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LETTER

Response to Article "Microfluidic Synthesis of miR-200c-3p Lipid Nanoparticles: Targeting ZEB2 to Alleviate Chondrocyte Damage in Osteoarthritis" [Letter]

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Dear editor

We recently read with great interest the article "Microfluidic Synthesis of miR-200c-3p Lipid Nanoparticles: Targeting ZEB2 to Alleviate Chondrocyte Damage in Osteoarthritis" by Zheng et al,[1] published in your journal. This study presents an innovative approach to treating osteoarthritis (OA) using miR-200c-3p lipid nanoparticles (Lipo-AgPEI-miR-200c-3p) synthesized via microfluidic technology to target ZEB2 and mitigate chondrocyte damage.

The research successfully constructs a novel drug delivery system with Lipo-AgPEI-miR-200c-3p, which not only enhances the delivery efficiency of miR-200c-3p but also significantly reduces material cytotoxicity.[2] This is crucial for the potential clinical application of miRNA in OA treatment. The study also confirms that miR-200c-3p targets ZEB2, regulating the inflammatory response, apoptosis, and matrix degradation of chondrocytes, revealing a key role in OA development and providing a new molecular target for therapy.[3]

However, the study has some limitations. Firstly, it lacks in vivo model validation. While the in vitro results are promising, the therapeutic effects and safety of Lipo-AgPEI-miR-200c-3p need to be verified in animal models to better understand its potential in a more complex biological environment. Secondly, the research does not sufficiently address the long-term efficacy and safety of the nanoparticles. Long-term stability and potential side effects are critical for clinical translation, and further studies are needed to evaluate these aspects. Lastly, the study could benefit from a broader consideration of the diverse pathological mechanisms of OA, such as oxidative stress and cellular senescence, to provide a more comprehensive therapeutic strategy.[4]

In conclusion, the work by Zheng et al offers valuable insights into the development of nano-drug delivery systems for OA. However, to fully realize the clinical potential of Lipo-AgPEI-miR-200c-3p, future research should focus on in vivo efficacy and safety assessments, as well as a more comprehensive understanding of its impact on the multifaceted pathological processes of OA.

Thank you for considering our comments.

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Disclosure

No potential conflicts of interest relevant to this article were reported.

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References

1. Zheng D, Chen T, Yang K, et al. Microfluidic synthesis of miR-200c-3p lipid nanoparticles: targeting ZEB2 to alleviate chondrocyte damage in osteoarthritis. *Int J Nanomed*. 2025;20:505–521. doi:10.2147/IJN.S491711
2. Lv S, Jing R, Liu X, et al. One-step microfluidic fabrication of multi-responsive liposomes for targeted delivery of doxorubicin synergism with photothermal effect. *Int J Nanomed*. 2021;16:7759–7772. doi:10.2147/IJN.S329621
3. Gregory PA, Bert AG, Paterson EL, et al. The miR-200 family and miR-205 regulate epithelial to mesenchymal transition by targeting ZEB1 and SIP1. *Nat Cell Biol*. 2008;10(5):593–601. doi:10.1038/ncb1722
4. Sheng W, Yue Y, Qi T, et al. The multifaceted protective role of nuclear factor erythroid 2-related factor 2 in osteoarthritis: regulation of oxidative stress and inflammation. *J Inflamm Res*. 2024;17:6619–6633. doi:10.2147/JIR.S479186

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