

Apparently non-exponential survival curves found in earlier work (Michael *et al.*, *Radiat. Res.*, 1973, **54**, 239) have been shown to be caused by an effect of cell density upon radiosensitivity. This effect has been eliminated and we have been able to determine the decay kinetics of oxygen-dependent damage in *Serratia marcescens* more accurately. The observed kinetics are qualitatively in agreement with those predicted by the Alper and Howard-Flanders model (Alper, *Radiat. Res.*, 1956, **5**, 573; Howard-Flanders and Moore, *Radiat. Res.*, 1958, **9**, 422) but quantitatively they do not match the first order decay indicated by the model. The simplest possibilities suggested by the present data are either that the oxygen-dependent damage decays by second order kinetics or that there are 2 types of damage decaying at differing rates.

THE ROLE OF SHORT AND LONG-LIVED RADIOLYTIC PRODUCTS IN RADIOSENSITIZATION BY IODINATED AROMATIC COMPOUNDS. G. SIMONE and M. QUINTILIANI, Laboratorio di Fotochimica e Radiazioni d'Alta Energia (CNR), Bologna.

In addition to iothalamic acid, other iodinated radiological contrast media have been tested for radiosensitizing activity. They were diatrizoic acid, containing a single triiodinated benzene ring, and iodipamide, containing 2 such rings. The experimental results have shown that both compounds strongly enhance the lethal effect of radiation on *E. coli* B/r in oxic conditions and are essentially ineffective in anoxia.

Buffered solutions of the above mentioned compounds develop a long-lasting radiation induced bactericidal activity when irradiated at pH lower than 6. The bactericidal products appear to be related to the release of molecular iodine from the irradiated compounds, and formed in a process requiring OH radicals and molecular oxygen.

In radiosensitization occurring when bacterial cells are irradiated in the presence of iodine containing compounds, the short-lived intermediate products appear to play the predominant role.

ACTIVITIES OF L-ORNITHINE DECARBOXYLASE AND S-ADENOSYL-L-METHIONINE DECARBOXYLASE IN X-IRRADIATED MURINE

LEUKAEMIC LYMPHOBLASTS L5178Y-S DURING MITOTIC DELAY.

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Observations are rapidly accumulating which suggest that polyamines-putrescine, spermidine and spermine may play an important role in the mechanisms regulating macromolecular biosynthesis and cellular proliferation. L-ornithine decarboxylase and S-adenosyl-L-methionine decarboxylase are enzymes from the biosynthetic pathway leading to these polyamines. The behaviour of these enzymes in irradiated cells is unknown. In the present investigation it was found that irradiation of exponentially growing *in vitro* murine leukaemic lymphoblasts L5178Y-S with 100 rad of x-rays causes long mitotic delay lasting approximately 7 h. The phase of recovery from mitotic delay is accompanied by transient increases in activities of L-ornithine decarboxylase (by approximately 200%) and S-adenosyl L-methionine decarboxylase (by 60%). It is suggested that the observed increases in both enzyme activities are connected with post-irradiation recovery of mechanisms regulating cell division.

RADIOLYSIS OF A PIG GASTRIC GLYCOPEPTIDE. G. PALLAVICINI, G. CETTA, F. SINIGAGLIA, R. BADIELLO and M. TAMBA, Istituto di Chimica Biologica, Facoltà di Scienze, Università di Pavia.

The mammalian gastrointestinal mucosae are particularly radiosensitive. Since the protective barrier of the epithelium is made of glycoproteins, a study of the effect of radiation on such biopolymers was undertaken. In the present communication some results are reported on gamma and pulse radiolysis of a gastric glycopeptide in aqueous solution.

Viscosity and gel filtration measurements, gas-chromatographic analyses of neutral sugars, analyses of amino acids and hexosamines and colorimetric analyses of hexoses and fucose were carried out in the steady-state radiolysis studies. The results show that irradiation gives some chemical modifications at the level of the single glucidic components, mainly galactose and fucose. Viscosity data and fractionation on Sephadex G-200 indicate that depolymerization of the macromolecule occurs to give low molecular weight products.

Preliminary pulse radiolysis data indicate that both e^-_{aq} and OH radicals react with this compound, giving a transient absorption in the UV region.

