Therapeutic Aspects of Reactive oxygen species generated in ozone-oxygen aqueous solutions and oil emulsions

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Electron Paramagnetic Resonance (EPR) spin trapping spectroscopy with DMPO was used to study aqueous ozone-oxygen solutions and emulsions. We have found decomposition rates of ozone generating reactive oxygen species (ROS), mainly hydroxyl radicals. Consecutive reactions with amines, amino acids and particular anti oxidants were studied. The rate of free radicals generation was increased by UV irradiation of samples. Reaction mechanisms of these reactions are discussed. We propose numerous applications of these emulsions and aerosols in medicine, biology, preparative chemistry and military science in the field of biological and chemical weapons and protection against them.

Ozone affects oxygen metabolism by:

1) the change of blood flow characteristics,
2) increasing glycoside concentration in erythrocytes,
3) activation of enzymes detoxification of peroxide and oxygen species,
4) oxidative decarboxylation of pyruvate,
5) activation of mitochondrial breathing chains.

Ozone bactericidity is explained by ozone toxicity for microorganisms in lower doses than higher doses toxic for human body.

Therapeutic properties of ozone are the following:

1) bactericide, fungicide and virucide –chronic infections including intracellular and HIV,
2) support of blood supply including CNS-central and peripheral ischemic disease,
3) immunostimulation - autoimmunity disorders, allergies etc.,
4) energetic positively affects psychosomatic exhaustion,
5) regeneration- healing wounds, fractures, etc.,
6) anti tumor- increasing tumor necrotising factor,
7) combination of the above mentioned effects- all stages of diabetes complications.

The presence and role of free radicals (studied by EPR spin-trapping technique), mainly ROS in described processes is discussed.

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