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Role of Nitric Oxide Concentrations on Human Sperm Motility

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Nitric oxide (NO) is a free radical generated from the oxidation of L-arginine to L-citrulline by 3 isoforms of reduced nicotinamide adenine dinucleotide phosphate (NADPH)-dependent NO synthases. Several data suggest a relevant role in sperm cell pathophysiology, but any conclusive data on its role in spermatozoa motility are still lacking. In the present study, we have correlated NO concentration in semen and kinetic features of sperm cells from normozoospermic fertile donors and infertile patients affected by idiopathic asthenozoospermia. Normozoospermic fertile men exhibited NO concentrations that were significantly lower than those of asthenozoospermic infertile men. A significant linear negative correlation was evident between NO concentration and percentage of total sperm motility. A further significant linear negative correlation was found between NO concentration and spermatozoa kinetic characteristics determined by a computerized analysis (curvilinear and straight progressive velocity). These data suggest that the overproduction of this free radical and the consequent excessive exposure to oxidative conditions have a potential pathogenetic implication in the reduction of sperm motility. The positive role played by NO in spermatozoa capacitation leads us to speculate that such paradoxical involvement in both pathologic and physiologic processes depends on the alternative redox state and relative level of NO.

Key words: Male infertility, spermatozoa motility, asthenozoospermia