

lung is equivocal. on with gastro- been found epi- yet regarded as ikoff, Hammond ouse, 1974), and than the excess experiments pro- an association. of Graham and ed that intra- emolite asbestos mours, but the bestos workers al. (1972) pro- usions on this rarity of the do give some etween asbestos mours as well genito-urinary vas significant, the relatively l p. To ined the of our other ng the non- of the same contained 2 vary and 5 ary tract in exposed to an tumours, it, and 11 ry tract in e larger set ween asbes- tumours is eas there is th tumours em. as are finer been used ver, there iner chry- he experi- levant to the past. of inhala- ail in an Canadian

chrysotile, a grade 7 sample from a Canadian mine and the superfine sample which proved the most carcinogenic of the materials which we inoculated intrapleurally (Wagner *et al.*, 1973).

The experiments we report have given results which in several respects correspond to those found in man. Thus, this experimental method is established as a valid tool for the investigation of the biological effects of asbestos.

We are grateful to all our colleagues who over a number of years were responsible for the daily attention necessary in carrying out the experiments. We would also like to acknowledge our thanks to Dr Harold Stewart of the National Cancer Institute who advised us on the classification of tumours. We are also grateful to our former colleague, Dr A. Walter, who had classified the non-lung tumours occurring in some of our earlier experiments which we mentioned for comparison.

REFERENCES

- ELMES, P. C. & SIMPSON, M. J. C. (1971) Insulation Workers in Belfast. 3. Mortality 1940-66. *Br. J. ind. Med.*, **28**, 226.
- GRAHAM, J. & GRAHAM, R. (1967) Ovarian Cancer and Asbestos. *Envir. Res.*, **1**, 115.
- GROSS, P., DE TREVILLE, R. T. P., TOLKER, E. B., KASCHAK, M. & BABYAK, M. A. (1967) Experimental Asbestosis. The Development of Lung Cancer in Rats with Pulmonary Deposits of Chrysotile Asbestos Dust. *Archs envir. Hlth*, **15**, 343.
- KNOX, J. F., HOLMES, S., DOLL, R. & HILL, I. D. (1968) Mortality from Lung Cancer and Other Causes Among Workers in an Asbestos Textile Factory. *Br. J. ind. Med.*, **25**, 293.
- KUSCHNER, M. & LASKIN, S. (1970) Pulmonary Epithelial Tumors and Tumor-like Proliferation in the Rat. In *Morphology of Experimental Respiratory Carcinogenesis*. Proc. Conf. Gatlinburg 13-16 May 1970. Ed. P. Nettesheim, M. G. Hanna, Jr. and J. W. Deatherage, Jr. U.S. Atomic Energy Commission, Symposium Series, No. 21. p. 203.
- MINISTER OF LABOUR AND NATIONAL SERVICE (1949) *Annual Report of the Chief Inspector of Factories for the Year 1947* (Cmd. 7621). London: HMSO.
- MORRIS, T. G., ROBERTS, W. H., SILVERTON, R. E., SKIDMORE, J. W., WAGNER, J. C. & COOK, G. W. (1967) Comparison of Dust Retention in Specific Pathogen Free and Standard Rats. In *Inhaled Particles and Vapours II*. Ed. C. N. Davies. Oxford: Pergamon. p. 205.
- NEWHOUSE, M. L. (1974) Cancer Among Workers in the Asbestos Textile Industry. In *Biological Effects of Asbestos*. Lyon, 2-5 October 1972. Ed. P. Bogovski, J. C. Gilson, V. Timbrell and J. C. Wagner. (IARC Scientific Publications, No. 8). In print.
- NEWHOUSE, M. L., BERRY, G., WAGNER, J. C. & TUROK, M. E. (1972) A Study of the Mortality of Female Asbestos Workers. *Br. J. ind. Med.*, **29**, 134.
- SELLIKOFF, I. J., HAMMOND, E. C. & CHURG, J. (1972) Carcinogenicity of Amosite Asbestos. *Archs envir. Hlth*, **25**, 183.
- SHABAD, L. M. & PYLEV, L. N. (1970) Morphological Lesions in Rat Lungs Induced by Polycyclic Hydrocarbons. In *Morphology of Experimental Respiratory Carcinogenesis*. Proc. Conf. Gatlinburg, 13-16 May, 1970. Ed. P. Nettesheim, M. G. Hanna, Jr. and J. W. Deatherage Jr. U.S. Atomic Energy Commission, Symposium Series No. 21. p. 227.
- STANTON, M. F. (1974) In *Pathology of Tumours in Laboratory Animals*. Vol 1. Tumours of the Rat. Part 2. I.A.R.C. Scientific Publications. No. 6. Lyon: International Agency for Research Cancer. In preparation.
- TIMBRELL, V., GILSON, J. C. & WEBSTER, I. (1968) UICC Standard Reference Samples of Asbestos. *Int. J. Cancer*, **3**, 406.
- TIMBRELL, V., HYETT, A. W. & SKIDMORE, J. W. (1968) A Simple Dispenser for Generating Dust Clouds from Standard Reference Samples of Asbestos. *Ann. occup. Hyg.*, **11**, 273.
- TIMBRELL, V., SKIDMORE, J. W., HYETT, A. W. & WAGNER, J. C. (1970) Exposure Chambers for Inhalation Experiments with Standard Reference Samples of Asbestos of the International Union Against Cancer (UICC). *Aerosol Sci.*, **1**, 215.
- VORWALD, A. J., DURKAN, T. M. & PRATT, P. C. (1951) Experimental Studies of Asbestosis. *A.M.A. Archs ind. Hyg.*, **3**, 1.
- WAGNER, J. C. (1963) Asbestosis in Experimental Animals. *Br. J. ind. Med.*, **20**, 1.
- WAGNER, J. C. (1965) The Sequelae of Exposure to Asbestos Dust. *Ann. N.Y. Acad. Sci.*, **132**, 691.
- WAGNER, J. C. (1972) The Significance of Asbestos in Tissue. In *Recent Results in Cancer Research, Vol. 39, Current Problems in the Epidemiology of Cancer and Lymphomas*. Ed. E. Grundmann and H. Tulinus. New York: Springer-Verlag. p. 37.
- WAGNER, J. C. & BERRY, G. (1969) Mesotheliomas in Rats Following Inoculation with Asbestos. *Br. J. Cancer*, **23**, 567.
- WAGNER, J. C., BERRY, G. & TIMBRELL, V. (1973) Mesotheliomas in Rats Following Inoculation with Asbestos and Other Materials. *Br. J. Cancer*, **28**, 173.
- WAGNER, J. C. & SKIDMORE, J. W. (1965) Asbestos Dust Deposition and Retention in Rats. *Ann. N.Y. Acad. Sci.*, **132**, 77.
- WRIGHT, G. W. (1969) Asbestos and Health in 1969. *Am. Rev. resp. Dis.*, **100**, 467.