Plasma Hydrogen Peroxide: A Myth or Reality?

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Dear Editor

Hydrogen peroxide (H_2O_2) is present in the human body, and its urinary excretion is also a fact [1]. Recently, plasma H_2O_2 concentration is of concern to the biomedical scientists [2]. However, we feel that it is a difficult proposition that plasma contains a stable concentration of H_2O_2 .

Various studies reports and measured the presence of H_2O_2 in plasma. In a study by Li et al. [3] the authors report the presence of low plasma H_2O_2 by using a kit based method (Product Code: S0038, Beyotime Biotechnology, Jiangsu, China).

In another study, by Zembron-Lacny et al. [4] the authors seem to rely on the results of plasma H_2O_2 generated using a kit based method (Oxis Research kit, USA). In both the cited studies, xylenol orange is used to detect H_2O_2 . However, It is well known that the xylenol orange

method is not specific for H_2O_2 . It has to be made specific for it by recording the data of the sample with and without catalase treatment before addition of iron and xylenol orange [5]. Therefore, it appears that the kit based methods used in the studies mentioned above didn't specifically estimate H_2O_2 concentration.

In reality, plasma has catalase activity which may be demonstrated by simple experiment (Fig. 1). Thus, it seems that higher levels of H_2O_2 are unlikely, and studies which have published lower concentrations have certain limitations (from a method point of view) to be sure about the claim. Therefore, the existence of plasma H_2O_2 is a controversial issue, and even its presence in low quantity cannot be promptly certified without an element of doubt.

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Fig. 1 Demonstration of production of profuse bubbles after addition of H₂O₂ in human plasma. **a** No bubble formation takes place when H₂O₂ is added to plasma solution in the presence of catalase inhibitor (10 mM sodium azide). **b** Profuse bubble formation occurs when 2 mM H₂O₂ is added directly into plasma sample (marked by arrow) indicating the presence of significant Catalase activity in human plasma. **c** No bubble formation on adding H₂O₂ to urine sample (bubbles seen are from the urine itself before addition of H₂O₂)

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Compliance with Ethical Standards

Conflict of interest Authors do not have any conflict of interest.

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