Oxidative Damage and Suppression: an Experimental Approach to Teaching Biochemistry

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Experimental Biochemistry is a challenging and worthy didactical task: a vast field with many different techniques. Radical mediated biooxidative processes, implied in aging and accompanying various pathologies, have an enormous appeal to public in general and particularly to students in the science field. The Fenton reaction, first reported by the 22-year old Cambridge chemistry undergraduate Henry J. H. Fenton (Chemical news vol. 33 page 190, 1876), is a useful in vitro system for generating hydroxyl radicals generally implied in biooxidation. When coupled with the 2-deoxyribose (DR)-thiobarbituric acid (TBA) method, provides a most resourceful tool for studying oxidative processes that may provide insights to in vivo processes. In this communication a classical experiment of quantification of thiobarbituric reactive substances (TBARS) resulting from breakage of DR (5 mM) in aqueous buffered media (5mM, pH 7.2) by 0,100 mM H₂O₂ and ferrous ion (up to 0,150 mM) is the base for the demonstration of oxidative damage suppressive ability of known hydroxyl radical quenchers as ethanol, dimethylsulfoxide (DMSO) and thiourea (1mM each). The results of the experiments, developed to be worked in experimental classes for senior undergraduate biochemistry students of biomedical sciences, show a very mild but consistent suppressive capacity for ethanol (reduction in 2 percent of TBARS measured at 0,150 mM ferrous ion concentration). Thiourea and DMSO show very similar suppressive abilities: reduction in 19 and 18 percent in measured TBARS, respectively (at 0,150 mM ferrous ion). Acknowledgments: Antonieta Alencastro (UnB), PRONEX and CNPq.