



Use of Fluorocarbons and Thiol Compounds in the Regulation of Blood Pressure and other NO Related Conditions

Principle Investigator:

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Background:

Liquid fluorocarbon emulsions (FCs) have been widely used as blood substitutes due to their ability to dissolve oxygen. Many positive effects have been noticed after the administration of FCs into the bloodstream. In most cases, the mechanisms of these effects have remained unknown. FCs also have the capacity to solubilize nitric oxide (NO) in the body. NO and the products of its metabolism are responsible for numerous physiological processes in mammals.

FCs form micelles, where NO is concentrated and can react with naturally occurring thiols, such as cysteine, to form nitrosothiols (RS-NO), which are stable forms of an endothelial derived relaxing factor (EDRF). EDRF is responsible for vasodilation and decreases in blood pressure.

Description of Project:

Dr. Nudler's laboratory has developed methods of shifting the equilibrium of the NO cycle, using perfluorocarbons, to selectively regulate different NO dependent processes in mammals. A change in the concentration of a particular NO metabolite can be obtained regardless of the overall production of NO.

Rapid, controllable and sustained regulation (increase or decrease) of blood pressure, through the administration of FC's and naturally occurring thiol compounds, has been demonstrated in rats.

Applications:

Imbalances in NO regulation can result in numerous pathologies. FCs can be used to treat local or systemic disease conditions resulting from either excess or insufficient amounts of NO in the bloodstream, including:

Ischemia; atherosclerosis; inflammation; acute hypotension or hypertension; preclampsia; restenosis; toxemia; toxic shock; thrombosis; reperfusion; stroke; various CNS disorders; female reproductive disorders; impotence; renal arterial stenosis; osteoporosis; eczema; rheumatoid arthritis; vasoplegia.

Patent Status: U.S. patent application has been filed.

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