has been the successful collection of large numbers of mitotic cells over a 3–4 hour period using a constant gentle washing procedure for large monolayers. The arrested cells show almost perfect metaphase synchrony and pass out of mitosis synchronously with similar kinetics to isotonically collected mitoses.

AGGLUTINATION OF NORMAL AND MALIGNANT CELLS BY CONCANAVALIN A IN RELATION TO CELL SURFACE STRUCTURE. N. E. PAYNE, P. WHUR and R. T. ROBSON. Cell Biology Unit, Marie Curie Memorial Foundation, Research Department, Oxted, Surrey.

Our Ehrlich ascites tumour cells do not aggregate *in vivo*. However, when washed and resuspended in tissue culture medium aggregation occurred at 37°C and the cells are agglutinated by concanavalin A. When preincubated in trypsin inhibitor (soybean) the cells show markedly less tendency to aggregate but in the presence of concanavalin A agglutination is greatly enhanced. This suggests that trypsin inhibitor interacts with a cell surface component, possibly a protease.

In related studies, concanavalin A agglutination was investigated using trypsinized BHK 21 cells. After exposure to trypsin these cells become agglutinable, but lose this property, apparently as the cell coat is resynthesized. The time course of this event is compared with polyoma-transformed BHK 21 cells, which remain agglutinable after coat resynthesis.

EXAMINATION OF EXFOLIATED CERVICAL CELLS BY THE SCANNING ELECTRON MICROSCOPE (SEM). J. F. MURPHY, J. M. ALLEN, J. A. JORDAN and A. E. WILLIAMS. Departments of Obstetrics and Gynaecology and Microbiology, University of Birmingham.

This study examines the ability of the SEM to differentiate exfoliated cells from the cervix uteri into benign and malignant types.

Three basic methods were used to obtain cell samples: (1) the cells were scraped from the cervix, examined by phase contrast microscopy and then processed for examination in the SEM; (2) cells were washed from the cervix with tissue culture medium and similarly treated and examined; (3) a membrane filter was used to remove cells from a colposcopically directed area on the cervix.

The results using techniques 1 and 2 often showed good cell preservation but were not sufficiently reproducible to be of clinical value. The membrane filter technique provided much more satisfactory results though there was some loss of surface detail at higher magnification.

THE TEMPORAL AND SPATIAL DISTRIBUTION OF OESOPHAGEAL CANCER AMONG MINEWORKERS IN SOUTHERN AFRICA. J. S. HARINGTON. National Cancer Association of South Africa, Johannesburg and N. D. MCGLASHAN, University of Tasmania, Hobart.

The initial analysis of cancer among mineworkers recruited from several rural areas of southern Africa (Robertson *et al.*, *Br. J. Cancer*, 1971, **25**, 395) has been tested for significance of time trends and spatial distribution. 48·8% of all cases of oesophageal cancer diagnosed in this medically well recorded populaton of 2·9 million men came from home addresses in the Xhosa-speaking Transkei, and a further 18·5% from neighbouring areas of the Eastern Cape Province, mainly the Ciskei, also a Xhosa area. Only 4·3% of oesophageal cases came from Mozambique. In contrast, 68·6% of cases of liver cancer occurred in Mozambique miners and only 10% in miners from the Transkei.

Regressions of annual rates per 100,000 employees for the Transkei and Eastern Cape for the 8 years, 1964–71, have been found to be similar and 7 times as high as those for all other areas of recruitment. Within the Transkei the districts with the highest rates, and significantly higher case numbers, lie in the extreme south-west. The spatial and temporal patterns, taken together, emphasize the high incidence both east and west of the Kei River. They suggest that the populations there are under uniform conditions of environmental risk and provide basis for aetiological enquiry amongst these general Xhosa populations.

CHILDHOOD CANCER: AN EPIDEMIOLOGICAL STUDY. J. POWELL. Birmingham Regional Cancer Registry, Queen Elizabeth Medical Centre, Birmingham.

