

TITLE: EFFECTS OF PHOTODYNAMIC THERAPY IN EXPERIMENTAL CANDIDOSE AND IMMUNOLOGICAL RESPONSE IN THE MODEL HOST OF *Galleria mellonella*

AUTHORS: FIGUEIREDO, L.M.A.¹; MENEZES, R.T.²; CARVALHO, J.S.¹, GARCEZ, A.S.³; JORGE, A.O.C.¹; JUNQUEIRA, J.C.¹.

INSTITUTION: 1. São Paulo State University (Unesp), Institute of Science and Technology (ICT), Campus São José dos Campos, São Paulo. (Av. Eng. Francisco José Longo, nº 777, Jardim São Dimas, 12245-000 - São José dos Campos, SP); 2. Universidade Paulista - Unip, Campus São José dos Campos – SP. (Presidente Dutra Highway, km 157.5); 3. São Leopoldo Mandic Dental Research Center. (Rua José Rocha Junqueira, 13, Campinas, Brazil).

ABSTRACT

Photodynamic therapy (PDT) has demonstrated antimicrobial activity on the yeast of the genus *Candida* and is considered a promising technique for the treatment of candidiasis. Recently it was reported that the application of PDT may also result in activation of the immune system, contributing to the improvement of the infection. The objective of this study is to evaluate the action of PDT and laser therapy on the immune response to experimental candidiasis using *Galleria mellonella* as host of the infection. *G. mellonella* larvae were infected with different *Candida albicans* strains and, after 30 min were treated with methylene blue-mediated PDT and laser diode emitted at 660 nm. Then, the larvae were incubated at 37° C for seven days and analyzed daily in order to determine the survival curve. For the study of the immunological response, after intervals of 3, 6, 18 h of the PDT, tests were performed to determine the density of hemocytes in the hemolymph of *G. mellonella*. The data obtained in the survival curve were evaluated by the Log-rank test (Mantel Cox) and the results of the immunological analysis by analysis of variance ANOVA and Tukey test, with significance of 5%. The results demonstrated that for both the ATCC 18804 strain and the *C. albicans* clinical strain 17, PDT prolonged the survival of the infected *G. mellonella* larvae by a lethal fungal dose. However, there was a statistically significant difference between the PDT and the control groups only with ATCC strain ($p = 0.0056$). It was also found that infection by the *C. albicans* ATCC 18804 strain in *G. mellonella* led to a reduction in the number of hemocytes in the hemolymph, and the treatment with PDT and laser therapy succeeded in increasing the number of hemocytes but without significant statistical difference. It was possible to conclude from this study that PDT as well as laser therapy positively influenced the improvement of *C. albicans* infection in the *G. mellonella* model.

Keywords: *Candida albicans*. Invertebrate. Photodynamic therapy.