

# Dendritic mesoporous silica nanoparticles as self-adjuvants for peptide-based vaccine sustained delivery

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Abstract:

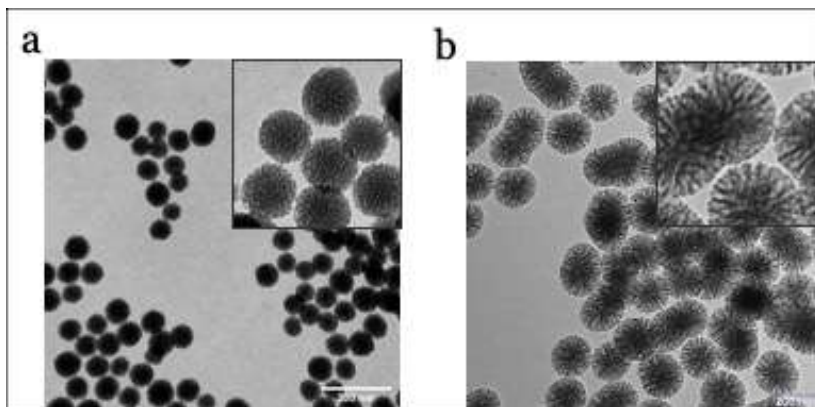
Mesoporous silica nanoparticles have drawn increasing attention as promising candidates in vaccine delivery[1]. Previous studies for evaluating silica-based vaccine delivery systems concentrated largely on macromolecular antigens. In this study, dendritic mesoporous silica nanoparticles (DMSNs) were used to evaluate their effectiveness as delivery platforms for peptide-based subunit vaccines capable of inducing significant levels of protective response without co-injection of adjuvants. An earlier reported foot-and-mouth disease virus (FMDV) peptide vaccine prototype named B<sub>2</sub>T[2,3] was employed as antigen model. Our nanoparticle-codelivery system (B<sub>2</sub>T@DMSNs) efficiently loaded B<sub>2</sub>T and showed long-time sustained release up to 930h in vitro. Besides, B<sub>2</sub>T@DMSNs of different sizes were assessed for their in vitro cellular uptake as well as in vivo immunogenicity, eliciting specific immune responses in mice with high IgG production in a particle size-dependent manner. Our results portray DMSNs nanocarriers as an attractive platform for developing peptide-based vaccine delivery.

## REFERENCES

- [1] K.T. Mody, A. Popat, D. Mahony, A.S. Cavallaro, C. Yu, N. Mitter, *Nanoscale*. 5 (2013) 5167–5179.
- [2] E. Blanco, C. Cubillos, N. Moreno, J. Bárcena, B.G. De La Torre, D. Andreu, F. Sobrino, *Clin. Dev. Immunol.* 2013 (2013).
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## FIGURES

**Figure 1:** TEM image of DMSNs-57. b) TEM image of DMSNs-156



**Figure 2:** Results of Anti-B<sub>2</sub>T IgG titers, measured by ELISA, from sera collected at days 20(pre-boost), 40, 60, and 80 in Swiss Mice immunized with B<sub>2</sub>T+Adjuvant (red circle), B<sub>2</sub>T@DMSNs-57 (green up triangle) and B<sub>2</sub>T@DMSNs-156 (purple down triangle).

