

INTERACTIVE EFFECTS OF POLYCYCLIC AROMATIC HYDROCARBONS AND IRON OXIDES PARTICLES. EPIDEMIOLOGICAL AND FUNDAMENTAL ASPECTS

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SUMMARY

Iron oxides are present in many occupational atmospheres mainly in iron ore mines and in steel industry. Among these workers, epidemiological studies indicated an excess of lung cancer deaths. In mines, it was difficult to involve iron oxides exposure because there are other possible causes as radon, polycyclic aromatic hydrocarbon (PAH) present in diesel exhausts, silicosis or siderosis. The contradictory results of these studies are due to the differences of exposure levels or to the presence or not of these cofactors or of a sufficient prevention. But generally the results agree with an interaction of iron oxide dusts and smoking habits. It is unclear if this interaction supports an additive or multiplicative risk of lung cancer. Experimental studies with Fe_2O_3 showed that these particles are able to induce lung cancers only in the presence of PAH when administered to animals. In vitro studies permitted to observe an interaction in the metabolism of benzo(a)pyrene (BaP) leading to a higher level of precursors of the ultimate carcinogen. As this metabolism of BaP is known to be enhanced during lipoperoxidation, it is possible to involve this mechanism with Fe_2O_3 . After phagocytosis and dissolution with production of ferric ions, Fe_2O_3 can enhance the production of reactive oxygen species responsible of damaging both lipidic constituents and DNA. Fe_3O_4 and mainly FeO may be more toxic, introducing directly ferrous ions in the cells after dissolution, but the cancerogenicity of these compounds is unknown, making necessary to develop research.

Key words: iron oxides, lung cancer, epidemiology, animal studies, in vitro studies

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