AMINE OXIDASES: A POSSIBILITY FOR A NOVEL APPROACH IN CANCER THERAPY?

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Putrescine and natural occurring polyamines, spermine and spermidine, are ubiquitous substances that are essential for eukaryotic cell in normal patterns of cell growth and differentiation as well as in malignant and induced proliferative states.
As reported by Bacharach et al. 1989, polyamine levels are markedly increased in tumor cells formation and oncogenic transformation is constantly coupled to an increased polyamine biosynthesis. The control of the intracellular polyamine pool is a highly regulated process that involves the synthesis and the activity modulation of the key enzymes responsible for polyamine synthesis and interconversion as well as the regulation of polyamines transport.
The pathway of involving key-enzymes in polyamine metabolism suggests the existence of suitable targets in the context of cancer therapy.
It was taken in account the interaction between Copper Amine Oxidases (CuAOs - EC 1.4.3.6), purified from animal and plant sources after delivering into cancer cells, and endogenous polyamines to induce a selective killing as a new antitumor therapeutic strategy.
CuAOs catalyze the oxidative deamination of aliphatic and aromatic amines to give the corresponding aldehydes, hydrogen peroxide and ammonia.
It has also been suggested that either aldehydes and hydrogen peroxide are able to induce a cytotoxic effect in human cancer cell cultures.
The aim of this research program is to study the activity of Bovine Serum Amine Oxidase (BSAO) and Diamine Oxidases from vegetable source (e.g. from *Leguminosae* and *Gramineae*) by several amperometric and voltammetric techniques, to develop a system suitable for the rapid evaluation and characterization of the catalytic activity of CuAOs and for the direct measurement of substrate concentration. This system will be employed for monitoring the enzymatic reaction in the presence and absence of several inhibitors and the enzymatic reaction products in cellular homogenates.
Experimental data here presented concern the study of catalytic activity of CuAOs with an electrochemical device for amperometric measurements carried out with free enzyme in solution and after enzyme immobilization on nylon for assembling a biosensor.
The study will be extended to the possibility of developing a miniaturized biosensor to detect polyamine concentration in cells.