systems (Michel, *Experientia*, 1974, **30**, 1195) but not of the tumour tested.

INTERACTION OF IONIZING RADIATION WITH A PLATINUM COMPLEX IN CHINESE HAMSTER CELLS. I. Szumiel and A. H. W. Nias, Glasgow Institute of Radiotherapeutics, Belvidere Hospital.

The effect of the platinum coordination complex, cis-dichlorobis (cyclopentylamine) platinum II-DBCP, has been examined alone and in various combinations with ionizing radiation, using Chinese hamster ovary (CHO) cells in monolayer culture.

After exposure of asynchronous cultures to increasing concentrations of DBCP for 1 h the dose-response curve is similar in shape to that found with ionizing radiation, with parameters: $D_0 = 9{\cdot}3$ μg/ml, $N = 6{\cdot}7$. With such asynchronous cultures significant synergism is observed when drug and radiation treatments are combined within a short time interval. Dose modifying factors up to 1·59 are found, depending upon the dose level. Reduction in recovery from sub-lethal radiation damage occurs following such drug treatment.

Studies with CHO cells synchronized by mitotic selection show that DBCP is not a phase-specific drug but that interaction with radiation is more marked in G_1 and Late S than in mid-S phase. Thus, comparison of the observed cell survival levels with those expected from a simple addition of drug and radiation effects, gives a ratio of 0·4 in G_1 and late S but 0·66 in mid-S.

EFFECTS OF COMBINED X-IRRADIATION AND HYDROXYUREA TREATMENT ON MOUSE HAEMOPOIETIC STEM CELLS. G. Hodgson and K. Koschel, Biological Research Unit, Cancer Institute, Melbourne.

Only a small fraction of murine haemopoietic stem cells capable of forming colonies in spleens of lethally irradiated mice (CFU-S) are in S phase. However, the fraction of CFU-S in S phase increases to about 50% in response to depletion. Proliferating CFU-S can be synchronized *in vivo* at the G_1/S border by hydroxyurea. Such cells show a decrease of the extrapolation number, to values not significantly different from one after irradiation, with change in D_0 from 88 to 74 R.

Both rapidly and slowly proliferating CFU-S show a decrease in D_0 by about 25 R when exposed to hydroxyurea after irradiation. A maximum decrease in survival as a function of x-ray dose is noted when hydroxyurea treatment is given both before and after irradiation.

PYROMELLITIC DIANHYDRYDE AS RADIOSENSITIZER. M. D. Astudillo, M. V. Alvarez, A. Goicoechea, P. Cabildo and F. Sanz, Instituto de Química Física-Radiobiologia-CSIC, Madrid.

This study includes experiments *in vivo* and *in vitro*. The PD given its chemical structure could be counted among the radiosensitizers that act by electron affinity. We determined theoretical electron affinity which reaches a value of 4·78 eV. This compound undergoes typical reactions of an aromatic carboxylic acid anhydryde, prepared in water and neutralized at pH 7 for its administration.

Initial experiments *in vivo* show that 1 mg/g is not toxic in mice lineage NMRI by oral and intraperitoneal way. In drug x-ray interaction 0·5 mg/g has no effect but with 1 mg/g the radiosensitizing effect is apparent by oral and intraperitoneal routes.

In vitro experiments on mammalian cells on an established line from a tumour of golden hamster, induced by SV-40 virus, have indicated that PD is not toxic in range 10^{-3} mol–10^{-7} mol. 10^{-4} mol was used for radiosensitizing tests with γ-rays and the radiosensitizing ability was determined in aerobic and hypoxic conditions.

EFFECTS OF DIAMIDE ON RADIATION INDUCED EMBRYONIC DAMAGE. Ch. Michel, H. Fritz-Niggli and I. Riehle, Strahlenbiologisches Institut der Universität, Zürich.

Diamide (diazenedicarboxylic acid bis (N,N-dimethylamide)) is a known radiosensitizer of anoxic bacteria and anoxic mammalian cells (Harris and Power, *Radiat. Res.*, 1973, **56**, 97). We have previously shown that some chemicals (iodoacetamide, tetracyclines, lucanthone) may radiosensitize embryonic damage produced by low radiation doses.

