Evaluation of the treatment of infectious endocarditis with aPDT and trans-thoracic irradiation in an animal model: A study protocol

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Endocarditis is an infection caused by an opportunistic bacterial that migrates to an injured endocardial. It affects 3-10/100,000 people every year, with a 30% of mortality rate. *Staphylococcus* is the most frequent and destructive microorganism that causes this disease. Usually, bacteria originated in an infection on another site, usually the teeth, travel through the blood flow and populate damaged areas of the myocardial, such as prosthetic valves, promoting vegetation, and tissue damage.

This protocol aims to evaluate the usage of antimicrobial Photodynamic Therapy with transthoracic irradiation and Methylene Blue to the treatment of Infective Endocarditis in an animal model.

The induction of the endocarditis, a catheter will be introduced in the carotid artery through surgery to produce a slight injury to the myocardium, and after two days the animals will be infected with *Staphylococcus Aureus.* An echocardiogram and hemogram will be used to confirm the infection, after which the Methylene Blue will be administered diluted in drinking water one hour before the irradiation procedure. The three study groups are as follows: 1: control infected group; 2: aPDT group with a single treatment and 3: aPDT group with 5 consecutive treatments (5 days). Each irradiation will be performed for 20 min with 800 mW LED emitting at 630 nm (342 J/cm2 at the surface of the rat’s thorax). Survival fraction as well as microbiological and imaging analysis will be performed in all groups. With this procedure, we expect to increase the survival rate of the subjects.