Methods of staining nuclear suspensions for bivariate Ki-67 antigen/DNA and bromodeoxyuridine/DNA analysis wer elaborated to minimize cell losses by the avoidance of fixation and washing, and could be performed only on 10^4 to 10^5 frozen cells/sample.

VACCINIA/POLYOMA RECOMBINANT VIRUS : A MODEL FOR TUMOUR IMMUNITY

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Many tumour cells present novel antigens. Tumour-specific antigens (TSA) have been exploited in the diagnosis and imaging of human carcinoma and the administration of anti-TSA antibodies has met some measure of success in the treatment of clinical disease. We have investigated, in a model system, the possibility that expression of TSA from a live recombinant virus might stimulate the host itself to mount an anti-tumour immune response.

Cells transformed by polyoma virus (PY) express three protein species from the integrated viral genome: LT, MT and ST. However, the exact relationship between the early PY protein species remains unclear. We thus constructed vaccinia virus recombinants separately expressing the three PY proteins.

Cell lines infected with the live recombinant viruses express high levels of the T proteins although cell surface fluorescence using anti-T serum was not detected. In all cases the recombinant T proteins exhibit biochemical activities associated with the authentic PY proteins.

Rats injected with syngeneic PY-transformed rat cells rapidly develop discrete tumours. Animals inoculated with the vaccinia recombinant expressing ST failed to reject transplanted tumour cells whereas animals previously vaccinated with recombinants expressing either MT or LT subsequently rejected their tumours. Further, animals already bearing tumours could be induced to reject their tumour cells by vaccination with the appropriate recombinant.

EFFECT OF GROWTH FACTORS ON FILM SARCOMA

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Film sarcoma is provoked by unabsorbable films, e.g. nitrocellulose filters, implanted in rodents. Substances adsorbed to the film can influence tumour growth. The cell-type of origin of the tumour has not been unequivocally determined. Growth fctors obtained from different types of cell were tested on this system to see if the response varied with the origin of the growth factor. Five groups of 50 female BALB/c mice were implanted subcutaneously with 25 mm filters bearing fibroblast (0.1 microgram), epidermal (0.2 microgram), interleukin 2 (2 units), nerve growth factor (0.002 mg) and saline respectively, and observed weekly for tumour growth. The yield of tumour in each was comparable to the controls, with the exception of nerve and interleukin factors, where yield varied by 25%. Differences were not statistically significant.

Growth factor	Mice	Tumours	Total weeks of life	Mean weeks of life/ tumour
Interleukin 2	47	25	2194	88
Fibroblast	49	26	2554	98
Control	50	23	2615	114
Epidermal	50	21	2559	122
Nerve	46	16	2149	134

PURIFIED TUMOUR ANTIGENS FROM MURINE SARCOMAS

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Two functionally similar TSTAs (Tumour Rejection Antigens) have been purified to chemical homogeneity from several chemically-induced murine sarcomas. p82, a unique antigen not previously described and p86 antigen, showing homology with heat shock proteins, are distinct entities but each is highly immunogenic and specific for the tumour of origin. Methods used for extraction and purification, biochemical properties, cloning of the gene encoding for p86, and immunogenic characteristics of these tumour antigens have been investigated and defined.

GROWTH FACTOR REQUIREMENTS OF NORMAL HUMAN MESOTHELIAL CELLS

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Recently, a major focus of our ongoing investigations into the mechanisms(s) of asbestos transformation of human mesothelial cells has been to delineate their growth factor requirements. Quiescent cells require insulin (INS) and either epidermal growth factor (EGF), platelet derived growth factor or transforming growth factor beta to undergo one round of DNA synthesis. However, a clonal growth does not occur unless the medium also contains high density lipids (HDL). Media containing HDL, INS and either gamma interferon or interleukin-1 will also support clonal growth, but the combination of HDL, INS and EGF with any of the other factors increases the growth rate. Sustained growth of human epithelial cells in defined media containing these factors (other than INS and EGF) is unusual. Interestingly, we have also found that mesothelioma cell lines elaborate some of these mitogens indicating that these factors may play an autocrine role in mesothelial cell carcinogenesis.

LIVER CELL PROLIFERATION INDUCED BY LEAD NITRATE DOES NOT PROMOTE THE GROWTH OF GGT+ FOCI

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We have recently shown that cell proliferation induced by the mitogen lead nitrate does not achieve initiation of hepatocarcinogenesis when coupled with administration of several carcinogens. Therefore, we have investigated the effect of lead-induced cell proliferation on the promotion phase of liver carcinogenesis. The experimental protocol consisted of initiating rat liver with DENA (200 mg/kg) and treating the animals with a mitogenic dose of lead nitrate (5 micromoles/100 g, twice a month). The rats were sacrificed at 6 and 12 months and the preneoplastic lesions were identified as gamma-glutamyltranspeptidase positive foci (GGT+). The results indicate that despite the several mitogenic stimuli exerted by lead, no increase in the size and/or number of GGT+ foci, was observed when compared with that of rats treated with DENA alone.

NUCLEAR DNA CONTENT CHARACTERISTICS OF 129 HIGH GRADE MALIGNANCY NON-HODGKIN LYMPHOMAS

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We have studied the DNA-ploidy of 129 non-Hodgkin lymphomas diagnosed during the last 30 years in the Tampere University Central Hospital. The material consisted of 45 large, non-cleaved follicular centre cell lymphomas, 34 small, non-cleaved non Burkitt type lymphomas, 26 Burkitt type lymphomas (BL) and 25 immunoblastic sarcomas (IBS, Lukes-Collins classification). The analyses of archival diagnostic biopsies were done with an EPICS Cr flowcytometer. By using a trypsin digestion method, which yielded low CV-values (mean 5.4%, range 3.13 to 8.50), we were able to analyze about 90% of the tumour samples.

Aneuploidy as defined by an abnormal DNA Index, was seen in 1/3 of the cases. Tetraploidy was found to be characteristic for IBS (present in 53% of cases compared with 11% in other tumours, $p<0.05$). Six Burkitt type tumours were aneuploid showing a low, near-diploid DNA-Index (mean 1.14, range 1.08 to 1.24). The BL cases had a significantly worse prognosis provided that they had near-diploid tumours ($p<0.02$). We conclude that the DNA content characteristics described can reflect the histopathological type and clinical behaviour of high grade malignancy non-Hodgkin lymphomas.

RELATIONSHIP BETWEEN EMBRYONAL CARCINOMA CELLS AND EMBRYOS

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The stem cells of teratocarcinomas, the embryonal carcinoma (EC) cells, are multipotential cells, which may proliferate as EC cells or differentiate into a variety of directions. This has suggested that EC cells correspond to a cell type in the early embryo. In line with this, the EC cells differentiate in a way comparable to that of the embryo, EC cells can be obtained from embryos both in vivo and in vitro, and EC cells reintroduced in the embryo can participate in the formation of the tissues of the foetus. Furthermore, the EC cells share many biochemical features with early embryo cells. At present, it appears that mouse EC cells represent primitive ectoderm cells of the mouse embryo.

Upon differentiation, the EC cells lose their malignant properties. The differentiation of EC cells is connected with rapid changes in, e.g. cell surface molecules and in the organization of