Chitosan as a nasal vaccine adjuvant / enhancer

As an intranasal excipient, chitosan has many attractive features, including a long history of safe clinical trial use, the availability of high purity “pharma” grade material, and the existence of compendial monographs. Here are some key reviews and references:

Borchard G, Esmaeili F, Heuking S, 2012. Chitosan-based delivery systems for mucosal vaccination. Chapter 12 in *Chitosan-Based Systems for Biopharmaceuticals: Delivery, Targeting and Polymer Therapeutics*, *1st edition*. Sarmento B and das Neves J (eds), Wiley.

Jabbal-Gill I, Watts P, Smith A, 2012. Chitosan-based delivery systems for mucosal vaccines. Expert Opin. Drug Deliv. 9, 1051-67.

Watts P, Smith A, Hinchcliffe M, 2014. ChiSys as a chitosan-based delivery platform for nasal vaccination. Chapter 23 in *Mucosal Delivery of Biopharmaceuticals: Biology, Challenges and Strategies*. Das Neves J and Sarmento B (eds), Springer.

Smith A, Perelman M, Hinchcliffe M, 2014. Chitosan: A promising and safe immune-enhancing adjuvant for nasal vaccines. Human Vaccines & Immunotherapeutics 10, 797-807.

Mann AJ, Noulin N, Catchpole A, Stittelaar KJ, de Waal L, Veldhuis Kroeze EJB, et al, 2014. Intranasal H5N1 vaccines, adjuvanted with chitosan derivatives, protect ferrets against highly pathogenic influenza intranasal and intratracheal challenge. PLoS One 9(5):e93761.

Singh B, Maharjan S, Sindurakar P, Cho KH, Choi YJ, Cho CS, 2018. Needle-free immunization with chitosan-based systems. Int. J. Mol. Sci. 19, 3639.