

The Effect of Media Type on ZnO Cytotoxicity

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Background

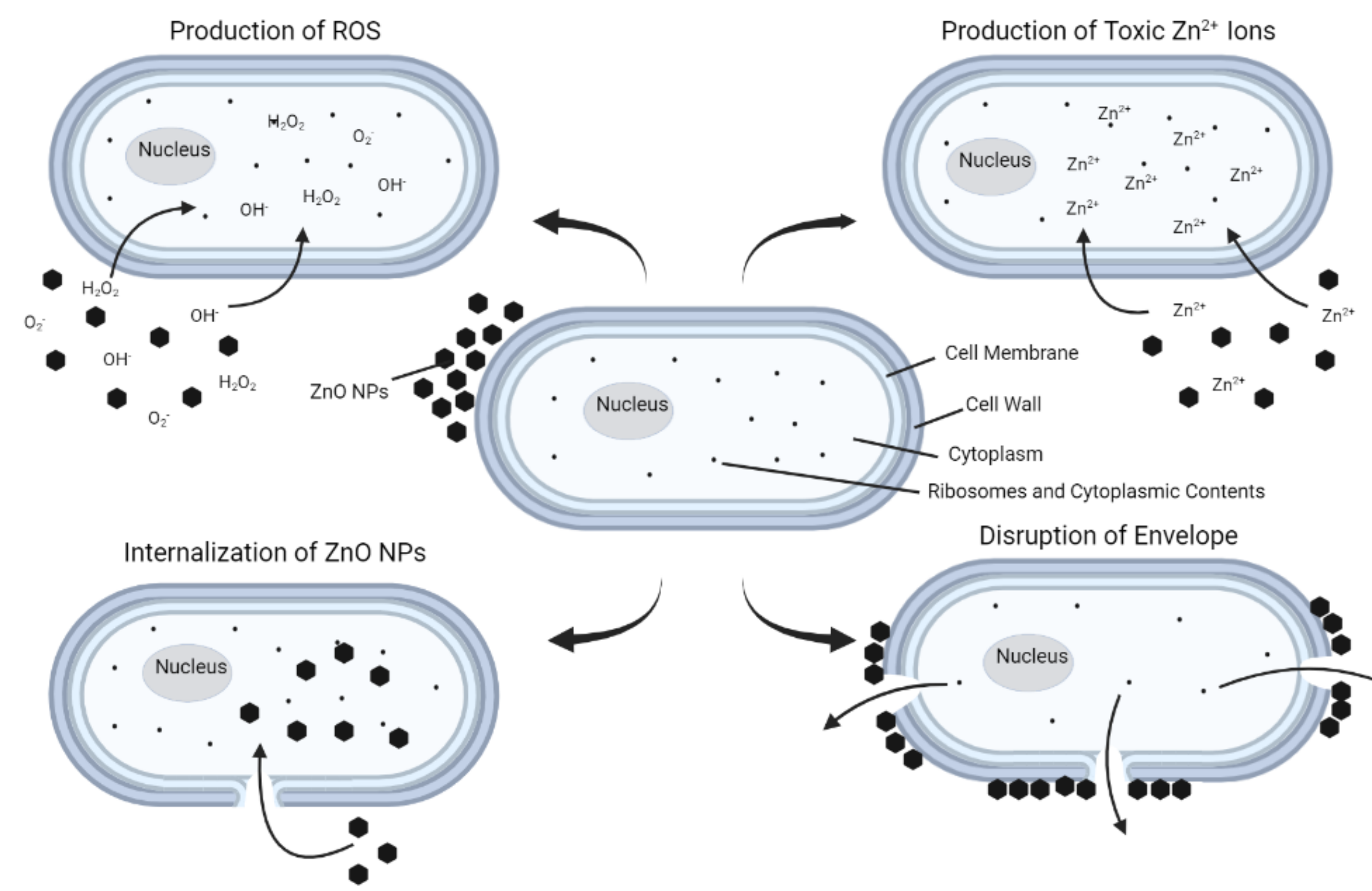
