

among its employees discovered four cases of rare liver cancer which may have been linked to the use of the monomer. The US Department of Labor has arranged a hearing to examine the extent of workers' exposure to vinyl chloride monomer.

The American deaths were at the works of B. V. Goodrich, and in England the death of a 71 year-old former process worker at ICI is being investigated in order to establish whether or not it was caused by long exposure to the fumes of the monomer. ICI employs 1,200 workers in PVC production, and about 380 of these have been warned of possible risks in their particular work.

Vinyl chloride monomer was first used in plastics manufacture in Germany in the 1930s, and in the early days of its use in Britain and the United States a threshold limit value (TLV) of 500 parts per million was observed because of the fire and explosion hazards involved. However, an Italian study in 1971 showed that rats exposed to vapour with a concentration of the order of 3,000 parts per million tended to develop cancer, and a current TLV of 200 parts per million is observed in industry.

The TUC's medical adviser, Dr Robert Murray, has been visiting plants throughout the country in order to consult with producers and advise workers. 'The difficulty in arriving at a safe level of exposure to the monomer lies in the fact that a carcinogen risk cannot be quantified as rapidly as a fire or a toxicity hazard, says Dr Murray. Furthermore, the organ most likely to be affected by the monomer is the liver, whose condition is not easily diagnosed by conventional methods of examination.

The immediate priority is to attempt to achieve a really low TLV (say, of 50 p.p.m.), to seek mechanical alternatives to the autoclave swabbing which is the main source of contact, and to make sure that nobody enters an autoclave without air-line apparatus.

"What you've got to say to the workers", says Dr Murray, "is that the risk is small: that apart from the risks involved when he drives his car, and eats too much, and drinks too much, here is another risk which he has got to live with. The production of PVC is too big an operation to be stopped entirely because of this hazard, so what we must do is reduce exposure as far as possible while pressing ahead with the epidemiology".

In Washington, Tony Mazzocchi, Legislative Director of the Oil, Chemical and Atomic Workers Union, said that the union is now in the process of identifying those of its members who have been exposed to vinyl chloride monomer, and that they will be examined for signs of liver damage. He said that there is

at present no basis for the statement that there is little risk from exposure to the chemical, and predicted that in the United States at least, the matter is likely to lead to a long battle. The Oil, Chemical and Atomic Workers Union has recently held a long strike against the Shell Oil Company in an attempt to secure a strong health and safety clause in work contracts.

## DMSO cut down to size

*Miranda Robertson, Chicago*

A CONFERENCE held recently in New York to discuss recent investigations with dimethyl sulphoxide (DMSO) may herald the beginning of the end of the continuing story of this controversial drug. A lipid solvent exploited commercially in household cleaners, it enjoyed a burst of popularity in the early 1960s as a miracle drug active against almost everything from arthritic pain to mental retardation until it was banned by the Food and Drug Administration (FDA) in 1965 on the basis of toxicity tests on animals. Now once again it is the subject of clinical investigation but this time on a more sober note.

In spite of a report by the National Academy of Sciences (NAS) last year, which essentially endorsed the decision made by the FDA in 1965, thirteen laboratories now have authorisation from the FDA to look into the effects of the drug on, for example, scroderma, strains and sprains, and bursitis, in man.

For although the NAS committee, set up in 1972 at the request of the FDA after a public outcry, concluded that profound scepticism was justified, it found the criteria for testing the drug on humans unduly rigorous. Nor is the evidence for its toxicity so terribly alarming. When applied to the human skin (which it penetrates with remarkable rapidity and ease), it causes irritation and blistering in about 50% of cases. In animals, it produces reversible changes in the lens of the eye after the administration of quite unrealistically large doses.

Toxicity apart, there are two main reasons for the bad odour into which the erstwhile wonder drug fell with the authorities. Nobody to this day has the slightest idea how DMSO produces any one of the diverse pharmacological effects claimed for it, for one. For another, it literally gives off a bad odour, within minutes of administration, which not only seems likely to enhance any placebo effect on the patient but makes normal control procedures, such as double blind trials, extremely difficult. Since many of the

claims rest on small but significant statistical differences between treated and control (or differently treated) groups, this constitutes a serious criticism—especially in the absence of any rationale which might be provided by an understanding of the mechanism of action of the drug.

In the view of the NAS committee, however, none of this is adequate reason for refusing investigation on man where controlled animal experiments show that there is a possibility of relieving incapacitating pain or saving life. The latter possibility seems to arise in the treatment of neurological injuries, an area which has not yet been given investigatory clearance by the FDA.

Work on a monkey model at the University of Chicago suggests that DMSO may be more effective than urea (the current drug of choice) in relieving compression on the brain due to subdural haematoma, a common and often fatal sequel of head injuries from any cause. The improvement, according to Dr J. de la Torre, is measured not only in somewhat reduced mortality but in decreased neurological damage to the survivors. There is some evidence in this case that the effects of the drug depend partly on a diuretic action and partly on a more mysterious influence on oxygenation.

How the treatment, which has been extended in animal tests to impact injury of the spinal cord and experimental 'stroke', would emerge from the exigencies of a real neurological emergency remains to be seen. Nor is it yet clear whether DMSO will eventually find a useful and respectable place in the pharmacist's therapeutic repertoire; but it seems likely that with its emergence into the cold light of properly controlled investigation, its days as a panacea are over.

## Britain backs seafloor search

To encourage British participation in deep sea mining for manganese nodules, the British Government has offered Rio Tinto Zinc and Consolidated Gold Fields Ltd up to £830,000 towards their participation in an international consortium examining the floor of the Pacific Ocean. The money will be repaid if the project leads to commercial production, and the companies have also agreed that British consumers will have first option to purchase a proportion of any metals produced. The project, therefore, is seen as a means of allowing British companies to break into a new technology, and also in the long term as a possible new source of metals (like copper, nickel and cobalt) for British consumers.