

## MICROSCOPIC EVIDENCE OF PLACENTA AS A NATURAL BARRIER FOR A PHOTOSENSITIZER

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**Abstract.** The aim of this work was to find out if there is selective accumulation of Photofrin II in placenta of a pregnant rat and an embryo at different stages of the embryogenesis and to make preliminary estimations of possible PDT application effect on the embryo.

Fluorescence microscopy methods were used to evaluate accumulation of the photosensitizer in an embryo and placenta at the 7<sup>th</sup>, 14<sup>th</sup> and 20<sup>th</sup> days of rat gestation, 24 hours after intravenous administration of the photosensitizer.

Fluorescence microscopy results revealed that there is no selective accumulation of Photofrin II in embryos during the first stage of gestation (7<sup>th</sup> day of embryogenesis) as well as after formation of placenta (14<sup>th</sup> day of embryogenesis) or before the birth (20<sup>th</sup> day of embryogenesis). However, spectroscopy results show relatively high fluorescence of Photofrin II in embryo at the 7<sup>th</sup> day of embryogenesis (if to compare with fluorescence in uterus). During the study, it was determined that after formation of placenta (14<sup>th</sup> day of embryogenesis) it accumulates photosensitizer in an active way. It is clear that placenta serves as an active natural barrier and protects the embryo from phototosensitizer. This proposes that embryo would be safer from the direct PDT effect at later stages of embryogenesis (after formation of placenta). However, even if the embryo does not accumulate photosensitizer, PDT application may have some indirect negative effects – PDT could damage the placenta and lead to abortion, birth defects, premature birth and many other complications.

Spectroscopic and fluorescence microscopy data revealed the presence of high concentrations of endogenous photosensitizers in the uterus before the birth (at the 20<sup>th</sup> day of gestation), therefore PDT applications at the latest stages of embryogenesis might have stronger side effects.

Further experiments must be performed in order to determine possible direct and indirect effects of Photofrin II administration and PDT on embryo.

**Keywords:** fluorescence spectroscopy, fluorescence microscopy, photosensitizer, uterus, placenta, embryo.