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(57) Abstract :
The invention discloses a nanoparticle-enabled vaccine delivery system comprising nanoparticles (101), encapsulated antigen (102), adjuvant (103), stabilizer (104), and surface-functionalized ligands (106). The nanoparticles are designed for enhanced antigen stability, targeted uptake by antigen-presenting cells (105), and controlled release. This system ensures rapid immune responses, sustained immunity, reduced booster requirements, and improved vaccine stability. The invention provides a scalable, biocompatible, and adaptable platform for diverse vaccine formulations, addressing urgent global health needs.

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