

## Assessment of selected transcription factors and neoplastic markers in stainless steel welders

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The exposure to toxic fumes generated during welding of stainless steel (SS) is toxic due to chromium content and the reduction of Cr (VI) to Cr (V), a cascade of reactions involving the production of reactive oxygen species (ROS). Generation of ROS may be induced also by nickel, leading to cytotoxicity and apoptosis.

The study focused on two transcription factors: NF-kappa-B (nuclear factor of kappa light polypeptide gene enhancer in B-cells 1) and AP-1 (activator protein 1). NF-kappa-B is encoded by one gene: *NFKB1*. AP-1 is a protein complex that consists mainly of two protooncogenic families: Jun (c-Jun, JunB, JunD) and Fos (c-Fos, FosB, Fra-1, Fra-2), encoded by eight genes: *JUN*, *JUNB*, *JUND*, *FOS*, *FOSB*, *FOSL1* and *FOSL2*.

The study of SS welders was undertaken to observe the relationship between NF-kappa-B and AP-1 and some plasma neoplastic markers (carcinoembryonic antigen (CEA), cytokeratin fragment antigen 21-1 (CYFRA 21-1 and prostate specific antigen (PSA)). Study participants included controls (n=50) and exposed SS welders (n=50) from production departments, exposed to the welding fumes at 0.12-3.50 mg/m<sup>3</sup> (inhalable fraction) and 0.12-1.65 mg/m<sup>3</sup> (respirable fraction). Total concentration of metals (mg/m<sup>3</sup>) was Fe 264.0, Mn 42.2, Cr 83.3 and Ni 40.4. mRNA expression for *JUNB*, *JUND*, *FOS*, *FOSB* and *FOSL2* was significantly increased in the exposed welders (as compared to controls). No significant changes were observed for *NFKB1*, *JUN* and *FOSL1*. Expression of majority of mRNA transcripts was inversely correlated with serum cyfra21 levels in controls but not in the exposed welders.

No correlation between mRNA expression of AP-1/NF-kappa-B and CYFRA 21-1 in welders may indicate disrupted cytoprotective mechanisms associated with AP-1/NF-kappa-B, specifically with respect to lung cancer development.

### Biography:

Tadeusz Halatek studied at the Faculty of Pharmacy, Medical University of Lodz. In 1991 received Ph.D in pharmacy Medical University of Lodz. In 1974 started working in the Department of Biochemistry, Nofer Institute of Occupational Medicine (NIOM) in Łódź as an assistant and then assistant professor in the Department of Toxicology and Carcinogenesis, NIOM (1991-2011). Since 2011 Professor in the Department of Biological and Environmental Monitoring, NIOM.

The main scientific interest of his work was identification of early biomarkers of critical effects of metals in occupational environmental for assessing the associated health risk. In studies on the respiratory biomarkers, he collaborated with the Catholic University of Louvain, Brussels, Belgium. in 1994-1995.