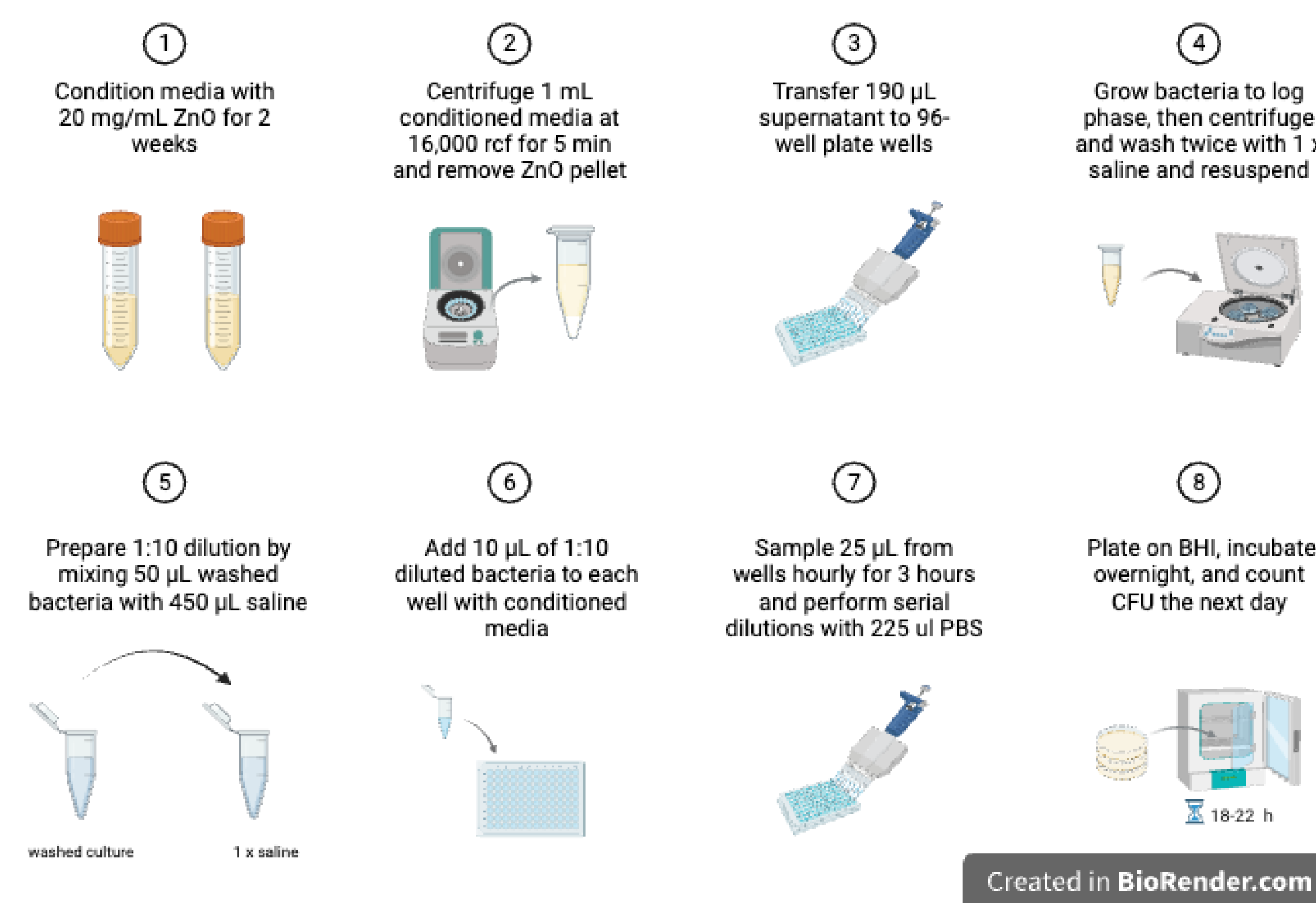
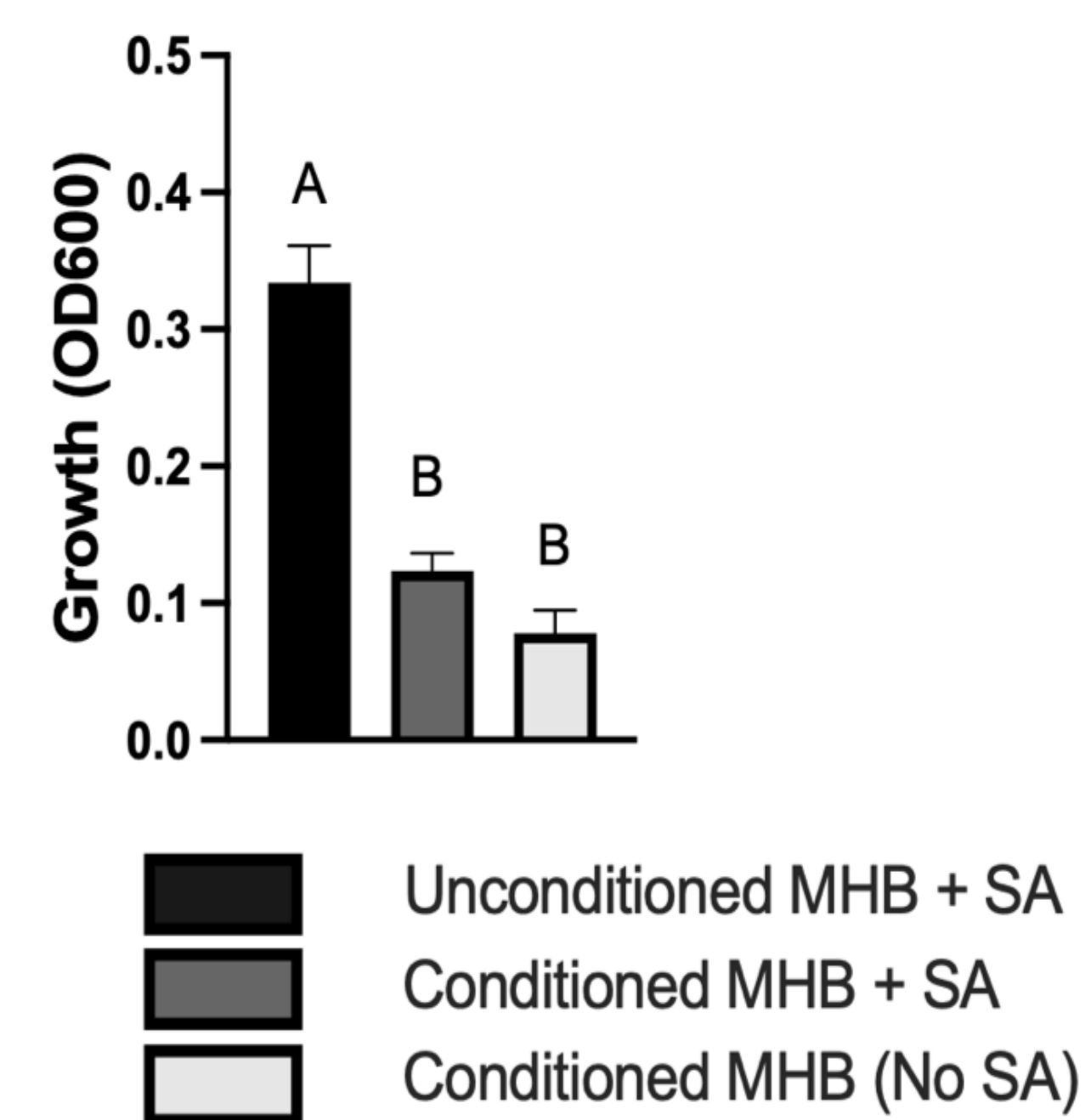