EARLY AND LATE EFFECTS OF ^{55}Fe CYTOTOXICITY. U. REINCKE, H. BURLINGTON, E. P. CRONKITE and J. LAISSUE, Medical Research Center, Brookhaven National Laboratory, Upton.

A single intravenous injection of $^{55}\text{FeCl}_3$ of high specific activity ($\geq 1 \text{ mCi}/\mu\text{g Fe}$) has marked early and late effects. The isotope, characterized by short-ranged deposition of decay energy ($1 \mu\text{m}$ path length for 6 keV Auger electrons) and 2.7 years half-life, effects immediate and ongoing cytotoxicity in the differentiated erythroid cell line. This is demonstrated in C57BL mice after 3 days by absolute and differential bone marrow counts and by reduced ^{59}Fe tracer uptake in blood. Recovery of ^{59}Fe uptake to normal values occurred 15 days after 0.7 mCi or 1.4 mCi/mouse but not after 2.8 mCi. Mice in the latter group died within 4–6 weeks. Periods with stable but moderately reduced peripheral blood counts were observed in the 2 lower-dose groups: RBC ~ 7 to $8 \cdot 10^6/\mu\text{l}$ and WBC $\sim 4000/\mu\text{l}$ after 1.4 mCi, RBC $\sim 9 \cdot 10^6/\mu\text{l}$ and WBC $\sim 5000/\mu\text{l}$ after 0.7 mCi. Cold-iron treated controls showed RBC values of $\sim 10 \cdot 10^6/\mu\text{l}$ and WBC of $\sim 10,000/\mu\text{l}$. The reduction of WBC is mainly borne by low lymphocyte counts. Reticulocyte counts were in the low normal range of $3\text{--}6 \times 10^4/\mu\text{l}$ blood after initial depression. In spite of these mild symptoms, bone marrow cellularity was significantly reduced in 2 mice killed accidentally 4 months after 0.7 mCi. Panmyelophthisis appears to be invariably the cause of spontaneous death, ending a short terminal phase which follows the stabilized period. Survival time is inversely related to ^{55}Fe dose. Although these features are consistent with the notion of exhausted regenerative ability of haematopoietic stem cells, definite conclusions cannot be drawn before the syndrome is more fully characterized.

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THE ROLE OF THE SPLEEN IN THE REPOPULATION OF THE

HAEMOPOIETIC SYSTEM OF MOUSE RADIATION CHIMAERAS. G. SILINI, L. V. POZZI and U. ANDREOZZI, Laboratorio di Radiobiologia Animale, CSN Casaccia del CNEN, Roma.

An auxiliary role of the spleen in the repopulation of the haemopoietic system after irradiation is often claimed but direct quantitative data to support this view are very scanty. Experiments have therefore been performed to elucidate the respective role, influence and contribution of spleen and marrow in the haemopoietic regeneration of irradiated (C57 BL \times C3H) F_1 female mice. Data to be presented pertain mainly to the effect of splenectomy on the CFU content and growth in the femur of endogenous and exogenous isogenic radiation chimaeras repopulated by spleen or marrow cells. Analysis of data as a function of time shows that the presence of the spleen affects the repopulation of marrow by progenitor cells only at the very early post-irradiation stages. The marrow CFU however continue to expand rather independently and remain eventually as the only source of haemopoietic cells. Thus, the reaction of the spleen represents a fast, important but brief contribution to the overall haemopoietic function of heavily irradiated animals.

ARTERIAL WALL DAMAGE BY X-RAYS AND FAST NEUTRONS. M. W. AARNOUDSE and H. B. LAMBERTS, Laboratory for Radiopathology, Groningen.

Irradiation of arteries in the hypercholesterolaemic rabbit causes severe atheromatosis, *i.e.* by depolymerization of the mucopolysaccharides in the vessel wall.

Following the results of Aarnoudse and Lamberts (*Int. J. radiat. Biol.*, 1971, **20**, 437), who observed that the RBE of 14 MeV neutrons in other mucopolysaccharide systems is < 1 (synovial fluid, connective tissue membranes), it is to be expected that the arteries will be damaged less by neutrons than by x-rays.

A total number of 148 rabbits, divided over several groups were irradiated with 2 doses, 500 and 1000 rad, to compare the effects of neutrons and x-rays on the carotid arteries. The result of this investigation is that with a dose of 500 rad the plaque forming effect of neutrons is more, and with 1000 rad it is less, extensive than the effect