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SIGNIFICANCE OF BRANCHED POLYPEPTIDES IN THE MODULATION OF TOXIC SIDE EFFECTS INDUCED BY RADIATION TREATMENT

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The reduction of the undesirable side effects of cytostatics and ionizing radiation is an important task of an effective tumour therapy. We have developed a new, structurally simplified group synthetic branched polypeptides with poly(lysine) backbone and studied extensively by different chemical, physicochemical and biological methods. The toxic side effects caused by radiation treatment on the bone marrow, haematological parameters, humoral immune response or rosette formation of T-lymphocytes could be compensated by some of these polypeptides in adequate schedule. Structure-activity relationship studies with our model system have evidenced that synthetic branched polypeptides as immunomodulators are perspective adjuvants in chemo- and radiotherapy.

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HYPOTHALAMUS-PITUITARY FUNCTION FOLLOWING RADIOTHERAPY FOR TUMORS NOT RELATED TO THE ADENOHYPOPHYSIS

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The endocrine status of 38 patients,irradiated because of nasopharyngeal carcinomas (14 pts), primary brain tumors (14 pts), and different other causes (10 pts) was assessed. There were 26 males and 12 females ranging in age from 12 to 80 years with a mean age of 47 years. The mean time of follow up was 62 months (range 6-156 months). All patients received a total dose to the hypothalamic-pituitary axis ranging from 30 to 65 Gy, the mean total dose was 43,3 Gy. All patients were tested for fasting cortisol , luteinizing hormone (LH), follicular stimulating hormone (FSH), prolactine (PRL), thyrotropin stimulating hormone (TSH), free T4 (FT4), corticotrophin (ACTH). Testosterone (T) was measured in males and estradiol (E) in females. In seven patients pretreatment values were available,they were normal. The FT4 level was elevated in one patient.There were no patients with the combination of a low FT4 and low TSH level. In five patients, all irradiated on the cervical lymphnodes an elevated TSH with a normal FT4 was found, suggesting subclinical primary hypothyroidism. Hyperprolactinaemia was present in seven male patients and three female patients. None of these patients had clinical symptoms of an elevated prolactin level. The hyperprolactinaemia can be explained by a deficit of prolactine inhibiting factor produced by the hypothalamus.
Serum testosterone and estradiol concentrations were normal in all patients. The serum FSH was significantly increased in five male patients, in one of these patients there also was an increase of the serum LH. The elevated FSH possibly is a consequence of a disturbance in the LHRH pulsatile mechanism in the hypothalamus. In twelve patients fasting cortisol and/or ACTH levels were decreased. In all these patients a Metapyrone test or insuline tolerance test was performed. One patient showed an abnormal cortisol response during the insuline tolerancetest. This patient was corticosteroid dependent.
In conclusion: the spectrum of endocrinologic abnormalities after radiation of the hypothalamic- pituitary axis frequently suggests disturbance of the hypothalamic regulation of the pituitary function. A clinical relevant change was seen in only one patient out of 38 irradiated patients, after a mean follow up time of 62 months. This patient required corticosteroid substitutional therapy.

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EFFECTS OF SUPEROXIDE DISMUTASE (SOD) ON LATE RADIOFIBROSIS FOLLOWING CONSERVATIVE TREATMENT FOR BREAST CANCER: A CLINICAL AND LABORATORY STUDY

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Forty-four patients with breast fibrosis induced by irradiation following treatment of breast cancer were evaluated for the therapeutic effects of SOD. SOD in a concentration of 3,650u/mg, was applied on the surface of the affected area twice a day for 90 days. The extent and structure of the radiofibrosis were evaluated and scored on the basis of clinical examination and laboratory tests. SOD was found to be effective in reducing radiation induced fibrosis. After 6 month results: 84% decrease in pain, 24% decrease of the fibrotic area, 61% - 81% decrease of thermography-zones, 10% on cryostimulation, 18% decrease of mammography-intensity, 37% decrease of tissue-fibrosis, 57% increase in tissue-alpha actin SMC and 54% increase of EGF-R. Skin dose influenced the initial score, and presence or absence of a boost dose modified the response to SOD treatment.

