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The ability of glass fibers and different types of asbestos to induce morphological transformation of Syrian hamster embryo cells has been compared. An increased transformation frequency was obtained with glass fiber (GF) 100 as well as chrysolite, crocidolite, amosite and anthophyllite, while no significant increase was observed for GF 100 and TiO_2. GF 100 was less potent than chrysolite, but more potent than crocidolite, amosite and anthophyllite. By comparing the transformation frequency and toxicity, it could be concluded that induction of transformation could not be caused by unspecific cytotoxic effects. In contrast to earlier studies, no synergistic effect was observed between benzo(a)pyrene and asbestos fibers. Electron microscopical studies show that the fibers were rapidly phagocytosed, and blebs appeared on the cell surface. The formation of blebs depended on the fibers used. The localization of the blebs seemed not to be specifically associated with area of physical interaction with the fibers.

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CYTOTOXICITY OF BENFLURON METABOLITES ON P388 AND EHRLICH CELLS

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The new cytostatic drug Benfluron is currently being tested in clinical trials. In the present study the cytotoxicities and mode of action of 2 metabolites of Benfluron(A), namely 7-dihydrobenfluron(B) and N-oxide(C), have been investigated. Both metabolites are cytotoxic against the two tumour types tested (P388 and Ehrlich tumour cells) but they are less active than the parent compound (A). In order to elucidate the mode of action, the effects of both B and C on aerobic glycolysis, different kinds of respiration, level of ATP and thiol groups, integrity of cell membranes and loss of transplantability have been compared. Both B and C have shown at least two modes of action according to the concentration tested. In low concentration both metabolites interfere probably with DNA synthesis and subsequently with RNA and protein biosynthesis. At the highest concentrations there is damage to cell membranes.

DNA DAMAGE AND IN VITRO EVALUATION OF ANTICANCER DRUG SCHEDULE DEPENDENCY OF N,N-BIS(CHLORETHYL)-3-CHLORPROPIOAMIDINE OXALATE

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It has been recently shown that N,N-bis(chlorethyl)-3-chlorpropioamidine oxalate possesses antitumour activity in vivo and is worthy of further evaluation. This study was aimed at characterization of its cytotoxicity in vitro and elucidating the possible mechanism of action in terms of effects on cellular DNA. As a result it was found (by clonogenic cell survival assay) that the drug produced exponential reduction in cell survival and similarly shaped dose-response curves when given by short or continuous exposure. That data, as well as the low ID50 ratio, characterize the cytotoxicity of the drug as schedule independent and suggest cell cycle non-specificity. It was found also (by using DNA unwinding assay and a nucleoid sedimentation technique) that the drug in pharmacologically relevant concentrations caused single DNA strand breaks, which increased with drug concentration. Considering all the data, it is probable that drug-induced DNA breaks are the major cause for the drug cytotoxicity.

PROGRESSION OF ENDOMETRIAL ADENOCARCINOMAS AS REFLECTED BY NUCLEAR DNA CONTENT AND CELLULAR ESTROGEN RECEPTORS

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The results from a combined retro- and prospective study of variations of nuclear DNA and cellular estrogen receptors of normal and hyperblastic endometrium and of endometrial adenocarcinomas in relation to the clinical stage, the histological grade and the growth pattern of the tumours, to the incidence of metastases and to the survival rates of the patients has been evaluated. The errors and the validity of DNA measurements on smear preparations and histological sections by direct microspectrophotometry and of flow cytometric determination of tumour cell

suspensions have been elaborated. The investigations have given conclusive evidence that the degree of aneuploidy of the endometrial carcinomas, documented by DNA histograms, is the most significant marker for a prognostication of the outcome of the disease. An inverse relationship has been found between variations of nuclear DNA and cellular estrogen receptors of the carcinomas.

STEROID HORMONE RECEPTORS IN HUMAN BREAST AND PANCREATIC TUMOURS

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The presence of estrogen (ER) and progesterone (PR) receptors in breast cancer is now accepted as an indicator for potential hormonal therapy. The beneficial effects of antiestrogen therapy are well documented in breast cancer. During the last few years ER and estrogen-binding proteins have been discovered in the normal pancreas and in pancreatic neoplasia. Data concerning localization and the amount of ERs and estrogen binding proteins in the normal and tumourous pancreatic tissue are still controversial.

In our study 150 primary breast carcinomas and 25 benign and malignant pancreatic tissues were investigated by the same quantiative biochemical and qualitative histochemical methods. Our findings suggest that estrogen and progesterone receptors are localized in exocrine part of the pancreas.

TRANSFORMING GROWTH FACTORS AND ONCOGENES

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The two types of TGF that have been purified and cloned have very divergent biological activities. TGF-alpha is a potent mitogen for many cell types while TGF-beta is the most potent growth inhibitory polypeptide known for most cell types. TGF-alpha binds to the EGF receptor and has biological activities very similar to those of EGF. TGF-beta is very different from TGF-alpha in molecular structure and has its own specific cell surface receptors. TGF-beta and its receptor are highly ubiquitous. Stimulation of proliferation by TGF-beta in at least some fibroblastic cells appers to be indirect through induction of c-sis and autocrine stimulation by endogenous platelet-derived growth factor. TGF-beta is a growth inhibitor for most cell types including human keratinocytes which also produce TGF-beta, but in a latent form. Activation of the latent form is thought to be a major regulatory step in TGF-beta action and may occur through the action of endogenous proteases such as plasmin. It is hypothesized that autocrine stimulation by endogenous TGF-alpha (many cells) or TGF-beta (fibroblastic cells) or loss of sensitivity to the normal autocrine or paracrine inhibitory effect of TGF-beta (epithelial cells) could lead to an increased proliferative potential and thereby contribute to the transformed phenotype.

A MODEL FOR THE STUDY OF TREATMENT RESPONSE IN HUMAN NORMAL AND TUMOUR CELLS IN VITRO

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Since all chemotherapy and radiation treatments affect normal cells, the establishment of differential sensitivities is fundamental to the success of treatment with a particular agent.

Our group has developed a model for testing the response of oesophageal and bladder explants from tumour and surrounding normal tissue in the same patient to chemotherapy and radiation, both singly and in combination. Both oesophageal adeno and squamous cell carcinomas and bladder carcinomas were found to be 3 to 5 times more radioresistant than surrounding normal mucosa. Addition of appropriate concentrations of carboplatin (10 to 50 µg/ml) to irradiated (7.5Gy) bladder samples reversed this ratio and caused 9 times more cell death in tumour explants than in similarly treated normal cells. Treatment of irradiated oesophageal tissue explants with bleomycin (20 µg/ml) had a similarly dramatic effect and required only a very low dose of radiation (2.5 Gy) to reverse the ratio.

STIMULATORY EFFECTS OF TWO GROWTH FACTORS ON BONE MARROW CULTURES FROM PATIENTS WITH ACUTE MYELOID LEUKAEMIA AT DIAGNOSIS AND IN COMPLETE REMISSION