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INTRODUCTION
Photodynamic therapy (PDT) treatment have been widely investigated in order to understand the photophysical mechanisms. PDT has been used for skin diseases, inactivation of virus and cancer treatment. In general PDT involves a photosensitizer (PS) molecule that it can be activate after light irradiation and generate radical species that it causes several effects in the target. In this way cell membranes composed by proteins and lipids are the major targets for photoinduced cell inactivation. After light irradiation, the free radicals and contact dependent reactions by PSs can produces oxidized lipids through lipid peroxidation process. The formation of these species can lead to membrane damage and causes cell death.
OBJECTIVES
To perform in vitro and theorical studies to analyzed PSs photochemical properties and membrane damage effects.
MATERIALS AND METHODS
Preparation of SUVs and GUVs vesicles with POPC lipid and molecular dynamics (MD) simulation using Gromacs software.
DISCUSSION AND RESULTS
Experiments performed in small unillamelar vesicles (SUVs) and giant unilamellar vesicles (GUVs), with a POPC (unsaturated lipid), showed that MB, DO15, DO16 and DO37 cause membrane damage in a small concentration, (1 μM), after light irradiation (630 nm). To better understand the results found in the experimental tests, we performed the molecular dynamics (MD) simulation of the PSs described above in a POPC membrane model. MD studies reinforce the importance of PS interaction with the cell membrane in PDT efficiency. As with the experimental results, the simulation suggests that DO15 is more efficient in generating damage to the cell membrane. Due to its proximity to the double bond of lipids, by a contact-dependent mechanism, followed by DO16, DO37, and finally MB.
CONCLUSION
All compounds entered the membrane, and those that came closer to the double bond, internalized perpendicularly to the membrane with the piperidine ring coming close to the lipid double bond, suggesting that the site of action is in this region.
Keywords: Photodynamic therapy, Photosensitizers, Membrane damage
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08890 - Poster Session

EB.12 - Reconstitution of Leishmania plasma membrane to understand the photodynamic effect

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INTRODUCTION
Leishmaniasis is an important neglected disease. Photodynamic therapy (PDT) has been used to fight cutaneous leishmaniasis showing good results. However, PDT mechanisms in Leishmania parasites are not yet completely clarified.
OBJECTIVES
In this work, our objective was to develop a protocol to produce giant plasma membrane vesicles (GPMVs) from *Leishmania amazonensis promastigotes* to understand the mechanisms of action of methylene blue (MB)-mediated PDT on the cell membrane of parasites.
MATERIALS AND METHODS
For membrane extraction, several techniques were tested. The osmotic shock was the technique that presented the best yield and effectiveness. Phosphate and protein measurements were performed to confirm membrane extraction. For the growth of GPMVs, the best technique was electroforming using different frequencies and voltages in 4 cycles. Reconstituted GPMVs were observed by phase-contrast light microscopy. Subsequently, PDT was applied to GPMVs dispersed in an aqueous solution containing 50 μM MB and we verified the changes in permeability before and after exposure to light. The same process was applied to giant unilamellar vesicles (GUVs) with lipid compositions similar to the parasite membrane.
DISCUSSION AND RESULTS
The electroforming technique with the protocol developed in this work made it possible to obtain GPMVs from a promastigote membrane isolate of L. amazonensis. The membrane isolation technique was effective to extract the parasite's membrane while preserving lipids and proteins. In GUVs we observe an increase in the area during PDT in different compositions and loss of contrast. The GPMVs showed a loss of contrast as well as the GUVs but did not show an increase in area.
CONCLUSION
This factor could be explained by the high degree of complexity of the membrane, which contains membrane proteins in addition to containing lipids.
Keywords: Leishmania amazonensis, GPMVs (Giant Plasma Membrane Vesicles), PDT (Photodynamic Therapy)

08278 - Poster Session

EB.13 - Enhanced action of nanoencapsulated herbicide on photosynthesis and antioxidant activity in spinach leaves: toward a sustained weed control?

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INTRODUCTION
Despite a wide range of possible applications of nano-enabled pesticides, the mechanisms involved in their enhanced action remain largely unknown. Understanding the interaction between nanopesticides and plants is crucial for evaluating their potential safety application.
OBJECTIVES
Using an experimental and theoretical approach, this study aimed to investigate the target effect of paraquat-loaded chitosan/tripolyphosphate nanoparticles on the photosystem I (PSI).
MATERIALS AND METHODS
Chitosan/tripolyphosphate nanoparticles carrying paraquat was prepared by ionic gelation method. Nanoformulation was characterized, and the amount of lipid peroxidation, photooxidizable P700 reaction center content, NADPH/NADP+ ratio levels, and antioxidant enzymes were evaluated in spinach leaf tissue exposed to the nanoherbicide compared to the non-encapsulated herbicide.
DISCUSSION AND RESULTS
Biochemical traits of PSI were significantly decreased in spinach leaf tissue exposed to the nanoherbicide. Our data also revealed that nanoformulation might act promoting oxidative stress by changes observed on antioxidant enzymes. Also, the molecular docking results showed a preferential disposition of the herbicide paraquat and paraquat-tripolyphosphate complex