Author's response to reviews

Title: Effects of uremic solutes on reactive oxygen species in vitro model systems in monitoring the renal function

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Adrian Covic  
Section Editor  
BMC Nephrology  

Dear Covic,

We would like to submit for publication the article entitled “Effects of uremic solutes on reactive oxygen species in vitro model systems in monitoring the renal function” by Renata P. de Assis; Juliana F. A. Castro; Vânia O. Gutierres; Carlos A. Arcaro; Renata S. Brotto; Olga M. M. F. Oliveira; Amanda M. Baviera and Iguatemy L. Brunetti.

It is proposed that the oxidative stress observed in chronic kidney disease (CKD) is exacerbated by hemodialysis, since this procedure activates endogenous inflammatory mechanisms, with the release of reactive oxygen species (ROS), while diminishing the levels of antioxidants by diffusion. The literature reports accumulation of around 90 compounds, known as uremic solutes, in the blood of CKD patients and some of these have antioxidant properties. This motivated us to investigate the antioxidant performance of the commonest uremic solutes: L-arginine, uric acid, hippuric acid, creatinine, phenol, methylguanidine, p-cresol, L-tyrosine and urea, in model in vitro systems.

Four of the tested solutes (uric acid, phenol, p-cresol and L-tyrosine) isolated or in mixtures, were effective in scavenging the ABTS radical cation, hypochlorous acid and the peroxyl radical, but had no effect on the superoxide anion radical or hydrogen peroxide. In the 4-solutes mixtures, each one of the solute captured 12.5% for the IC$_{50}$ of the mixture to ABTS$^{++}$ or HOCl/OCl$^{-}$, exhibiting a virtually exact additive effect. In the 2-solutes mixtures, for ROO$^*$ capture, it was need more mass of uremic solutes to reach an IC$_{50}$ value that was higher than the projected IC$_{50}$, obtained from the medium of the IC$_{50}$ of single solutes (25% of each, in the binary mixtures).

The use of the IC$_{50}$ as an analytical tool to prepare and analyze mixtures allows the determination of their scavenging capacities and may be useful for the assessment and treatment of the oxidative status of CKD and hemodialysis patients.

We declare that:

This manuscript has not been published elsewhere, nor has it been submitted simultaneously for publication elsewhere;

All the authors participated in the work in a substantial way and take full responsibility for its contents and the authors declare that there is no conflict of interest.

Thanking you for your attention.

Yours sincerely,

Iguatemy Lourenço Brunetti (PhD)
AUTHOR DECLARATION OF THE COMPETING INTERESTS

We declare that there are no financial competing interests associated with this manuscript and there has been no significant financial support for this work that could have influenced its outcome.

We declare that there are no non-financial competing interests in relation to this manuscript.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

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