Figure adapted from Sirelkhatim et al. Nano-Micro Lett. 2015

Method: Creation of Condition Media

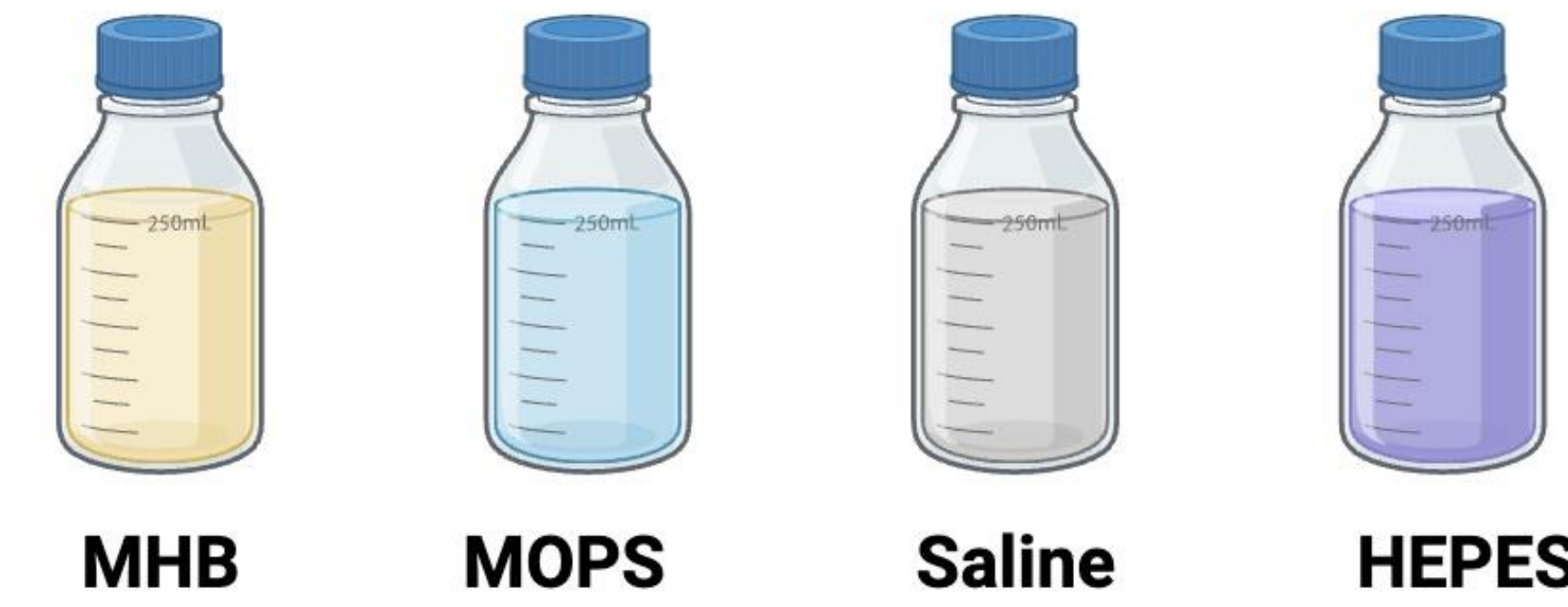


MHB conditioned 1 month



Caron et al. 2024

Does Media Matter?



From previous experiments we have determined that Zn^{2+} release contributes to ZnO-mediated toxicity with Mueller Hinton Broth MHB media.

