Anti- or Pro-oxidant Activity of the Thiamine, Nicotinic Acid, Tryptophan and NADH: $^1O_2$ and DNA Damage

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Introduction and Objectives: Singlet Oxygen ($^1O_2$), which stands out between Reactive Oxygen Species, can damage several biomolecules. The DNA is considered an important biomolecule because modifications in aromatic DNA bases have been related to cancer. The generation of $^1O_2$ *in vitro* can occur by photosensitilization of molecules like methylene blue and rose bengal that in turn transfer theirs energy to molecular oxygen. Once $^1O_2$ is generated it can attack the DNA bases, in the meantime the presence of anti-oxidants molecules can avoid damage of this biomolecule. In this view, the objective of this study is to evaluate the anti- or pro-oxidant activities of thiamine, nicotinic acid, respectively, B1 and B3 vitamins, tryptophan, a important aromatic amino acid, and NADH, a biologic coenzyme, in the presence of $^1O_2$. **Results and Conclusions**: The results have showed an intensive anti-oxidant effect of thiamine and niacine through the inhibition of $^1O_2$ by physics quench. However, *in vitro* the researches also have presented a pro-oxidant effect of tryptophan and NADH depending on theirs concentration. In conclusion, there is an important protection of pBR322 plasmid DNA damage when it is incubated with B1 and B3 vitamins *in vitro*. The pro-oxidant activity of tryptophan can be justified by the presence of metal ions, such as iron and copper. Still, further research need to be done about NADH due to controversies in the literature: if NADH can or can´t generates $^1O_2$ *in vitro*.

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