

## Letter to the Editor

### Bacterial Lipopolysaccharide Retention by a Positively Charged Filter

We read with interest the recent paper by Bononi and colleagues (2) concerning the capacity of positively charged membranes to remove endotoxins from solutions intended for intravenous administration. This study raises two issues of concern that should be made known to your readership.

First, the abstract of the article was incorrect in stating that “to date no filters have retained bacterial endotoxins.” Pall Corporation has manufactured positively charged, membrane-based intravenous filter products with a claim for the removal of bacteria and associated endotoxins for the health care community for over two decades. Evidence corroborating this fact is readily available in the peer-reviewed literature (1, 3, 4). We are pleased to see that the results demonstrated by Bononi and colleagues further substantiate the findings in these published works.

Second, there are historical data to suggest that filter performance is influenced by the ionic strength of a salt solution, with filtration efficacy decreasing as ionic strength increases (5). Although the filters evaluated in the referenced studies show performance in the presence of physiologic levels of salt, Bononi and colleagues did not challenge their test filters with saline-based solutions. This leaves open the question of whether or not, in a clinical setting, the new-generation positively charged filters tested will reduce the risk associated with infusing salt-containing intravenous solutions inadvertently contaminated with gram-negative bacteria and associated endotoxins.

We encourage the authors to further characterize this filter, and we look forward to the results of such studies employing more clinically relevant salt-containing intravenous solutions.

We are employees of Pall Medical.

#### REFERENCES

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#### Authors' Reply

We find reasonable most of the comments and suggestions from Dr. Ortolano and colleagues concerning the article by Bononi et al. (1). In reply to the first comment, we wish to point out that the reduced number of words, no more than 50, published in the abstract of the short-form paper did not allow us to be completely specific in the sentence “A filter introduced into an intravenous line prevents microbiological contamination, but to date no filters have retained bacterial endotoxins,” which should be followed by “with an efficiency of 100%.” Indeed, in our assays, both Pall and GVS positively charged filters were able to retain bacterial lipopolysaccharide. However, the analysis carried out by the *Limulus* amoebocyte lysate test does not allow the challenge of positively charged filters for their absolute efficiency in retaining the bacterial lipopolysaccharide (1). The second comment is correct. Nonetheless, in our experience, GVS positively charged filters performed well in clinical settings. No complaints came to our attention from different hospitals which were GVS customers (our unpublished data). We agree with the final suggestion to carry out additional experiments with “more clinically relevant salt-containing intravenous solutions.” This analysis is feasible, and it will be part of our next study.

#### REFERENCE

1. Bononi, I., V. Balatti, S. Gaeta, and M. Tognon. 2008. Gram-negative bacterial lipopolysaccharide retention by a positively charged new-generation filter. *Appl. Environ. Microbiol.* **74**:6470–6472.

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