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Molecular insights into the effect of ozone on human hemoglobin in autohemotherapy: highlighting the importance of the presence of blood antioxidants during ozonation

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Abstract

Ozone has been known for several decades, with its antiseptic and therapeutic effects determined by the hormesis theory. It is shown that the therapeutic efficacy of ozone therapy may be partly due to the controlled and moderate oxidative stress produced by the reaction of ozone with several biological components. In this study, the effect of ozone on healthy human hemoglobin (Hb) in the whole blood environment (in the presence of antioxidants) and in the purified form (in the absence of antioxidants) is investigated using a number of different techniques including intrinsic fluorescence, circular dichroism and UV/VIS absorption spectroscopy as well as SDS- and Native-PAGE and dynamic light scattering. The results show that the presence of antioxidants prevents damage to Hb while its absence means that as the exposure to ozone is increased, Hb is increasingly damaged. These results highlight the importance for the use of appropriate doses of ozone, for patients with different diseases and hence antioxidant levels, in autohemotherapy.

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