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50TH ANNUAL MEETING OF THE BRAZILIAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY (SBBQ)

45TH CONGRESS OF BRAZILIAN BIOPHYSICS SOCIETY (SBBF)

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PROGRAM AND ABSTRACT BOOK

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Ilustração da Capa: Alexandre Takashi

EB.18 - Photodynamic therapy associated with ionizing radiation in the treatment of triple-negative breast cancer cells

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Breast cancer is the most common cancer for women worldwide. According to the World Health Organization, it is considered the 5 th leading cause of death from cancer. Triple-negative breast cancer (TNBC) is a subtype of this disease that represents around 20% of all invasive breast cancer, whose main characteristics are resistance to conventional treatments, such as exposure to ionizing radiation (IR). On the order hand, the photodynamic therapy (PDT) using porphyrins and their derivatives has been described in the literature as a potential therapy against cancer. Thus, our goal in this work was to associate PDT and IR in the treatment of TNBC. MDA-MB-231 cells at a concentration of 2x104 cells were submitted to PDT using TMPyP porphyrin (30 μM) and a red light (660 ±11 nm) with fluences of the 23 and 57.5 J/cm 2 (57.3 mW/cm 2). Immediately post-PDT, cells were divided into groups: non-treated (control), only IR and PDT associated with IR (PDT57+IR and PDT23+IR) and then, exposed to IR with a dose of 2.5 Gy. Past 24-h of the PDT-session, the cell viability, clonogenicity and total glutathione were verified. Cells exposed to IR not presented statistically significance difference compared to the control group. However, treated groups showed around 38% lower cell viability in relation to the control and IR groups. For the clonogenic assay a reduction of the approximately 65% was observed between IR and treated groups. Regarding to the total glutathione, all groups showed an increase when compared to control group. Nonetheless, no were identified differences between IR and treated groups. Taken together, our results indicate that PDT associate with IR may be an ally in TNBC treatment.

Keywords: radiotherapy, combined therapy, cancer
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EB.19 - Combination Therapy of Antimicrobial Photodynamic Inactivation: Potential of Nanoparticles and Plant Based Compounds

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The multidrug resistance of pathogenic bacteria has become a serious problem to public health, finding novel approaches to combat multidrug resistant bacteria have therefore become increasingly important. Microbes in biofilm form can tolerate higher levels of antibiotics than their planktonic form. An “ideal” anti-biofilm agent should be able to penetrate the matrix and/or to inhibit/interfere with its accumulation; combined with the ability to recruit immune cells and/or modulate the host immune response would be an added value. One promising approach is antimicrobial photodynamic therapy (APDT) which involves the use of photosensitizer (nontoxic dyes) that are excited by visible light and produce oxygen free radicals in the presence of oxygen. APDT can be combined with other agents or drugs, improving the overall result while reducing individual concentrations and avoiding host tissue damaging. Among these options nano formulations of photosensitizer or using nano vehicle for drug delivery got enormous interest and advance in the recent. Also polyphenol compounds from plants showed antibacterial activity against different pathogen which could be consider as an adjuvant in APDT. In our work, after performing MTT assay (to evaluate photosensitizer toxicity on human fibroblast cells), the effect of APDT on bacteria in the planktonic and biofilm forms were investigated. We combined APDT based methylene blue as photosensitizer with polyphenols or used curcumin nano particle as photosensitizer. Our result showed that there was a reduction in the number of bacteria in planktonic condition, bacterial biofilm production and also enhance in destruction of the biofilm in combination mode compared to single mode. Therefore, combination therapy with APDT could be suggested as novel approach in the treatment of multi drug resistant bacteria in chronic ulcer condition.

Keywords: Antimicrobial photodynamic inactivation, Combination therapy, Nano particles