An application of diamide alone (156 mg/kg) on gestation day 8 in mice had a teratogenic effect of 5·69%. In combined treatments diamide was injected i.p. 30 min before irradiation with 25, 50 and 100 R of different kinds of radiation.

Contrary to lucanthone as a very effective radiosensitizer (Michel, *Experientia*, 1974, **30**, 1195), no synergistic effect could be observed with diamide and radiation doses of 50 or 100 R. However, with 25 R of 200 keV roentgen rays a possible synergistic effect is not to be excluded.

ACTION OF DRUGS ON REPAIR PROCESSES. M. C. L. Zumel, G. Cobreros and M. D. Astudillo, Instituto Química Física " Rocasolano " CSIC, Madrid.

The study of chemical compounds acting as modifiers of radiation effects requires the understanding of their ways of action. Inhibition of repair processes is one of the mechanisms by which some radiosensitizers act on living cells. In this paper the effect of chloroquine on the non-scheduled synthesis of DNA after irradiation of mice spleen cells is studied. Methyl-^{3}H thymidine is used in order to follow the kinetics of this synthesis and 10^{-2} mol hydroxyurea and 5×10^{-4} mol chloroquine are incorporated into Hanks' incubation medium. A 50% inhibition on the repair replication process is obtained. Ultracentrifugation studies on DNA γ-irradiated samples with and without the compound and quantitative determinations of phosphate groups and spectrophotometrical measures on UMP and OPEA supply information about the way in which chloroquine joins at important biological molecules.

EFFECT OF CAFFEINE ON THE SURVIVAL OF PAIRS OF MAMMALIAN CELL LINES OF DIFFERENTIAL SENSITIVITY TO RADIATION AND ALKYLATING AGENTS. D. Scott, M. Fox and R. R. Marshall, Paterson Laboratories, Christie Hospital and Holt Radium Institute, Manchester.

The possibility that pairs of mammalian cell lines differing in sensitivity to the lethal and chromosome damaging effects of x-rays, UV and alkylating agents might differ in post-replication DNA repair capacity has been investigated by studying caffeine potentiation of lethality. Caffeine strongly enhanced sulphur-mustard (SM) induced lethality in rat lymphosarcoma cells which are resistant to this drug but had a lesser effect on SM sensitive cells. No such differential enhancement of lethality was observed between x-ray and UV sensitive mouse lymphoma and Chinese hamster cells compared with x-ray and UV resistant mouse and hamster cells. Only with the alkylating agent, therefore, does the differential sensitivity of cell lines appear to be mediated through differences in the capacity for post-replication repair.

EFFECTS OF HYDROXYUREA AND 5-FLUORODEOXYURIDINE ON EXCISION REPAIR IN HUMAN CELLS. K. Erixon, B. Johansson and G. Ahnström, Wallenberg Laboratory, University of Stockholm.

Incubation of UV irradiated human cells results in the production of strand-breaks due to endonuclease attack at the site of a pyrimidine dimer. These breaks are, however, hardly detectable by the use of alkaline sucrose gradient sedimentation. By applying the rate of strand separation technique (Ahnström and Edvardsson, *Int. J. radiat. Biol.*, 1974, **26**, 493) it has been possible to follow the kinetics of the enzyme reactions in which the breaks are produced and sealed. Hydroxyurea and 5-fluorodeoxyuridine, both potent inhibitors of DNA synthesis, markedly increase the number of breaks, which are detectable during the repair process. This is probably caused by a decreased polymerization rate due to lack of deoxynucleotides because addition of TdR to FUdR treated cells will drastically reduce the number of breaks observed.

Xeroderma pigmentosum cells were also investigated. Cells belonging to complementation group A showed no UV induced strand-breaks, either in the absence or presence of HU, whereas Xp-variant cells had activity like normal cells.

ACTIONS OF SOME DRUGS ON ENZYMES INVOLVED IN DNA REPAIR AND SEMI-CONSERVATIVE DNA SYNTHESIS. E. Wawra, W. Klein, F. Kocsis and P. Weniger, Institut für Biologie, Forschungszentrum Seibersdorf.

Different antirheumatic and cytostatic drugs had been tested by measurement of the