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Can occupational exposure contribute to the development of malignant melanoma of the skin?

As the incidence of malignant melanoma of the skin has shown a marked increase during the last 20–30 years, the question of what might be the reasons for this increase has been asked. Ultraviolet radiation has been suspected for many years, and the causal relationship between ultraviolet radiation and malignant melanoma of the skin has been well documented (5, 7, 10).

The occurrence of malignant melanoma of the skin is more frequent among light-skinned people living near the equator (5), and it has been assumed that people with a low tolerance to sun exposure are more susceptible to the disease than others (6). In the same way there is also some evidence that skin pigmentation and complexion might protect against the development of malignant melanoma (5).

As malignant melanoma of the skin, both in Britain and in Australia, has been shown to be more frequent among indoor workers than among people working outdoors, exposure to fluorescent lighting at work has been suggested as a possible cause (1).

Environmental and industrial chemical agents which have been suggested as capable of causing malignant melanoma of the skin include arsenic, suntan preparations, polychlorinated biphenyls, alcohol, polyunsaturated fats (10), and tear-gas (α-chloroacetophenone) (9). The link between the ozone concentration in the stratosphere and skin cancers caused by increased ultraviolet radiation is also of interest in discussions of environmental factors which have an influence on the occurrence of malignant melanoma of the skin (8).

In two recent studies of cancer incidence carried out in one plant producing polyvinyl chloride (4) and another plant where the workers have been heavily exposed to asbestos, an increase in the incidence of malignant melanoma of the skin (ICD no 190) was observed in both groups of workers. At the polyvinyl chloride plant 4 cases were found against the 0.8 expected, and among the asbestos-exposed workers there were 3 observed cases against 0.6 expected (paper in preparation). The expected incidence was calculated by use of the age- and sex-specific incidence rates for cancer published for each year by the Cancer Registry of Norway (2). From the figures on the geographic distribution of cancers in Norway there is no reason to assume that the incidence of malignant melanoma of the skin in the southern region where the plants are located should be different from the rest of the country. The two plants are part of a large electrochemical industrial complex and, in addition to polyvinyl chloride and asbestos, the workers have been exposed to a variety of other industrial air pollutants, including nitrogen oxides.

The question is in what way exogenous factors could have a carcinogenic effect upon the melanocyte. Evidence has been presented in experiments that inhaled vinyl chloride monomer and its metabolites can be found in subcutaneous layers after a short time (3). There has been no investigation to see whether inhaled asbestos fibers are retained in the skin of exposed workers or experimental animals. As the three cases of malignant melanoma of the skin found among the asbestos workers were all located in exposed regions of the skin such as hands and head, a transcutaneous penetration of asbestos fibers might be considered as a possible explanation.

There seems to be no doubt that ultraviolet radiation is a causal factor in the development of malignant melanoma of the skin. Results from previous studies (1, 5, 7, 9, 10), the results concerning malignant melanoma in the two studies discussed in the present communication, and the fact that the observed increase in the occurrence of malignant melanoma in many countries has been more pronounced in the male population (5) give reason to consider whether occupa-

tional exposures alone or in combination with other exposure factors or life styles might be an additional cause of malignant melanoma of the skin. Epidemiologic studies, limited to patients with malignant melanoma, need to be carried out in order to investigate the possible association between occupational exposure and the disease and the possibility of interactions between ultraviolet radiation and occupational exposure.

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