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50TH ANNUAL MEETING OF THE BRAZILIAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY (SBBQ)

45TH CONGRESS OF BRAZILIAN BIOPHYSICS SOCIETY (SBBF)

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PROGRAM AND ABSTRACT BOOK

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Ilustração da Capa: Alexandre Takashi

NB.13 - A simple and quick method to generate *in vitro* tridimensional tumor bodies from a human breast adenocarcinoma (MCF7) using magnetic aggregation technique

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Tumor physiology studies have to rely on efficient and representative models, as animal-based or *in vitro* tridimensional cell constructs. The work used magnetite (Fe3O4) nanoparticles produced by electron-beam induced chemical reduction to give cells the ability to form aggregates when submitted to a magnetic field, and thus to produce micro tumors *in vitro*. The work aimed to produce human breast adenocarcinoma mini tumors (BAMT's) *in vitro*. Paramagnetic iron oxide nanoparticles (PION's) were synthesized through electron-beam induced Fe3+ reduction and subsequent coprecipitation. Due to its poly-L-lysine coating, PION's were adsorbed on cell membranes of MCF7 (human breast adenocarcinoma). Cells were seeded in 24-well cell culture plates pre-treated overnight with Pluronic® F-127 to prevent cell adhesion and kept in culture conditions under magnetic fields for at least 6 days. BAMT's were differentially stained with Hoescht 33342 and ethidium bromide and imaged by wide-field fluorescence microscopy. BAMT's appeared as integer and well-defined cellular aggregates, with sparse dead cells stained by ethidium bromide. These structures can be further used for *in vitro* tumor studies, as BAMT's are supposed to be more reliable models than monolayer cultures. Treatment of wells with poloxamer caused a mild to moderated cell-repellent effect, similar to those found in commercially available products, only by a fraction of the cost. The experiments succesfully produced mini tumors prone to be used in *in vitro* studies.

Keywords: breast cancer, 3d culture, magnetic
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NB.14 - Development of a Female Mouse Computational Model Based on CT Images for Dosimetric Assays

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Small animals, such as mice, are used in biodistribution studies and innumerous preclinical investigations involving ionizing radiation. Longitudinal preclinical studies with five or more image procedures (MicroCT and/or PET/SPECT) are not uncommon. However, the cumulated absorbed doses in mice organs and their influence in experimental results is often neglected. Accurate calculation of absorbed doses in mice organs are needed to evaluate potential radiobiological effects that may interfere with in vivo experiments. Based on a previous study of a male mouse computational model known as DM_BRA, this paper is focused on the development of FM_BRA, a female mouse computational model. Develop and implement for the MCNP code a female computational mouse model for mice radiopharmaceutical dosimetry. A set of Micro-CT images of a female mouse kindly available at (https://www.youtube.com/watch?v=-Xg921NVFSs) was selected for the segmentation process. Forty-seven coronal slices were manually segmented using AdobePhotoshop®. In these images each color corresponds to a numerical code that identifies each organ. After the segmentation process, the images were converted into a ".raw" 3D file format. An in house C++ program was used to convert the 3D image into the computational model in the MCNP format. The new FM_BRA was segmented with 20 tissues/organs. The model matrix has (156 x 366 x 105) voxels and the voxels dimensions are (0.25 x 0.25 x 0.25) mm3. Elemental composition and density of human organs were used in MCNP setup of the model. The total mass of the model is 26.3 g. The masses of segmented organs were compatible with the values found in the literature. A new female mice model was successfully developed and implemented for MCNP. A set of S-values for dosimetry of positron emitting radioisotopes will be available soon.

Keywords: female mouse model, mice dosimetry, Monte Carlo
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