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## COULD CO-ENZYME Q<sub>10</sub> BE CONSIDERED A DETOXYFYING AGENT TOWARDS NITROGEN OXIDES?

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## Abstract

Endogenous ubiquinones such as coenzyme  $Q_{10}$  are essential electron carriers in the mitochondrial respiratory chain and the reduced ubiquinol form  $Q_{10}H_2$  is also a good chain-breaking antioxidant. For example,  $Q_{10}H_2$  is particularly active in the prevention of lipid peroxidation either directly or through recycling of vitamin E in both cases after a hydrogen transfer process involving the OH group.  $Q_{10}H_2$  is able to act as an antioxidant not only against reactive oxygen species but also against reactive nitrogen species, such as 'NO and 'NO<sub>2</sub>, through an electron transfer or a hydrogen transfer process, according to the ionization state of the ubiquinol. On the other hand, the possible involvement of the isoprenic chain of ubiquinones/ubiquinols in the reactivity towards the above mentioned NO<sub>x</sub>, has never been considered.

Nitric oxide and nitrogen dioxide are not only endogenously formed, but they are also generated during combustion in critical conditions and thus they are components of the environmental pollution.

When studying the reaction of the reduced and oxidised  $Q_{10}$  with 'NO and 'NO<sub>2</sub>, we observed the formation of a nitroxide radical (ESR spectrum characterised by three lines with  $a_N=15$  G and g=2.0064) and the same results were obtained with  $Q_1$  and  $Q_3$ . The observed spectra were attributed to a nitroxide radical arising from a reaction involving the isoprenic moiety of the molecule. In order to gain a better understanding of the role of the isoprenic chain in ubiquinols/ubiquinones reactivity towards NO<sub>x</sub>, we undertook a spectroscopic investigation (ESR, FT-IR, <sup>1</sup>H-NMR and MS) using  $Q_{10}$  and its short-chain analogues  $Q_1$  and  $Q_3$ . The mechanisms leading to the formation of the observed products (dinitro-, and nitro-nitrite adducts to the isoprenic double bond will be discussed in this communication.

The present results evidence that ubiquinones/ubiquinols can be considered as novel detoxifying agents against \*NO and \*NO2.