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Study of vascular remodelling in breast tumors and its influence on the Enhanced Permeability and Retention (EPR) effect

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The growth and spread of tumors depends on an altered vascular network, which supports its survival and expansion in addition to providing accessibility to the vasculature and a transport pathway to metastasize the tumor cells. Nanomedicine offers effective therapies to help the compounds stay in the blood longer and accumulate in tumors instead of healthy tissue. Much of these therapies are based on the idea that particles accumulate in tumors through a phenomenon in which blood vessels present fenestrations that facilitate the preferential passage into tumor tissue and remain in place longer because of inefficient lymphatic activity (Permeability Effect and Increased Retention). However, many researchers in the field question this premise because of the difficulty of drug-loaded nanoparticles to demonstrate greater efficacy in clinical trials. Thus, the study of how tumor vascular remodeling affects the accumulation of nanoparticles could facilitate the clinical application of nanomedicine-based therapies. Thus, the objective of this work is to study tumor vascular remodeling in two experimental models of carcinoma (Ehrlich ascites carcinoma and murine mammary carcinoma) and to analyze its influence on the biodistribution of nanoemulsion containing the fluorescent marker DiR. For this purpose, imaging and morphological analysis techniques such as scanning electron microscopy, computerized microtomography, fluorescence tomography, vascular permeability (evans blue), histology and immunohistochemistry (CD31, D240 and KI67) were used to study how vessels blood cells behave in the fourth week of tumor development. Using these techniques, we observed that even the two carcinoma lines being in the same developmental stage and with the same anatomical location, present different vascular behavior in a way that affects the passive biodistribution of the nanoemulsion to tumor tissue. Thus, it is recommended that for a better clinical application in therapies using nanostructured materials, the biological behavior of the tumor should be evaluated individually so that the most appropriate strategy for the treatment can be selected and, consequently, the clinical success in nanomedicine is improved.

Biography

Graduated in Pharmaceutical Sciences from the Faculty of Imperatriz - FACIMP / Wyden (2014). She was a Fellow of CNPQ / FAPEMA and a student of scientific initiation in the pharmacognosy, microbiology and chemistry laboratories of the FACIMP / Wyden Department of Pharmaceutical Sciences. He has experience in the areas of pharmacognosy, pharmacology, pharmacobotany and microbiology, working mainly on the following topics: Identification of secondary metabolites, organography and microtechnology, production of plant extracts and analysis of antimicrobial activity, such analyzes performed with leaves and oil-resin of Copaiba (*Copaifera* spp.). She currently holds a master's degree in Nanoscience and Nanobiotechnology at the University of Brasília (UnB) under the guidance of Prof. Dr. João Paulo Figueiró Longo, focused on the study of vascular remodeling in breast tumors and its influence on the Enhanced Permeability and Retention (EPR) effect with the application of a mathematical model to predict hemodynamic parameters.

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