

## **Silica in Nanomedicine: Developing Next-Gen Therapeutic Platforms**

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Silica-based nanoparticles with their biological compatibility, thermal stability and chemical versatility are an important class of materials being utilized in nanomedicine. Silica provides a surface that can be easily modified to enable applications such as drug delivery and site-specific biological targeting. Mesoporous silica in particular is a choice material for targeted delivery of active pharmaceutical ingredients for cancer therapy and other treatments.

Alongside our collaborators at City of Hope, nanoComposix has developed an innovative mesoporous silica-based HIV vaccine for the National Institute of Allergy and Infectious Diseases (NIAID). We utilized the unique morphology and chemical versatility of mesoporous silica nanoparticles (MSNs) to engineer a particle that targets dendritic cells and selectively releases a cocktail of adjuvant and mRNA when taken up by these immune cells. Preliminary cell culture testing has shown successful transfection using this method. This vaccine design provides a platform for many mRNA-based vaccines.