



Zebrafish and Nuclear Medicine methods and techniques: an each-day improving partnership

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Aims: This work aims the introduction of zebrafish as a very promising and each day more interesting animal model in radiobiology. It will be briefly discussed the most relevant advantages and disadvantages related with the use of zebrafish, mentioning some of the previous studies using this model in Nuclear Medicine and concluding with its potential applications.

Discussion: In recent years, zebrafish, *Danio rerio*, a small vertebrate from Southeast Asia, has gain the interest of researchers and significantly increased its use as animal model for studying a large number of human diseases. Its genome is entirely sequenced, allowing its use for gene functional studies, developmental biology and toxicology. With a reasonable cost and ease of care, large numbers of specimens can be maintained in a relatively small space wherein frequent paired mating produces hundreds of embryos each time. Generation time is short, typically 3-4 months, making it suitable for selection experiments. Embryonic development is rapid, with major organ systems - such as eyes, brain, heart, liver, muscles, bone and gastrointestinal tract - conveniently evident.

The study of DNA damage responses in vertebrates, using in vitro cell cultures, has become more and more common. In recent years, there were an increasing number of research works using the zebrafish embryo as an in vivo model to study the DNA damage response to ionizing radiation. One from the most relevant advantages is that the human and zebrafish genomes share considerable level of homology, including conservation of most DNA repair-related genes. Moreover, zebrafish has also been used as model system to screen radiation modifiers.

In our case, namely on this study, started on January 2011, the choice and the use of this model has been related with the evaluation, characterization and - as much as possible - quantification from biological effects of low doses, starting on medical imaging level, of irradiation using sources of X and Gamma Rays. Taking profit from the



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intrinsic characteristics of *Danio rerio* already briefly mentioned above, our study, planned to be executed during at least three years, will be focused on the radiobiological effects across a considerable number of generations and will - expectantly - allow obtaining interesting and useful conclusions about major aspects and systems involved.

Conclusions: The use of zebrafish as animal model in radiobiological studies, namely using Nuclear Medicine methods and techniques, is currently regarded with great potential, receiving an increasing attention in this important research field.

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