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## I] Introduction

We all must eat to live, yet only few of us are experts in nutrition or the healing arts. We need to increase our knowledge in the area of nutrition and to understand how nutrients and toxic substances derived from food or drugs interact either to our detriment or to our benefit.

The toxic effects of exogenous compounds (xenobiotics) often result not from the parent compounds, per se, but from reactive metabolites formed inside the cells. The biotransformation of relatively inert chemicals to highly reactive metabolites is commonly referred to as "Metabolic Activation" and is a well recognized, essential event in numerous chemically induced toxicity. The activation of oxygen ( $O_2$ ) by reduction to superoxide anion radical ( $O_2^{\bullet-}$ ), hydrogen peroxide ( $H_2O_2$ ) and possibly hydroxyl free radical ( $HO^{\bullet}$ ) and singlet oxygen ( $O_2^1$ ), can play an important role in the toxicity of a number of drugs and chemicals. The repeated process of generation of reactive oxygen species is involved in the toxicity of many hydroquinones, quinones, metal chelates, nitro-compounds, amines and azo-compounds with deleterious effects particularly on DNA leading to the

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Carotenoids can inactivate excited molecules such as singlet oxygen. This quenching is to protect macromolecules and photoexcitation or chemiexcitation-related damage as well as against lipid oxidation. The depletion of GSH in isolated hepatocytes can be restored by the addition of its sulfur containing precursors such as cysteine or methionine to maximize biosynthesis. Hence the newly synthesized GSH is indeed an endogenous cellular protective and free radical scavenger. In order to assess the toxicological implications of drug metabolism in general, it has been suggested that depletion of GSH in

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the liver could be a useful toxicological tool for the early detection of toxic metabolites of drugs.

The **aim** of the present study is to serve a general information of free radicals relative to areas of current biochemical research concern. Emphasize is given to the roles of free radicals in tissue damage resulting from nutrient / drug / toxicant / interactions on organs such as liver and kidney.

The protective effects of both endogenous and exogenous free radical scavengers on disease prevention will be stressed. The chosen drug toxicants were the common clinically used non-steroidal antiinflammatory compounds paracetamol and indomethacin. The selected natural free radical scavengers were:  $\alpha$ -tocopherol,  $\beta$ -carotene, melatonin, nigella seeds and carrot.