

**EV0624**

**ePoster Viewing**

**Mechanisms of action, preclinical data & pharmacology of antibacterial agents**

**Comparison of the efficacy of the photoinactivation of *Escherichia coli* using different lamps.**

Vanesa Pérez Laguna<sup>1</sup>, Luna Pérez-Artiaga<sup>2</sup>, Verónica Lampaya<sup>2</sup>, Yolanda Gilaberte<sup>3</sup>, Maria Jose Revillo<sup>4</sup>, Antonio Rezusta<sup>\*4</sup>

<sup>1</sup>*Hospital Universitario Miguel Servet, Department of Microbiology, Zaragoza, Spain*

<sup>2</sup>*Miguel Servet University Hospital, Department of Microbiology, Zaragoza, Spain*

<sup>3</sup>*San Jorge Hospital, Department of Dermatology, Huesca, Spain*

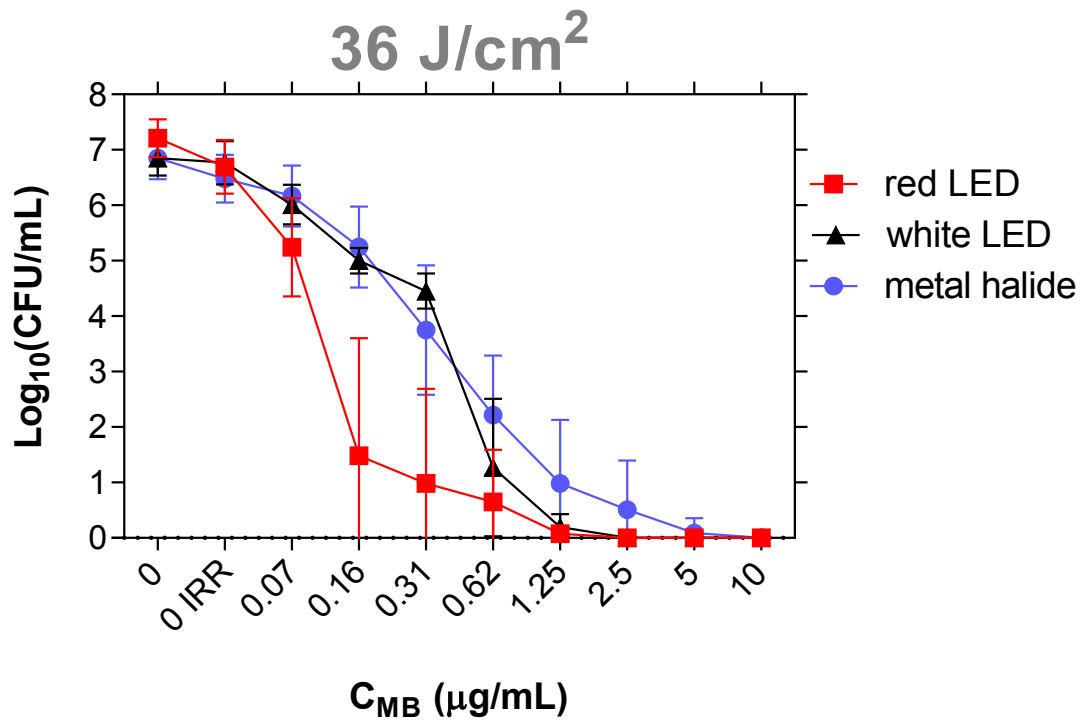
<sup>4</sup>*Hospital Universitario Miguel Servet, IIS Aragón, Department of Microbiology, Zaragoza, Spain*

**Background:** Nowadays, antibiotic resistance is increased and the development of new alternative to treat infections is required. Antimicrobial photodynamic therapy (aPDT) is a new treatment strategies based on the application of a photosensitizer (PS) activated by visible light to generate reactive oxygen species that are cytotoxic to the target cells. APDT could be an alternative treatment for infections. *E. coli* is commonly involved in skin and mucosal infections, where aPDT can be easy performed. Methylene Blue (MB) is a very active PS (maximal absorption wavelength ( $\lambda$ ) at 665 nm) for aPDT.

The aim of this study is to compare the efficacy of aPDT-MB to photoinactivate *E. coli* using three lamps, one corresponding to its peak of  $\lambda$  absorption and the others two covering the entire spectrum.

**Material/methods:** *E. coli* ATCC 25922 suspensions containing  $>10^7$  cells/mL were prepared. Different concentrations two-fold serial dilution of MB (from 0.16  $\mu\text{g/mL}$  to 160  $\mu\text{g/mL}$ ) were added. Irradiation was performed using a fluence of 36  $\text{J/cm}^2$  with different lamps: red-light-emitting diode (LED) lamp (625 nm, an irradiance of 0.007  $\text{W/cm}^2\text{w}$ ), white-LED lamp (460-515-625 nm, 0.024  $\text{W/cm}^2$ ) and white metal-halide lamp (broad-band 420 to 700 nm, 90  $\text{mW/cm}^2$ ). Afterwards, microbial suspensions were subcultured onto blood agar to determine the viable bacteria by colony-forming units counting (CFU/mL). Appropriate control experiments were carried out. A criterion of 6  $\log_{10}$  unit decrease from the starting inoculum was adopted to define bactericidal activity.

**Results:** APDT with MB reached a reduction of 6  $\log_{10}$  in the number of CFU/mL using concentrations of MB between 0.6-1.25  $\mu\text{g/mL}$  with red-LED light, whereas 1.25-2.5  $\mu\text{g/mL}$  were needed with white-LED light, and 2.5-5  $\mu\text{g/mL}$  with metal-halide at 36  $\text{J/cm}^2$  (Graphic 1).



Graphic 1: Photoinactivation of *E.coli* with the different lamps tested.

**Conclusions:** *In vitro* PDT-MB has a significant bactericidal effect on *E. coli* with any of the tested lamps although red light is more efficient than white light (red-LED aPDT-MB > white-LED aPDT-MB > white metal-halide aPDT-MB).

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