Analysis of chromosomal aberrations in cells exposed to ionising radiation for the purpose of retrospective dose estimation and the assessment of DNA damage

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ANALYSIS OF MICRONUCLEI IN PERIPHERAL BLOOD LYMPHOCYTES OF PATIENTS TREATED WITH IODINE-131 FOR THYROID DISEASE
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131I activity: 0.16 – 6.6 GBq

Cumulative doses to the thyroid gland of patients with hyperthyroidism and thyroid cancer on the day of blood draw

Mean frequencies of micronuclei and mean dispersion indices in lymphocytes of patients and healthy donors.
* difference significant with p<0.001

Mn in patients with thyroid cancer and hyperthyroidism
Mn frequency normalized to age of 50

Donor groups
Enhanced level of micronuclei in peripheral blood lymphocytes of patients treated for restenosis with $^{32}$P endovascular brachytherapy

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Stents are inserted to treat coronary closures. In the case of many patients the stents close again due to restenosis.

Correlations between the micronucleus gain observed in lymphocytes of brachytherapy patients and A: the average blood volume exposed, B: the average dose to a single lymphocyte, C: the free lumen of the blood vessel, D: the duration of brachytherapy.
Project that will start at GMT: DNA damage and repair in cells exposed to mixed beams of radiation

Who is exposed to mixed beams of radiation?

- People living in areas of high natural background radiation
- Astronauts
- Cancer patients treated by high energy intensity modulated radiotherapy (IMRT) ($\gamma$,n reaction)

Collaboration with IE JRC EC, Petten, Netherlands

Preliminary results on impact of a changing dose rate on the cellular effects of ionising radiation

Micronucleus frequencies in lymphocytes exposed to a dose of 3 Gy in the state of movement to and from a radiation source. MPR:O, declining dose rate, MTO: increasing dose rate, BNC: binucleated cells. Numbers indicate independent experiments. In experiments 5 and 6 blood from two donors was exposed. *: difference significant with p<0.05 (chi2 test), bars represent standard deviations. Work done in collaboration with A. Gonzales and E. Azzam, unpublished.

Thank you for your attention.