-99-7; Proto-Oncogene Proteins c-bcl-2; Tetrazolium Salts; Thiazoles; thiazolyl blue, 298-93-1

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