

The FASEB Journal

www.fasebj.org

April 2016

The FASEB Journal vol. 30 no. 1 Supplement 920.6

Induction of AP-1-MAPKs Signaling by Copper Oxide Nanoparticles

Tabatha Lynn Barber, Linda Bowman and Min Ding

□ Author Affiliations

Toxicology and Molecular Biology Branch, National Institute for
Occupational Safety and Health/CDC, Morgantown, WV

Abstract

Occupational exposures to copper dusts or fumes have been reported to be harmful to human health, with possible risk of cancer among copper smelter workers. Copper (II) oxide (CuO) nanoparticles have not, to our knowledge, been extensively examined for potential carcinogenic or genotoxic effects. To investigate the mechanisms of CuO-induced pathogenesis, the effect of CuO on AP-1-MAPKs and ROS generation were investigated. The results indicated CuO caused a 2-fold increase in AP-1 activity in JB6 cells. The induction of AP-1 activity in cultured cell lines was time and dose-dependent. The signal transduction pathways for AP-1 activation were also investigated. Western Blot analysis demonstrate that CuO stimulates phosphorylation of p38 MAPK and ERKs. CuO also generated ROS when incubated with the cells as measured by electron spin resonance (ESR). Nano-sized CuO generated more ROS than the fine sized particles when incubated with the cells. Comet assay suggested that exposure of the cells with CuO resulted in DNA damage. Unraveling the complex mechanisms associated with these events may provide insights into the initiation and progression of CuO-induced pathogenesis.

Footnotes

This abstract is from the Experimental Biology 2016 Meeting. There is no full text article associated with this abstract published in The FASEB Journal.

We recommend

ROS Generation Is Involved in Titanium Dioxide Nanoparticle Induced MAPKs/AP-1 Activation in JB6 Cells
Min Ding et al., FASEB J, 2015

Induction of Anchorage Independent Growth and Angiogenesis by Tungsten Carbide-Cobalt Nanoparticles
Min Ding et al., FASEB J, 2016

The inhibitory effect of sulforaphane on the expression of VCAM-1 in vascular smooth muscle cells
JI YUN KIM et al., FASEB J, 2012

Activation of HIF-1 pathway by cholesterol in hepatocytes under normoxia (649.1)
Sarit Anavi et al., FASEB J, 2014

Transcription activator protein 1 (AP-1) mediates NO-induced apoptosis of adult cardiomyocytes.
G Taimor et al., FASEB J, 2001

Miniature Medicine
IEEE Pulse, 2014

Helicobacter pylori activates IL-6-STAT3 signaling in human gastric cancer cells: Potential roles for reactive oxygen species
MDLinx

Anti-leukaemic effects induced by APR-246 are dependent on induction of oxidative stress and the NFE2L2/HMOX1 axis that can be targeted by PI3K and mTOR inhibitors in acute myeloid leukaemia cells
MDLinx

Role of p38 MAPK activation and mitochondrial cytochrome-c release in allicin-induced apoptosis in SK-N-SH cells
MDLinx

ERK1/2, MEK1/2 and p38 downstream signalling molecules impaired in CD56