



## Modern Radiobiology: Study of Ionizing Radiation Biological Effects using ThreeDimensional Cell Cultures

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**Introduction:** Biological effects of high doses of ionizing radiation are reasonably well studied and documented. Nevertheless, there is a clear lack of information and/or evidence concerning biological effects of Low Doses, namely at medical imaging levels, as those characterizing Nuclear Medicine and Radiology typical environments. Our group has been involved in the *in vitro* study of these low dose radiobiological effects. Preliminary experimental results with 100mGy external gamma irradiation of HepG2 monolayer cells showed a slight increase in the proliferation rate 24h, 48h and 72h post irradiation. These preliminary results also pointed into the presence of some Bystander effects 72h post irradiation, constituting the starting point and motivation for the need of a more accurate analysis, here presented.

**Material and Methods:** To perform this study, due to the complexity of the effects aimed to be studied, and recognizing several known limitations and difficulties of the current monolayer cellular models, as well as the increasing difficulties to translate *in vitro* obtained data to *in vivo* biological behavior, advanced biological alternative cellular models, namely three-dimensional cell cultures, have been developed. These models are consensually recognized by its capacity of better mimic *in vivo* cellular arrangement and communication, and could be considered as a better/ more adequate tools for the study of modern radiobiological effects such as bystander and/or hormesis.



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**Results and Conclusion:** Obtained results, namely cellular metabolic activity and proliferation (using MTT and/or clonogenic assays), will be presented, discussed and potentially explained, always focused on the acute biological effects observed after irradiation with low doses of ionizing radiation.



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