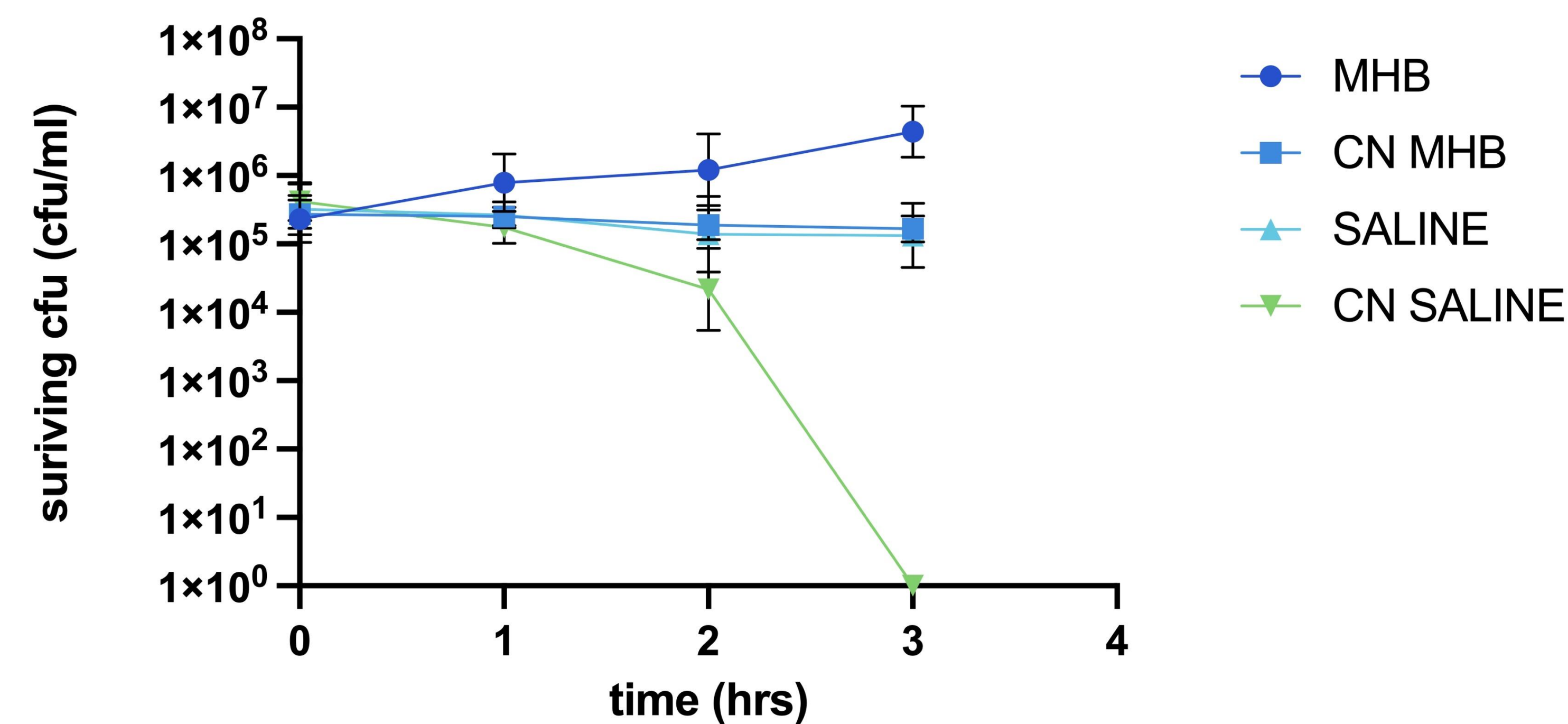
Other studies have found that HEPES and MOPS were non complexing with metals and would be great additional medias to test.

