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Application of FISH technique to study chromosome 1, 2 and 4 in colorectal cancer patients

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Colorectal cancer is one of the most commonly occurring malignancies in both men and women. However, application of radiotherapy might be beneficial depending on individual susceptibility or even may cause risk of secondary cancers and others complications. Therefore, studies on influence of endogenic or egzogenic factors on the body's response in modeling a therapeutic procedure are still required.

Many reports indicate the importance of FISH technique in revealing sensibility to structural rearrangements such as stable aberrations as translocations and many other abnormalities in individual's chromosomes. This technique has significant impact for public health as a biomarker of applied in human monitoring for the health effects of exposure, in particular the cancer risk.

The aim of this study was to compare vulnerability to the induction the aberrations in chromosome pairs: 1, 2 and 4 by X-ray's challenging high dose

(2 Gy) in lymphocytes from colorectal cancer patients (age range with 39 –73) with results from control group-healthy subjects (age range 25 –60), of various occupations, including nuclear medicine workers. We wanted to find out if their cellular radiosensitivity can be associated with predisposition to cancer induction as well as any endogenic or egzogenic factors i.e.: occupational exposures, smoking habit or diets. Cells were examined in metaphase after application the three-color FISH technique.

Preliminary results showed extensive variability in susceptibility to radiation, expressed in significantly elevated or lowered frequency of aberrations for chromosome 1, 2 and 4 for various patients with colorectal cancer, when compared to average of control group. Results are in an agreement with our previous findings from classic cytogenetics, that have shown higher than in a control group level of chromosome damage and strong variation between individuals. Additionally our results suggest, that application of challenging dose and FISH technique may identify patients more sensitive or resistant to radiation as well as a role of a life style related factors modifying their vulnerability to the therapeutic treatment. Secondly, our results from control group, also show to what extent diagnostic or occupational exposures might alter susceptibility to other genotoxic and health risk.

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