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Comparative studies between amyl nitrite and sodium nitrite in nitrite induced hemoglobin oxidation of diabetics and non-diabetics blood

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Abstract

The effect of amyl nitrite on human Type 2 diabetics blood was undertaken using non-diabetics blood as the control group. It was revealed that diabetics erythrocytes were oxidized by amyl nitrite at a significantly greater rate than control erythrocytes ($P<0.05$).The mean oxidation time of the diabetics blood was 1.5 ± 0.2 min (sample size is n=20) whereas the mean oxidation time of the non-diabetics blood was 3.1 ± 0.5 min (sample size is n=20). Next the effect of sodium nitrite on human Type 2 diabetics blood was undertaken using non-diabetics blood as the control group. These studies revealed that diabetics erythrocytes were oxidized at apparently the same rate as the control blood ($P>0.05$). The sodium nitrite mean oxidation time of diabetics blood was 3.5 ± 0.8 min (sample size is n=22) and the mean oxidation time of the nondiabetics blood was 3.5 ± 0.7 min (sample size is n=22). Thus, these studies demonstrate that while diabetics blood has an enhanced susceptibility to oxidation to methemoglobin by amyl nitrite compared to the control group when sodium nitrite is used both diabetics and control blood are oxidized at the same rate. This difference could be attributed to the fact that sodium nitrite reactions with oxyhemoglobin are sigmoidal and involve an induction lag phase, whereas the amyl nitrite reactions with oxyhemoglobin are immediate wherein a rectangular hyperbolic curve is generated. This means that amyl nitrite has greater accessibility to the heme crevice especially in the diabetic presumably due to glycation induced structural modifications present in HbA1C.

Biography

John Philip Tarburton has completed his Ph.D at the age of 25 years from the University of Nebraska and also did postdoctoral studies at the University of Nebraska. Dr. Tarburtion is an Assistant Professor at National University, the second-largest private nonprofit institution of higher learning in California and the twelfth largest in the United States. Dr. Tarburton has published more than 25 papers and abstacts in reputed journals and a book chapter about his research findings.