Correspondence

Neurophysiological studies on workers exposed to lead

Sir,—Jeyaratnam and coworkers recommend, on the basis of the results of their neurophysiological study in 46 workers exposed to a combination of organic and inorganic lead, that the biological occupational exposure limit for Pb-B of 70 µg/dl, as proposed in 1982 in the EEC for male workers, should be lowered.¹ There are, however, some flaws that limit the way in which the data may be interpreted:

(1) The demonstrated mean values of nerve conduction velocities (NCV) show no consistent findings. For instance, the value for the sensory NCV of the median nerve is somewhat greater for the lead exposed workers, by comparison with the controls, whereas in the case of the motor fibres of the median nerve the opposite is found. This is unusual, since most studies concerning NCV and lead showed negative effects in all the nerves investigated.²⁻⁶

(2) The age (mean or distribution or both) of the lead exposed workers and of the control group is not given. It is well known that the NCV decreases with increasing age.⁷ For this reason, a misinterpretation of the neurophysiological data cannot be excluded.

(3) The authors performed no correlation analyses for the detection of possible dose-effect/response relationships. These statistical tests are important for the evaluation of significant causal relationships or trends.

(4) Blood lead concentrations (Pb-B) were estimated only once. Seppäläinen and coworkers² and our own study⁸ showed that it is not the "actual", but the "time weighted average" concentrations of Pb-B that are more relevant for defining chronic lead exposure.

(5) The authors give no information about the lower limits of the neurophysiological parameters measured. Therefore the incidence and degree of abnormal NCV in both groups are unknown.

The study takes no account of the latest scientific findings and there are some procedural, methodological, and statistical gaps. In my opinion, therefore, the conclusion drawn from this research is not substantiated.

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Book review

N-Nitroso compounds: occurrence, biological effects and relevance to human cancer. Edited by IK O'Neill, RC von Borstel, CT Miller, J Long, and H Bartsch. (Pp 1011, £75.00.) Oxford: Oxford University Press (for the International Agency for Research on Cancer (IARC 57)), 1985.

Dimethylnitrosamine was shown to induce liver tumours in rats in 1956 and now over 100 different N-nitroso carcinogenic compounds are known. The Lyon International Agency for Research on Cancer has organised eight international symposia on N-nitroso compounds. The last, held in Banff, Canada, was attended by 200 participants and the proceedings occupy over 1000 pages.

Although nitrosamines cause cancer in many different animal species, there is still no convincing evidence that they have caused cancer in man. "The nitrosamines in fermented tobacco" provide the greatest and most widespread source of human exposure presently known (except for some occupational exposures). The association between human

cancer and tobacco chewings and snuff dipping could be due to the nitrosamines in tobacco. The methods of analysis of nitrosamines are extremely sensitive so that with thermal energy analysers, nanogram quantities of many nitroso compounds may be measured. Several papers deal with the formation, destruction, and metabolism of nitrosamines. Among those dealing with the carcinogenic activity of nitrosamines is one involving 5120 rodents that was commissioned by the Ministry of Agriculture, Fisheries, and Food many years ago. The doses that halve the proportion of tumour free animals (TW_{50}) were 0.06 mg/kg a day for nitrosodiethylamine and 0.12 mg/kg a day for nit-

rosodiethylamine.

Although the work is essential reading for those working with nitrosamines, the role of nitrosamines in occupational disease is not considered. The final conclusion by Dr Magee who first showed that dimethyl nitrosamine was carcinogenic is "it is highly probable that human beings are susceptible to nitrosamine carcinogenesis. A role for nitrosamines in the causation of human cancer has not been established, but it should not be excluded and merits further study."

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