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Inhibition of copper-zinc superoxide dismutase activity by selected environmental xenobiotics

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Abstract

The function of Cu,Zn-SOD is to dismutate superoxide into hydrogen peroxide and oxygen. This task is fulfilled due to structural nuances of the enzyme. Many environmental xenobiotics have been proved to inhibit Cu,Zn-SOD. Those compounds could be found not only in industrial sewage, cigarettes and various chemical agents - some of them are used as drugs, drug production substrates, or are the product of drug biotransformation. Cu,Zn-SOD exposition to these compounds leads to inhibition due to: copper ion chelation, unfolding the structure of the enzyme, affecting residues vital for activity maintenance. This review covers a selection of Cu,Zn-SOD inhibitors, referring to *in vivo* and *in vitro* study.

Abbreviations

2-MBI, 2-mercaptobenzimidazole; 2-ME, 2-methoxyestradiol; 4-AAP, 4-aminoantipyrine; ATN-224, choline tetrathiomolybdate; CAT, catalase; DDC, N,N'-diethyldithiocarbamate; GPx, glutathione peroxidase; GSH, reduced glutathione; GSSG, oxidized glutathione; MTs, metallothioneins; QDs, quantum dots; ROS, reactive oxygen species; SNP, sodium nitroprusside; SOD, superoxide dismutase.