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Modulation of erythrocyte nitric oxide bioavailability

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Abstract

Changes in tissue oxygen partial pressure are sensed by erythrocyte contributing to vasodilation or vasoconstriction through its NO bioavailability. Endogenous or exogenous compounds modulate the erythrocyte NO bioavailability through the membrane target molecules such as band 3 protein, acetylcholinesterase (AChE) and CD47. Binding of acetylcholine to RBC membrane AChE originates a signal transduction mechanism involving Gi protein and band 3 protein that stimulates NO efflux. The bioavailability of NO in presence of velnacrine maleate, an AChE inhibitor, is preserved. Timolol maleate (TM) used in patients with primary open angle glaucoma (POAG) is an AChE inhibitor. In POAG the total NO in retina was consistently higher and associated with intraocular pressure. The aim of this study is to assess the effect of TM in erythrocyte NO efflux in healthy humans. Human venous blood samples were collected from the forearm vein of fifteen healthy Caucasian men from National Blood Institution after informed consent. RBC suspensions performed from each blood sample was divided in three 1mL samples, centrifuged, and 10µL of NACl was taken and replaced by same volume in order to achieve 10µM final concentration either of ACh or timolol. NO was evaluated by amperometric method. Timolol did not change NO efflux in relation to the control samples but significantly decreased it when compared to the ACh samples. Erythrocyte preserves, in vitro, its bioavailability in healthy humans in presence of TM. Extrapolating to POAG patients under TM therapeutic a similar behaviour the lower oxidative stress evidenced may be explained.

Biography

Carlota Saldanha has completed her Ph.D at the age of 39 years from Universidade Nova de Lisboa; postdoctoral studies from Faculdade de Medicina da Universidade de Lisboa (FMUL). She has a Master in Medical Education. She is Associate Professor with Habilitation in FMUL and Head of Unit of Microvascular Biology and Inflammation in Instituto de Medicina Molecular (IMM) of FMUL. She has published more than 80 papers in reputed journals and serving as an editorial board member of repute journal.