

Studio del rilascio *in vitro* di radicali ossidrilici (HO·) da parte di polveri contenenti fibre di fluoro-edenite identificate nella roccia lavica di Biancavilla (Sicilia orientale)

V. RAPISARDA, MONICA AMATI, SABRINA COLOCCINI, LUCIA BOLOGNINI, L. GOBBI*, DOMENICA DUSCIO**

Clinica di Medicina del Lavoro, Facoltà di Medicina e Chirurgia, Università di Ancona

* Dipartimento di Fisica e Ingegneria dei Materiali e del Territorio, Facoltà di Ingegneria Università di Ancona

** Clinica di Medicina del Lavoro, Facoltà di Medicina e Chirurgia, Università di Catania

KEY WORDS

Asbestos exposure; fluoro-edenite fibers; hydroxyl radicals production; mesothelioma

SUMMARY

«In vitro hydroxyl radical (HO) generation from dust containing fluoro-edenite in volcanic rock in Biancavilla (Eastern Sicily)». Background: Epidemiological studies revealed an unusually high incidence of malignant pleural mesothelioma in Biancavilla, a town in eastern Sicily located in a volcanic area. In the absence of occupational risk factors connected with asbestos inhalation, a nearby stone quarry, which has long been providing most of the local building materials (e.g. plaster), was suspected to be the source of mineral fibres. These fibres had never been studied before and were identified as fluoro-edenite. Objective: To investigate the ability of the fluoro-edenite fibres present in mineral dusts and house plaster to release hydroxyl radicals *in vitro*. Methods: After fibre characterisation and the determination of particulate specific surface, the ability of quarry rock dust and house plaster dust to generate hydroxyl radicals was measured *in vitro* using the deoxyribose degradation assay. Treatment with 1,3-dimethyl-2-thiourea (DMTU), a hydroxyl radical scavenger, or deferoxamine (DFX), an iron chelator, was performed to confirm hydroxyl radical production and study the role of iron. Crocidolite (UICC) was used as positive control. Results: The rocks were found to contain fibrous amphiboles, identified as fluoro-edenite, which are chemically similar to tremolite. All samples generated hydroxyl radicals, with rocks yielding consistently higher values than plaster. Treatment of the dusts with DMTU or DFX significantly reduced hydroxyl radical production by both samples. The type of biological reactivity observed with these fluoro-edenite fibres resembled that of asbestos fibres. Conclusions: The hydroxyl radicals generated by asbestos fibres have long been known to mediate inflammatory fibrosis of the lung and DNA damage that may ultimately result in lung carcinoma and mesothelioma.

Pervenuto il 15.3.2002 - Accettato il 10.7.2002

Corrispondenza: Dott. Rapisarda Venerando, Clinica di Medicina del Lavoro, Università degli Studi di Ancona, Polo didattico-scientifico Aragosta, via Tronto 10/a, 60020 Torrette di Ancona (AN)

Tel. 071-5964302 - Fax 071-2206062 - e-mail: nandorapisarda@libero.it