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LETTER

Response on Article "A Sustained-Release Nanosystem with MRSA Biofilm-Dispersing and -Eradicating Abilities Accelerates Diabetic Ulcer Healing" [Letter]

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Dear editor

We have read the published article by He et al which was just published in International Journal of Nanomedicine and given much attention in order to give impactful input for future studies. The authors had established and reported a composite nano-sustained release system for anti-MRS biofilm agent, TTO-NL/polyvinyl alcohol/chitosan (TTO-NL @PCS), by using high-voltage electrospinning with increased stability and slow release.[1] The early exposure to TTO-NL@PCS was reported to disperse biofilm and completely kill methicillin-resistant *Staphylococcus aureus*, which is also known as MRSA, without any induced cytotoxic effects on the cells and human skin tissue samples used in in vitro assay. The results obtained in this study offered a promising effort for an alternative antibacterial and antibiofilm agent. Moreover, this study highlighted the use of TTO-NL@PCS in patients with diabetic foot ulcer (DFU), where the early biofilm inhibition and full bacterial clearance in the deep, latent phase of the wound are especially crucial.[2]

The in vitro antibacterial capability of TTO-NL@PCS was proven by the inhibition zone showed by TTO-NL@PCS on MRSA was the highest compared to those showed by controls, TTO@PCS and PCS. Due to the significant decreased amount of bacterial cells treated by TTO-NL@PCS, its biofilm formation was also decreased significantly. The question should be raised that whether the quantification of biofilm formation should be detected before TTO-NL@PCS treatment. Practically, patients with DFU must have been infected with suitable bacteria. Therefore, the bacterial community could probably have formed biofilm in order to protect themselves from any physical, antibacterial agent attack, or the host immune response on the patient's tissue.[3,4]

In addition, this study used healthy human skin for the in vitro assay of MRSA growth on human tissue.[1] This experimental method, for sure could be tested, however lacks of practical application. The skin tissue obtained from patients diagnosed with diabetes mellitus could probably give more impactful data of TTO-NL@PCS as a composite nano-sustained release system for anti-MRS biofilm agent in diabetic patients, as claimed in the purpose of this study.[5,6]

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All authors have equal contribution in conceiving the critical design of the letter. NSDP analyzed the reported data. RR gave the necessary suggestion and revision. NSDP and DMH revised the letter manuscript. All authors confirmed and agreed to the final revision form of the manuscript.

Disclosure

There is no conflict of interest stated regarding this communication.

References

1. He S, Wen H, Yao N, Wang L, Huang J, Li Z. A sustained-release nanosystem with MRSA biofilm-dispersing and -eradicating abilities accelerates diabetic ulcer healing. *Int J Nanomedicine*. 2023;Volume 18:3951–3972. doi:10.2147/IJN.S410996
2. Afonso AC, Oliveira D, Saavedra MJ, Borges A, Simões M. Biofilms in diabetic foot ulcers: impact, risk factors and control strategies. *Int J Mol Sci*. 2021;22(15):8278. doi:10.3390/ijms22158278
3. Wada A, Murakami K, Ishikawa Y, et al. Anti-inflammatory and protective effects of Juncus effusus L. Water extract on oral keratinocytes. *Biomed Res Int*. 2022;2022:1–13. doi:10.1155/2022/9770899
4. Pokharel K, Dawadi BR, Shrestha LB. Role of Biofilm in Bacterial Infection and Antimicrobial Resistance. *J Nepal Med Assoc*. 2022;60 (253):836–840. doi:10.31729/jnma.7580
5. Yeap AD, Woods K, Dance DAB, et al. Molecular epidemiology of Staphylococcus aureus skin and soft tissue infections in the Lao People's Democratic Republic. *Am J Tropl Med Hygiene*. 2017;97(2):423–428. doi:10.4269/ajtmh.16-0746
6. Sajid M, Akash H, Rehman K, Fiayyaz F, Sabir S. Diabetes - associated infections: development of antimicrobial resistance and possible treatment strategies. *Arch Microbiol*. 2020;202(5):953–965. doi:10.1007/s00203-020-01818-x

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