

## Induction of micronuclei by $^{153}\text{Sm}$ -EDTMP in peripheral blood lymphocytes in vitro

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The purpose of this study was to evaluate the degree of cytologic radiation damage to lymphocytes induced by beta particle (71%  $E_{\text{max}}$  810 keV) and gamma rays (29%  $E_{\text{max}}$  103 keV) of  $^{153}\text{Sm}$  ( $T_{1/2}$  46.3 h). Samarium-153 ethylene diamine tetramethylene phosphonate ( $^{153}\text{Sm}$ -EDTMP) has been successfully applied as a radiopharmaceutical for palliation of metastatic bone pain at dose of 37 MBq/kg (1mCi/kg) intravenously.

Blood samples from four healthy donors and three patients with no previous radiotherapy were exposed to 370, 555 (equivalent to the activity administered in vivo) and 1110 kBq/ml during one hour in vitro. Then the lymphocytes were cultured for cytokinesis block micronucleus assay that has received increased attention for biologic monitoring of radiation exposure.

The MN induction in binucleated cells (CB) at 370 and 555 kBq/ml was not significantly increased and showed no difference between the groups. This result may be explained as a consequence of the sensibility of this technique. The radiation damage to PBL exposed to 1110 kBq/ml may be considered to be equivalent to that observed after an external irradiation with  $^{60}\text{Co}$  at doses of 0.3Gy in healthy donors ( $\text{MN/CB} = 0,052 \pm 0.007$ ) and 0.5Gy in patients ( $\text{MN/CB} = 0.069 \pm 0.016$ ).

This initial study showed that the use of  $^{153}\text{Sm}$ -EDTMP induced no significant increase in the micronucleation of PBL at radioactive concentration lower than 555 kBq/ml (37MBq/kg) and also that the radiosensitivity of the patients was higher than the healthy donors.