

## Study of radiation effects through an innovative and alternative biodosimetric method based on the use of a plant organism

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Human beings are continuously exposed to radiation from multiple sources throughout their lives (solar radiation, background radiation, radiation from medical procedures, *etc.*). It has therefore become increasingly important to develop systems for evaluating radiation effects on cells and in particular on genetic material, using simple, rapid and easily applicable techniques to a large number of samples. These techniques are based on the identification of cytogenetic defects (endpoints), which can be generated inside the cells, due to interaction with radiation. The relationship between endpoints and absorbed dose is called biodosimetry.

The use of biodosimetry on human models is documented in the literature, but most of the data refers to subjects who absorbed high doses, while there is a lack of data on the effects of low doses.

This deficiency is linked to the impossibility of performing this type of studies on humans. Furthermore, the use of animals is also strongly discouraged, not only for ethical reasons, but also due to the difficulty of obtaining the large number of samples necessary to generate statistically acceptable results.

The aim of this work is the biodosimetry of high and low LET ionizing radiations (alpha particles and X-rays), and the biodosimetry of Ultraviolet radiations (UVB and UVC) through the use of apical meristematic cells of a plant organism (*Allium Cepa*). The use of this organism is of great interest, as it allows to carry out experimental work that applies the principle of the 3Rs with the aim of replacing the animal model. Studies on the genotoxicity of X, alpha, UVB and UVC radiations were carried out through the application of the micronucleus test, the analysis of the mitotic index and of chromosomal aberrations. In addition the already known procedure for the preparation of the samples was optimized and standardized through the design and construction of a device for the obtainment of meristematic cell monolayers to be analyzed.

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