CA.03 - Evaluation of Photoinduced Membrane Damage by Substituted Magnesium Porphyrazines

Otávio A.O. Reis [1], Camila F.N. Silva[1], Thiago T. Tasso[2], Helena C.Junqueira[1], Maurício da S. Baptista[1]
[1]Dep de Bioquímica, Instituto de Química, Universidade de São Paulo (São Paulo, Brasil), [2]Dep de Química, Instituto de Ciências Exatas, Universidade Federal de Minas Gerais (Minas Gerais, Brasil)

Photodynamic Therapy (PDT) is an innovative and efficient treatment modality for a wide array of diseases, including infectious and many types of cancer. PDT is usually based on a photosensitizer (PS), its excitation by light and the subsequent energy or electron transfer to molecular oxygen ($^3O_2$), generating reactive oxygen species (ROSs), specially singlet oxygen ($^1O_2$). However, new experimental evidences suggest that contact-dependent reactions between the PS and biomolecules in the cell membrane – mainly lipids – are essential to cause membrane leakage, therefore unbalancing the chemical gradients that keeps the cell functioning and generating cell death. In order to advance in the development of this treatment, research on PSs that act by the mechanism of contact-dependent reactions with the cell membranes is essential. We have prepared a series of magnesium porphyrazines octa-substituted with fluor and trifluoromethyl groups (FMgPz and CF_3MgPz, respectively) and have investigated their properties in interaction with membrane models, more specifically SUVs and GUVs (small and giant unilamellar vesicles, respectively), which are made of unsaturated lipids. The membrane damage was investigated in the presence of the porphyrazines after red light irradiation (λ = 630 nm), which is the wavelength of maximum absorption by the porphyrazines (ε=~6x10 ^{4} L.mol $^{-1}$ .cm $^{-1}$). Both FMgPz and CF_3MgPz have equal $^1O_2$ quantum yields (Φ_Δ = 0,34). Our results showed a greater photoinduced membrane leakage in the presence of CF_3MgPz when compared to FMgPz. We attributed the higher efficiency of CF_3MgPz to the contact-dependent reactions between the CF_3MgPz and the vesicles, which also causes PS photobleaching. Interestingly, the photobleaching rate of CF_3MgPz was also far greater than that of FMgPz, indicating that the greater membrane damage is parallel with the higher photobleaching rate. Therefore, in order to develop more efficient PS, we need to consider strategies to have the bleached photosensitizer replenished during PDT. **Keywords:** Redox Biochemistry, Photochemistry, Membrane. **Supported by:** FAPESP

CA.04 - Effects of *Amburana cearensis* dichloromethane extract in cerebral ischemia models focusing on glial cells

Rafael Short Ferreira [1,2], Juliana H.C. e Silva [1], Juliana B. Hoppe[3], Monique M.A. de Almeida[1,2], Francesca Pieropan[2], Erica P.L. Pereira[1], Andrea Rivera[2], Beatriz C.L.Ferreira[1], Gustavo B.S. Andrade[1], Paulo R. Ribeiro[4], Luzimar G.Fernandez[5], Christianne G. Salbego[3], Jose Cl.F. Moreira[3], Silvia L.Costa[1], Arthur M. Butt[2], Victor D.A. da Silva[1,2]
[1]Lab of Neurochemistry and Cell Biology, Institute of Life Sciences, Federal University of Bahia (Brazil), [2]Institute of Biomedical and Biomolecular Sciences, University of Portsmouth (England), [3]Dep of Biochemistry, Institute of Basic Health Sciences, Federal University of Rio Grande do Sul (Brazil), [4]Dep of Organic Chemistry, Institute of Chemistry, [5]Biochemistry, Biotechnology and Bioproducts Laboratory, Federal University of Bahia (Brazil)

Glutamatergic excitotoxicity is a pathophysiological mechanism present in chronic neurodegenerative diseases (Alzheimer's Disease) and acute (Brain Ischemia), and it especially affects the hippocampus, as it has a high density of glutamatergic neurons. Under these conditions, neurons and oligodendrocytes can be severely affected. However, astrocytes can attenuate or prevent cell death through this mechanism by re-uptake excess glutamate. It is known that secondary metabolites of *Amburana cearensis* may be related to neuroprotection mechanisms against excitotoxic damage. The aim of this work was to investigate the neuroprotective effects associated with treatment with *A. cearensis* Dichloromethane Extract (EDAC) in models of cerebral ischemia. Hippocampal slices from wild-type Wistar rats (P6-8) or transgenic SOX10-EGFP and GFAP-EGFP reporter mice (P10-12) were used to identify oligodendrocytes and astrocytes, respectively. These slices were submitted in two models treated with EDAC: 1) oxygen and glucose supply (OGN) or deprivation (OGD); and 2) in organotypic culture (OHSC) submitted to glutamate excitotoxicity. Protein expression, cell morphology, cell viability and genetic transcription tests were performed. Under OGD conditions, our results showed that EDAC prevented the reduction of cellular processes of SOX10 expression, without an increase in the expression of astrocytic proteins between the OGN and OGD control groups. However, EDAC increased GFAP expression under OGD conditions. In OHSC, we observed that excess glutamate induced an increase in cell death and that this was inhibited by treatment with EDAC. However, under these conditions, EDAC does not protect neurons. On the other hand, GFAP, GLT1, GLAST and GS were overexpressed in cultures treated with EDAC under glutamatergic excitotoxicity. We also observed, by RT-qPCR, a slight increase in transcription in GDNF, GLT1, GS, NGF and OLIG2 in EDAC-treated hippocampal slices. Our results demonstrate that EDAC has a potential pharmacological effect in brain ischemia models. **Keywords:** Amburana cearensis, Neuroprotection, Glia. **Supported by:** FAPESB, CAPES and CNPq