# MUTAGENESIS AND CITOTOXICITY CAUSED BY PHOTOSENSITIZERS-INDUCED OXIDATIVE STRESS

Oliveira, A.H.S., Silva, A.E., Timoteo, A.R.S., Carvalho, F.M., Agnez-Lima, L.F.

Departamento de Biologia Celular e Genética, UFRN – RN. lfagnez@ufrnet.br

Reactive oxygen Species (ROS) are cellular metabolism by-products, generated by aerobic organisms, and they are able to react with cellular macromolecules, such as proteins, lipids and nucleic acids. These reactions can cause deleterious modifications to cell. Photosensitizers like methylene blue (MB) and riboflavin (RF) can produce ROS, such as singlet oxygen ($^1O_2$), one of the most reactive forms of molecular oxygen. $^1O_2$ carries out the oxidation of DNA bases, such as 7,8-dihydro-8-oxoguanine (8-oxodG), the most frequent oxidation product. The aim of this study was to characterize citotoxic and mutagenic potential of $^1O_2$, using *Escherichia coli* strains deficient and proficient in MutY-glycosylase, a repair enzyme involved in the correction of 8-oxodG:adenine misspair. These strains were treated with photosensitization of different concentrations of MB and RF and survival and mutagenesis were analyzed. Both treatment induced cell death and mutagenesis, however, the strain deficient in MutY showed a higher sensibility to the MB than RF treatment. The results suggest that this divergence may occur due to $^1O_2$ predominantly released by MB plus light and its capacity to penetrate in cell. On the other hand, RF can react with $O_2$ and generate $^1O_2$. However, RF releases mainly superoxide anion and can take part in hidroperoxides reduction.

**Supported by:** CNPq
**Key words:** MutY-glycosylase, methylene blue, riboflavin, singlet oxygen, oxidative stress, DNA damage.