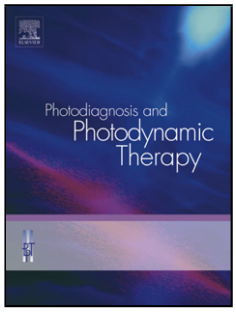

Title: Fluorescence analysis of a tumor model in the chorioallantoic membrane used for the evaluation of different photosensitizers for photodynamic therapy

Authors: Hilde Harb Buzzá, Amanda C. Zangirolami, Arthur Davis, Pablo A. Gómez-García, Cristina Kurachi

PII: S1572-1000(17)30212-0
DOI: http://dx.doi.org/doi:10.1016/j.pdpdt.2017.04.012
Reference: PDPDT 947

To appear in: *Photodiagnosis and Photodynamic Therapy*

Received date: 16-2-2017
Revised date: 23-3-2017
Accepted date: 24-4-2017

Please cite this article as: Buzzá Hilde Harb, Zangirolami Amanda C, Davis Arthur, Gómez-García Pablo A, Kurachi Cristina.Fluorescence analysis of a tumor model in the chorioallantoic membrane used for the evaluation of different photosensitizers for photodynamic therapy.*Photodiagnosis and Photodynamic Therapy* http://dx.doi.org/10.1016/j.pdpdt.2017.04.012

<AT>Fluorescence analysis of a tumor model in the chorioallantoic membrane used for the evaluation of different photosensitizers for photodynamic therapy

<AU>Hilde Harb Buzzá[a,*] ##Email##hilde.buzza@gmail.com##/Email##, Amanda C. Zangirolami[a], Arthur Davis[b], Pablo A. Gómez-García[c], Cristina Kurachi[a]
<AU>

<AFF>[a]São Carlos Institute of Physics, University of São Paulo (USP) PO Box 369, 13560-970, São Carlos, São Paulo, Brazil
<AFF>[b]Institut d'Optique Graduate School, Palaiseau, France
<AFF>[c]Escuela Tecnica Superior de Ingenieros Aeronauticos, Universidad Politécnica de Madrid, Madrid, Spain

<PA>*Correspondent author.

<ABS-HEAD>HIGHLIGHTS► Dynamic distribution of different photosensitizers was evaluated; ► It was possible to understand the interaction of PS with blood vessels and tumor cells. ► A tumor model in CAM could be interesting to test several mechanisms of PDT;

<ABS-HEAD>Abstract

<ABS-P>The development of a tumor in the chicken chorioallantoic membrane (CAM) enables a more individualized understanding of the dynamics of the photosensitizer (PS) interaction with the tumor blood vessels and cells. Photogem® and 5-aminolevulinic acid (ALA), a protoporphyrin IX (PpIX) precursor, were used as PS and their red fluorescence enabled the monitoring of PS dynamic distribution in the vessels and in the tumor. With a tumor model in CAM and fluorescence assessment, the aim of this study was to evaluate the PDT parameters comparing different photosensitezers. In this model, the topical application was chosen as the best way of drug delivery and widefield fluorescence images were at every 30 minutes. The images were processed in a MATLAB® routine for a semi-quantitative analysis of the red fluorescence. PpIX formation in the blood vessels and in the tumor region was observed after 3 h and 1.5 h, respectively, whereas Photogem® was accumulated in the tumor region after 2 h. The illumination was performed by a diode laser with emission centered at 635 nm and irradiance of 80 mW/cm^2 for 10 minutes. After PDT irradiation, the photobleaching for both compounds was observed. Photogem® showed a reduced photobleaching, however, both PS induced a destruction of the tumor mass and vascular network in the treated area.
<KWD>Keywords: Photodynamic Therapy; Chorioallantoic Membrane; Tumor Model; Photosensitizers; Fluorescence

<H1>1. Introduction

Improvement in both treatment and diagnosis of cancer is a constant motivation for the scientific community. Photodynamic Therapy (PDT) is a local treatment modality based on three main components, namely light, a photosensitive compound and oxygen present in both the cell and the microenvironment. The interaction between the light and the photosensitizer (PS) results in the excited state of PS that will react mainly with the oxygen. The singlet oxygen produced is highly reactive and toxic to the cell. (1–5)

Dosimetry studies are very important for the therapy effectiveness since minimum doses of the three elements of PDT are necessary and involve, basically, three factors, namely light distribution in the tissue, variations on PS concentration and tissue oxygenation. Oxygen depletion during the PDT irradiation is directly related to the induced damage on the