

Research Hypothesis in Autism: The Role of Therapeutical Ozone

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Newest findings in molecular and cellular pathways have been achieved in autism research, opening new platforms and strategies for novel, patient-designed treatments [1,2].

Ozone (O₃) is a molecule consisting of three atoms of oxygen in a dynamically unstable structure due to the presence of mesomeric states [3]. In air pollution, ozone shows dangerous effects, however nowadays many clinicians consider it as beneficial tool to restore body damages. By a therapeutical approach, ozone is a gas constituting by an ozone and oxygen mixture with a great oxidative power. Oxygen-Ozone therapy is a new, non-invasive technique currently being used for several diseases (i.e. myocardial infarction, neuropathic pain, vasculogenesis) [4], in which a strongly involved of inflammation processes is required. Indeed, ozone mixture shows anti-inflammatory, analgic, antibacterial and virustatic effects.

Ozone shows long-term anti-inflammatory effects and it has been proposed as an antioxidant enzyme activator, immune modulator, and cellular metabolic activator [5]. Indeed, several experimental and clinical evidences have shown advantageous effects of oxygen/ozone therapy in several pathologies characterized by a cellular oxidative and inflammatory response, including renal injury, cardiopathy, atherosclerosis and septic shock [6]. Very interesting, ozone is able to decrease pro-inflammatory cytokines and neurotrophic factors production (i.e. Il-1b, Il-2, BDNF) without toxicity or serious side effects [7].

Autism is characterized by a coexistent immune system dysregulation [8]. Alterations in both T cell- and B cell-mediated immunity, as well as an imbalance in CD3+, CD4+, and CD8+ T cells and natural killer (NK) cells, and increased expression of genes that regulate inflammatory mechanisms have been demonstrated [9,10].

On these bases, the regulatory effects mediated by ozone mixture could represent an optimal way to restore immune balance in autism, which cannot otherwise be obtained through pharmaceutical interventions. Its property in decreasing inflammatory mediators could be useful as non-specific immunomodulation therapy for autistic patients.

Currently, there are no pre-clinical or clinical studies on the use of therapeutical ozone in autism treatment. This editorial is a work hypothesis to further stimulate research and possible application in this interesting topic. Exact dose, ozone concentration, as well as administration sites will need of a deep and exhaustive studies and experimental data.

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