

Acrylamide-induced apoptotic effects on NIH/3T3 cells

Elahe Mahdizade^a, Maryam Baeeri^a, Mohammad Abdollahi^{a, *}

Authors' Affiliations:

^aToxicology and Poisoning Research Center, Department of Toxicology and Pharmacology, Faculty of Pharmacy and Pharmaceutical Sciences Research Center, Tehran University of Medical Sciences, Tehran, Iran;

Abstract Presenter:

Elahe Mahdizade; MSc; Toxicology and Poisoning Research Center, Department of Toxicology and Pharmacology, Faculty of Pharmacy and Pharmaceutical Sciences Research Center, Tehran University of Medical Sciences, Tehran, Iran; E-mail: mahdizade84@gmail.com

***Correspondence:**

Mohammad Abdollahi, Department of Toxicology and Pharmacology, Faculty of Pharmacy and Pharmaceutical Sciences Research Center, Tehran University of Medical Sciences, Tehran 1417614411, Iran. E-mail: Mohammad.Abdollahi@UToronto.Ca or Mohammad@TUMS.Ac.Ir

Abstract

Introduction: Acrylamide (ACR) is used in an extensive industrial applications and scientific studies. ACR can be produced through food processing at high temperatures via the Maillard reaction. ACR as a chemical and its metabolite glycidamide causes cell toxicity and damage to DNA and proteins in the body. This study was designed to investigate the ACR-induced apoptotic effects on NIH/3T3 fibroblasts in cell culture.

Methods and Results: The NIH/3T3 cells were treated with ACR in different concentrations (1, 2, 5, 10 mM). After 24 hours incubation, early and late apoptosis, necrosis, and viable cells were counted. Type of cell death (apoptosis, necrosis) induced by ACR is characterized by Annexin V-FITC and Propidium Iodide (PI). Moreover, caspase 9 and 3 were measured via colorimetric assay. Flow cytometric result showed, the percentage of live cells in 10 mM of ACR were significantly reduced compared to the control group that was accompanied by an increase in necrotic cell death. ACR compound caused an increased in Caspase 9 activity in a dose-dependent manner, the activities of caspase 3 also showed a significant increase compared to the control group only at concentration of 10 mM.

Conclusions:

Our findings showed that exposure to ACR could induce apoptosis at high concentrations in embryonic fibroblast cell. Moreover, it was shown that acrylamide induces necrotic cell death at the high concentration of 10 mM ACR.

Key words: Acrylamide, Apoptosis, NIH/3T3 cells, Necrosis

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