Micronuclei in lymphocytes of children from the vicinity of Chernobyl before and after 131I therapy for thyroid cancer.

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Neoplasms, Radiation-Induced - genetics
Power Plants
Research Support, Non-U.S. Gov't
Thyroid Neoplasms - genetics
Time Factors
Ukraine

Abstract: The present study addresses the monitoring of children from the Belorussian and Ukrainian Republics exposed to the fall-out of the Chernobyl accident. Micronucleus analysis has been performed on 56 children from different areas. The micronucleus frequencies in individuals as well as in regional groups were comparable with controls, except for three donors. Such results had to be expected, taking into account that at least 7 years have passed since the accident. Most of the children whose micronucleus frequencies were determined are suffering from thyroid cancer and were treated by radioiodine (131I) therapy. We studied the effect of in vitro exposure with 131I on micronucleus induction and that proliferative ability of lymphocytes. The present investigation indicates that micronuclei can be usefully employed to detect individual exposures to the incorporated radionuclide within several days after the intake of the radionuclide in a dose range of around 65-390 mGy (effective dose).

PubMed ID: 8609463 View in PubMed

Micronucleus formation in lymphocytes of children from the vicinity of Chernobyl after (131)I therapy.
After the Chernobyl accident a statistically significant increase in the number of children with thyroid tumours was observed. In this study 166 children with and 75 without thyroid tumours were analysed for micronucleus formation in peripheral blood lymphocytes using the cytochalasin B approach. The following factors did not significantly affect micronucleus formation: gender, age at the time of the first (131)I treatment, tumour stage, tumour type, or metastases; a statistically significant increase in the number of micronuclei, however, was observed for the residents of Gomel compared to other locations, such as Brest, Grodno, and Minsk. The children with tumours received (131)I treatment after surgical resection of the tumours. This gave us the opportunity to systematically follow the effect of (131)I on micronucleus formation. A marked increase was observed 5 days after the (131)I treatment followed by a decrease within a 4-7 months interval up to the next application, but the pre-treatment levels were not achieved. Up to 10 therapy cycles were followed each including an analysis of micronucleus formation before and 5 days after (131)I application. The response of the children was characterised by clear individual differences and the increase/decrease pattern of micronucleus frequencies induced by iodine-131 was correlated with a decrease/increase pattern in the number of lymphocytes.
Mutations in the p53 tumour suppressor gene in thyroid tumours of children from areas contaminated by the Chernobyl accident.

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Humans
Male
Neoplasms, Radiation-Induced - etiology - genetics
Point Mutation
Polymerase Chain Reaction
Power Plants
Research Support, Non-U.S. Gov't
Thyroid Neoplasms - etiology - genetics
Ukraine

Abstract: The number of p53 mutations observed in thyroid carcinomas derived from children from areas contaminated by Chernobyl accident is higher compared with studies on patients who had no contact with radioactivity.

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Polymorphisms in the p53 gene in thyroid tumours and blood samples of children from areas in Belarus.

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We present changes in the p53 gene in a group of 70 thyroid tumours and 40 blood samples obtained from children from Belarus. Three thyroid tumours show a polymorphism in exon 6 (codon 213) and 5 tumours show a polymorphism in intron 6, 37 bp upstream to the 5′-end of exon 7. Only one patient has a mutation in exon 7 (codon 258) resulting in an amino acid substitution in the protein p53. The distribution of polymorphisms in the 40 blood samples was as follows: three patients had a polymorphism in exon 6 and two persons had a polymorphism in intron 6. One polymorphism in intron 6 was also found in the group of 30 healthy children from Belarus. The fact that the differences in the sequence in p53 found in the tumours was also seen in the blood of these patients demonstrates that they are polymorphisms not induced by radiation exposure. It is difficult to conclude, if the polymorphisms found by us could be associated with the predisposition to radiation-induced cancer.

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