Hypothesis

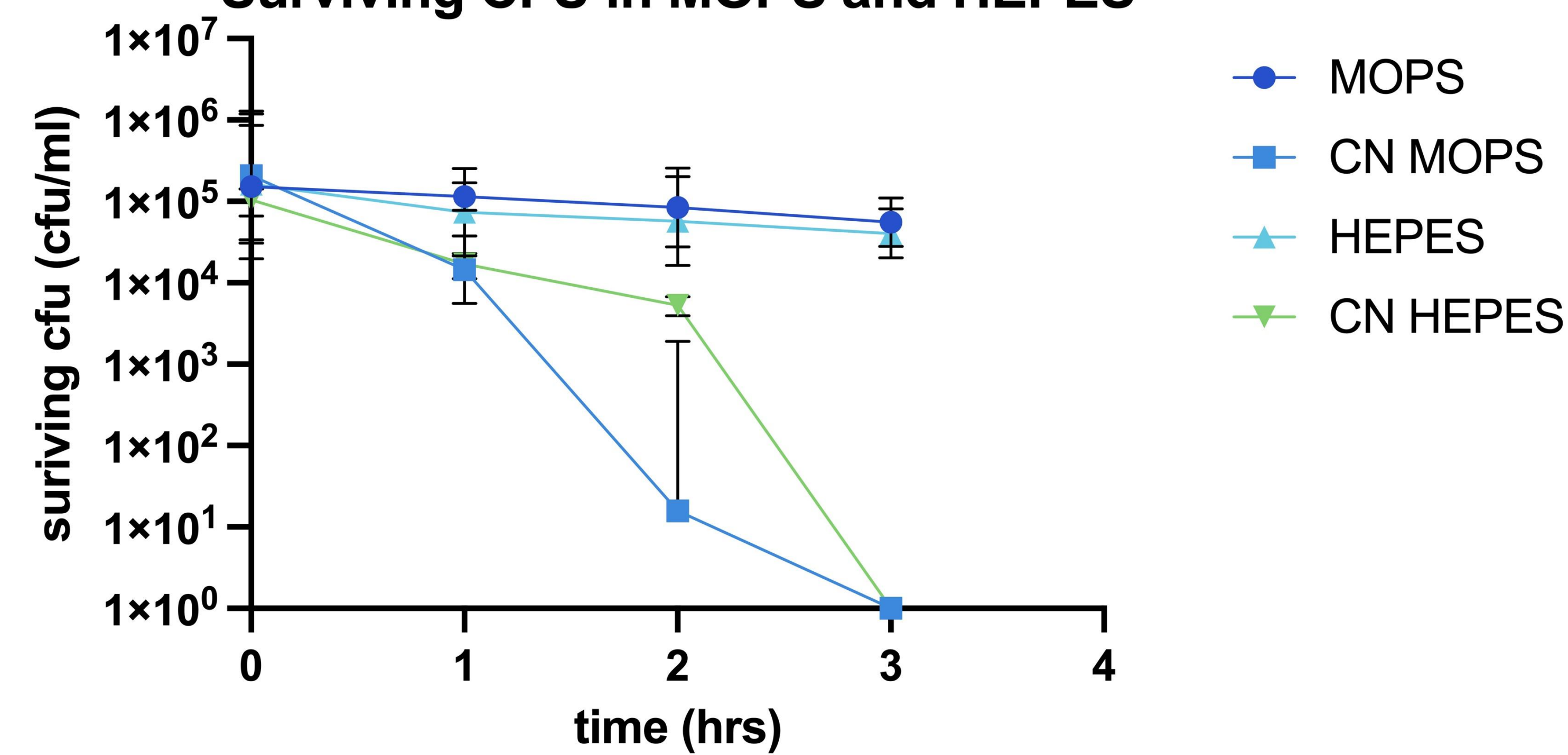
We hypothesize that we will see increased inhibition in non reactive buffers such as Saline, HEPES, and MOPS.

