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LETTER

The Challenges Ahead for Exosomes Treatment for Diabetes Mellitus [Letter]

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Dear editor

We read with great interest of this study[1] titled "Exosomes as Promising Nanostructures in Diabetes Mellitus: From Insulin Sensitivity to Ameliorating Diabetic Complications". This narrative review made an integrated scoping view of current advances and perspectives of exosomes in Diabetes Mellitus which will benefit researchers in future studies.

We agree with the authors of the prospective mentioned in the article. In the treatment of diabetes and its complications, several advantages are listed below:

1. Exosome delivery system has the advantages of high stability, easy storage, convenient for quantitative use, and tissue specificity aggregation.[2]
2. Compared with cytokine injection, exosomes have higher safety and greater tissue regeneration potential due to the multiple proteins and RNA content.
3. Exosomes can avoid some of the pitfalls of targeted cell therapy, such as immune rejection, ethical issues, etc.[3]

Additional to the authors' reviews, I would like to make few amendments regarding the application and challenges lying ahead before we put this into real clinical practice.

1. Regarding the manufacturing stage of exosomes, the extraction method of exosomes and its complex classification system hinder its application. Efficient extraction and storage technology of exosomes has become an important problem to be solved before clinical application.[4]
2. Regarding the heterogeneous nature of exosomes,[5] differences may be discovered in exosomes secreted by different cells or different physiological states of the same cell. The consistent content and mechanism of production needs further exploration.
3. Regarding the targeted functional stage, since exosomes transport a variety of biomolecules, the specific mechanism of cell receptor regulation and in vivo cell control has yet to be elucidated with further in-depth exploration.

While the concentration of effective exosomes at local injection site is unknown, the optimal concentration and half-life of exosomes for promoting pancreatic or other tissue regeneration or immune regulation requires more research.[6]

After all, to conclude the letter, the incidence of diabetes is rising, and the complications of diabetes are increasing year by year. Exosomes are involved in the occurrence and development of diabetes and its related complications. It can not only be used as a biological marker for early diagnosis and staging of diabetes, but also as a target for diabetes treatment. More importantly, it can monitor the response of diabetic patients to treatment and provide a basis for the implementation of individualized treatment of diabetes. It is believed that with the continuous deepening of research and

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the continuous maturity of clinical technology, the role of exosomes in the treatment of diabetic complications will be more widely confirmed in the future, becoming another weapon for the treatment of diabetic complications.

Disclosure

The authors report no conflicts of interest in this communication.

References

1. Ashrafizadeh MKA, Aref AR, Zarrabi A, Mostafavi E, Mostafavi E. Exosomes as promising nanostructures in diabetes mellitus: from insulin sensitivity to ameliorating diabetic complications. *Int J Nanomedicine*. 2022;17:1229–1253. doi:10.2147/IJN.S350250
2. Marbán E. The secret life of exosomes: what bees can teach us about next-generation therapeutics. *J Am Coll Cardiol*. 2018;71:193–200. doi:10.1016/j.jacc.2017.11.013
3. Main H, Munsie M, O'Connor MD. Managing the potential and pitfalls during clinical translation of emerging stem cell therapies. *Clin Transl Med*. 2014;3:10. doi:10.1186/2001-1326-3-10
4. Chen J, Li P, Zhang T, et al. Review on strategies and technologies for exosome isolation and purification. *Front Bioeng Biotechnol*. 2021;9:811971. doi:10.3389/fbioe.2021.811971
5. Willms E, Cabañas C, Mäger I, Wood MJA, Vader P. Extracellular vesicle heterogeneity: subpopulations, isolation techniques, and diverse functions in cancer progression. *Front Immunol*. 2018;9:738. doi:10.3389/fimmu.2018.00738
6. Gupta D, Zickler AM, El Andaloussi S. Dosing extracellular vesicles. *Adv Drug Deliv Rev*. 2021;178:113961. doi:10.1016/j.addr.2021.113961

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