Current interest in the epidemiology of childhood cancer stems largely from the variations in frequency observed, particularly between continents (Miller, *Int. J. Cancer*, 1972, **10**, 675), with the consequential possibility of identifying environmental agencies in its causation.

A series of 2000 cases from the Birmingham Region have been classified according to their histogenesis into 8 broad categories. When the numbers by age of onset are studied there are marked differences; in no category is the rate of occurrence constant throughout childhood, rather rates either decrease or increase sharply with age. Further the rates of change are very different, giving rise to curves characteristic for each type of malignancy. When categories are sub-divided into cell types it is found that within each, the patterns of behaviour are very similar, and in some this suggests a relationship with other malignancies. In general, the sexes show a close resemblance, making the divergencies which do occur the more remarkable.

LUNG CANCER IN MINERS. D. J. B. ASHLEY. Pathology Department, Morriston Hospital, Swansea.

Lung cancer is seen less frequently in miners than in men who work in other occupations. This difference does not appear to be related to the extent of cigarette smoking or to death at an early age from chronic occupational respiratory disease, and is an advantage which is shared by workers in the wool and cotton industries.

Two hundred and fifty-eight instances of lung cancer in miners were compared with just over 2000 instances in non-miners at a single hospital in South Wales. In the case of miners the lesion was less likely to be resectable than in non-miners, and was more likely to be of the undifferentiated, small cell type. However, if resection was possible the prospect of survival was much better in the miners.

It is suggested that the lung changes induced by dust may give a local enhancement of the defence mechanisms against carcinogenesis.

GENETIC MARKERS FOR LEUKAEMIA. D. K. O'DONOVAN and J. BELL. Department of Medicine and Therapeutics, University College, and Our Lady's Hospital for Sick Children, Dublin.

In a clinical survey of 50 consecutive patients with acute leukaemia, developmental defects and anomalies were recorded. There was a striking absence of all the major developmental defects, as illustrated by the absence of mental retardation and congenital heart disease. There was a 30% incidence of minor anomalies of development in the fifth finger, the fifth toe and facial asymmetry. The frequency of such anomalies was at least 10 times greater than that seen in control groups. The frequency was approximately the same in both myeloblastic and lymphoblastic leukaemia. Some of the anomalies observed are similar to, but more obvious than, those previously noted with simple goitre and hyperthyroidism. The evidence does not suggest that in leukaemia such anomalies are inherited by a dominant autosomal gene. It appears more likely that the defects arise at the very early stages of development (?) partial nondisjunction. The relationship to Down's syndrome will be discussed.

***IN SITU* HYBRIDIZATION OF VIRAL NUCLEIC ACIDS IN TUMOUR CELLS.** J. K. MCDOUGALL, P. H. GALLIMORE, A. R. DUNN and K. W. JONES. Department of Cancer Studies, The Medical School, Birmingham.

The use of radioactive complementary RNA (cRNA) transcribed *in vitro* to detect virus nucleic acid in infected cells by the *in situ* method has been reported (McDougall, Dunn and Jones, *Nature, Lond.*, 1972, **236**, 346). This molecular hybridization technique has recently been used in the study of cells from tumours with proven or possible virus aetiology (Orth, Jeanteur and Croissant, *Proc. natn. Acad. Sci., U.S.A.*, 1970, **68**, 1876; Zur Hausen and Schulte-Holthausen, *Oncogenesis and Herpesviruses*, 1972. Lyon: I.A.R.C., p. 321).

In this study adenovirus type 2 or type 12 cRNA, transcribed *in vitro* using *E. coli* RNA polymerase, was hybridized to adenovirus transformed and tumour cells. Autoradiographic grains found over cell nuclei indicated that the cRNA hybridized only to cells transformed by the homologous virus and not to control cells. Preliminary results indicate an association between virus and host DNA.