Threshold dose distribution and its causes and consequences in photodynamic therapy (Conference Presentation)

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ABSTRACT

Experimental Photodynamic Therapy (PDT), either in vivo or in vitro, is normally carried out under distinct conditions making it difficult to compare results in order to propose the best combination for optimized outcomes. In this work, a threshold distribution model was used to investigate the PDT response in vitro. It is known that different types of cells present distinguished resistance to treatment, which can be due to several factors. The threshold distribution obtained from the differentiation of the dose-response curves, is under discussion by several authors. The main parameters of the distribution are related with the most frequent threshold in the population, given by the dose of the peak, and its variability is represented by the the distribution width. To evaluate how PDT response differs, we used normal and tumor cell lines from liver (HepaRG, HepG2, respectively) and breast tissues (MCF-7 and HMEC). We also performed an induction protocol of tumor resistance to assess the variations in the threshold distributions of the derived cells. Results show that the normal cell lines generally present a more homogenous response since the threshold distributions are more symmetric and narrower than the ones from the tumor cell lines. We also observed that MCF-7 is more resistant to PDT than HepaRG and HepG2. Experiments to investigate the causes for the different responses, such as photosensitizer uptake and reactive oxygen species (ROS) production, were performed. The findings are promising and encourage the further investigation ofvariability in PDT responses using the threshold distribution model.

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