

Low dose irradiation impact on proliferation rate and genetic damage in three-dimensional HepG2 cell cultures

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Biological effects of low doses of ionizing radiation are not yet consistently studied and documented. In this context, more advanced and complex biological models should be applied to obtain relevant data.

Recognizing the need to evolve and develop advanced biological models, in order to try overcome as much as possible known limitations and difficulties of the current monolayer cellular models, as well as the increasing difficulties to use advanced biological models, our group has been working to develop distinct advanced biological alternative models, namely three-dimensional cell cultures.

Two three-dimensional cellular models and a control monolayer cellular culture were externally irradiated with 100mGy and 1000mGy. Radiobiological effects were studied by the assessment of proliferation rate (using MTT assay) and genetic damage (by comet assay), at two time-points: 24h and 72h post-irradiation.

Our results show an acute statistically significant tendency of decrease in the proliferation rate of three-dimensional cell cultures irradiated with both doses, 24h post-irradiation, with recovery at 72h post-irradiation. Interestingly, monolayer cell cultures displayed a distinct proliferative behavior when compared with three-dimensional cultures.

On the other hand, there seems to be no evidence of any relationship between these irradiation doses and DNA damage, while culture methods seem to produce a considerable impact on it: in fact, higher manipulation in three-dimensional cultures seems to be related with increased genetic damage.

Data already obtained suggests our conclusions, that the acute response to 100mGy and 1000mGy irradiation is related with the decrease of proliferation rate (recovering at 72h post-irradiation) while it seems to have no significant genetic impact.



Foi decidido que não será apresentada a versão integral deste documento.

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