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THE COSTS OF FIXED, NON-FIXED VERSUS INDIVIDUALISED SHIELDING BLOCKS IN RADIOTHERAPY

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Shielding blocks are one of the devices used in routine radiotherapy to assure the accuracy of dose delivery to the tumour. This paper details the hospital costs of manufacturing and using shielding blocks, on the basis of the manufacturing and placement procedures applied in the University Hospital St. Rafaël in Leuven. Three types of blocks are used: standard blocks, that are not fixed to a plexi plate, standard blocks, fixed to a plexi tray and individual blocks (always fixed).
The initial investment expenses are lower for non-fixed (40 000 ECU) than for standard-fixed (70 000 ECU) or individual blocks (100 000 ECU). The variable cost (unit cost) of a fixed block (15 ECU) is lower than of the other types of blocks. Whereas the manufacturing costs are much lower for non-fixed blocks than for individual blocks, their application costs (for daily placement) are much higher, implying that the unit cost of both types of blocks is more or less identical (25 ECU).
Departments, that have all the equipment for the manufacturing of individual blocks available, are recommended to use standard-fixed blocks in patients where there is no clear indication for a specific type of block. Individual blocks, because of their higher cost, should be used only when they are judged to be superior for the patient.
In case of new investments, it is sufficient to invest in standard-fixed blocks equipment, unless individual blocks are recommended for medical reasons. Only if one intends to use blocks in very few patients (less than 60 per year), are non-fixed blocks the cheapest alternative.

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EFFECTS OF RADIATION TREATMENT OF CEREBRAL METASTASES EVALUATION BY 99mTc-HM-PAO SPECT IMAGING

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99mTc-HM-PAO is widely used to image central nervous system because of its ability of passing through the intact blood brain barrier. Four patients affected by lung cancer with CT demonstrated brain metastases of variable sizes were studied. All patients were treated by a total-brain radiation field (40 Gy in 4 wks.). SPECT imaging was performed one-two days before the beginning of radiation treatment and again one-five days after the end of treatment. In one patient the test was repeated at three months after the end of radiation treatment. In the pretreatment test all patients showed at least one perfusion defect corresponding to the metastatic lesion and the associated oedema (even in a multifocal case with a lesion smaller than 1 cm.) , already detected by CT scan .
After treatment there was a significative reduction in the defect size in 2 out of 4 patients. Ratios between symmetrical ROIs were calculated : in 2 patients they shifted from .75 vs. .97 and from .70 vs. .82 respectively; in the other 2 patients in one instance there was no significative change (.77 vs..82) and in the last case ratio worsened (.87 vs. .72). No further improvement in the perfusion pattern was found in the single patient re-imaged three months after the end of radiation treatment. It can be suggested that in selected cases, cerebral SPECT with HM-PAO might be proposed as a complementary test in the follow-up of patients with cerebral metastases. Larger series and longer time of follow-up of the observed scintigraphic changes are needed to assess an eventual prognostic role.

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INTRACAVITARY Cf-252 NEUTRON THERAPY IN THE RECTAL CANCER TREATMENT

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About 30-50% of the rectal cancer patients diagnosed every year in Lithuania have locally wide spread disease. Adjuvant pre or postoperative radiotherapy can inprove rectal cancer treatment results.

11 patients with T3NXM0 rectal cancer (histology-adenocarcinoma) were treated by preoperative adjuvant radiotherapy by the use of intracavitary Cf-252 neutron therapy. Postoperative Cf-252 neutron radiotherapy was applied in 15 patients. External gamma therapy was used in some cases too.

Good toleration of such type of radiation therapy was obtained. There were not observed common reactions of the radiotherapy. Local radiation reactions middle grade of intensity have been observed in 60% of patients after 18-20 iGy dose has been realized. They were cured with medicine treatment, without actinotherapy disruption.

The preliminary results we have got allow us to that combined treatment of the rectal cancer is with good prospects if there is a high grade of the risk locoregional cancer relapse developing.