

The combination of CEA and γ GT was particularly advantageous for separating pelvic or local recurrence from hepatic metastases. In the former there was a moderate rise of CEA but little increase of γ GT whereas in hepatic metastases the γ GT was elevated. These tests, when considered with relevant clinical history, can readily distinguish hepatic metastases from non-malignant disease of the liver. Approximately 10% of outpatients who were symptom free and without apparent recurrence showed a moderate elevation (40–100 units) of γ GT without corresponding increase in CEA, when examined 3 months to 13 years after excision of the primary. The significance of this biochemical abnormality is, as yet, unknown.

A COMPARISON OF PHOSPHATE BONE SCANNING AGENTS IN HUMAN MALIGNANT DISEASE, D. L. Citrin, R. Bessent, J. Tuohy, P. Crumlish, W. R. Greig and L. H. Blumgart, University Department of Medicine and Surgery, Departments of Nuclear Medicine and Radiology, Royal Infirmary, Glasgow, and Department of Clinical Physics and Bio-Engineering, Western Regional Hospital Board, Glasgow.

Bone scanning is recognized to be more effective than radiology in the demonstration of skeletal metastases. The established bone scanning agents, strontium-87m and fluorine-18, are not entirely satisfactory. Recently, technetium labelled phosphate compounds—polyphosphate, pyrophosphate and ethane hydroxy diphosphonate—have become available for skeletal scanning. We have now performed over 200 consecutive studies in man and no toxic effects have been noted. A study of the relative efficacy of these agents in patients with metastatic disease, and in normal subjects, is described. Adequate visualization of the skeleton has been obtained and comparison of the scans and x-rays suggests that these compounds are of definite value in the investigation of malignant disease of the skeleton.

THE RELATIONSHIP BETWEEN CELL SURVIVAL, CHROMOSOME ABERRATIONS AND DNA REPAIR IN TUMOUR CELL LINES OF DIFFERENTIAL SENSITIVITY TO X-RAYS AND SULPHUR MUSTARD, D. Scott,

M. Fox and B. W. Fox, Paterson Laboratories, Christie Hospital, Manchester.

Cultured Yoshida lymphosarcoma cells resistant (R) to treatment with sulphur mustard suffered much less chromosome damage than sensitive (S) cells in spite of equal alkylation of DNA, RNA and protein in R and S cells. The R and S cell lines were equally sensitive to x-rays and sustained the same amount of chromosome damage. DNA repair synthesis is equal in R and S cells after sulphur mustard or x-ray treatment.

Much less chromosome damage was found in L5178Y mouse lymphoma cells resistant to x-irradiation than in radiation-sensitive cells but the amount of DNA repair was similar.

Thus, drug and radiation resistance is accompanied by, and perhaps mediated through, a reduced amount of induced chromosome damage but is not quantitatively related to DNA repair capacity.

MECHANISM OF ACTION STUDIES WITH IRCF 159: EFFECTS ON THE GROWTH AND MORPHOLOGY OF BHK-21S CELLS, T. C. Stephens and A. M. Creighton, Imperial Cancer Research Fund, London.

The effects of IRCF 159 on macromolecular synthesis in cultured cells led to the suggestion of a possible radiomimetic action (Creighton and Birnie, *Int. J. Cancer*, 1970, 5, 47). We have found a dose-dependent inhibition of the growth (cell numbers) of BHK-21S cells approaching 100% at $>100 \mu\text{mol/l}$ ($27 \mu\text{g/ml}$). Continuous exposure to a range of doses $>5 \mu\text{mol/l}$ produced a hyperbolic decrease in survival (colony forming assay). Such a response is generally associated with antimetabolites but in this case the hyperbolic curve seems more likely to be caused by a protective effect which is seen with IRCF 159 at high doses (ca. $400 \mu\text{mol/l}$).

Time lapse cinemicrography has shown that the increase in cell numbers is inhibited due to an interference with cytokinesis. However, the cells continue to grow and accumulate DNA, RNA and protein and many become multinucleate. Comparative studies indicate that this cell line is particularly sensitive in this respect. Cells with a similar multinucleate morphology were obtained following treatment with x-radiation