Survival in Condition Media

Surviving CFU in MHB and Saline

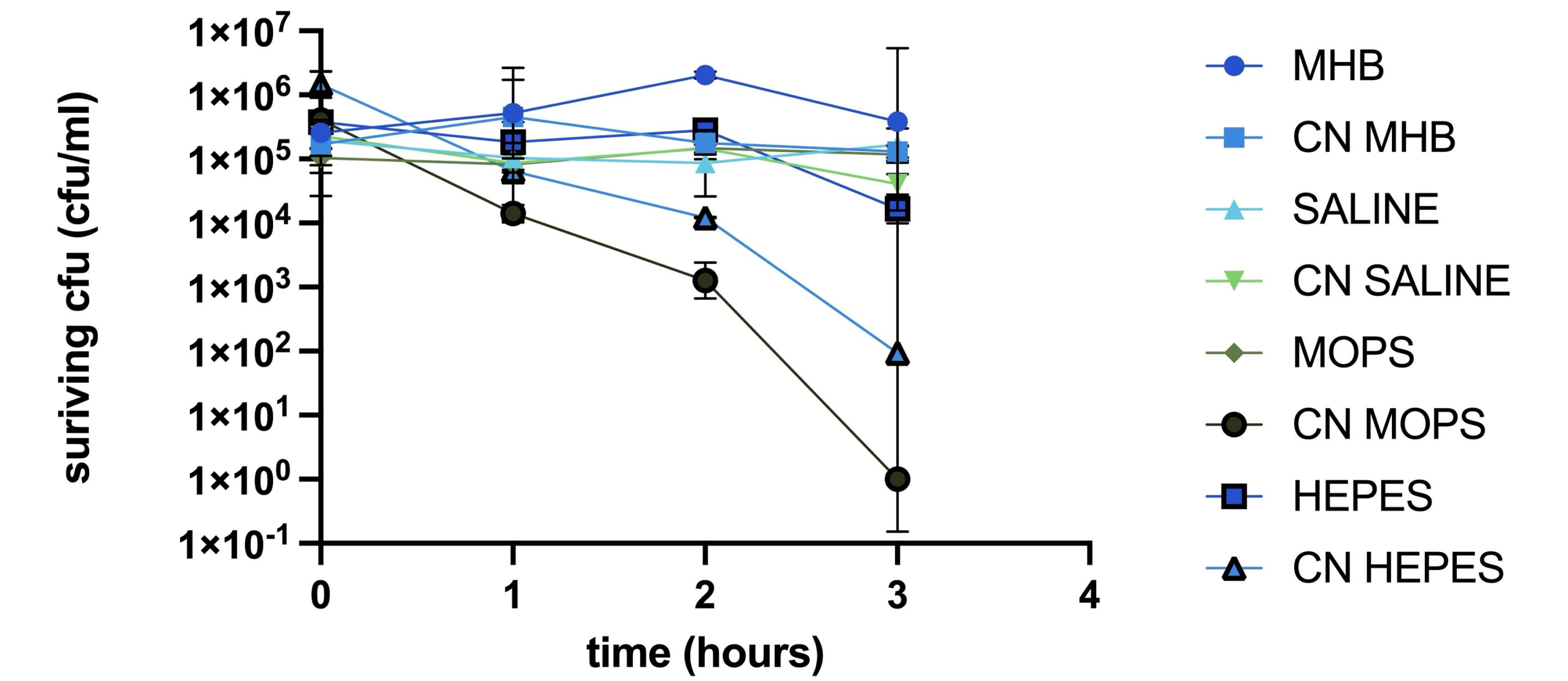


Surviving CFU in MOPS and HEPES



Direct Comparison Between Media

Surviving CFU in MHB, Saline, MOPS, and HEPES



Conclusions & Future Directions

Our results suggest that media type plays an important role in ZnO cytotoxicity by influencing dissolution of Zn^{2+} ions into the media. Conditioned MOPS, HEPES, and 1x Saline showed bactericidal activity against *S. aureus* while MHB was only bacteriostatic. This supports our hypothesis that increase ZnO solubility increases the antimicrobial effects. We would like to repeat this experiment with new conditioned media to see if the results hold. In the future, we would like to repeat the survival assay with RPMI and BHI that is supplemented with HEPES or MOPS. A publication found HEPES and MOPS were to be non complexing with metals and when supplemented with RPMI there was an increase in cytotoxicity.

References

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