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# State of the art and future directions in nanomedicine for tuberculosis.

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Expert Opinion on Drug Delivery

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# State of the art and future directions in nanomedicine for tuberculosis

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## Abstract

**Introduction:** Tuberculosis (TB) ranks the second leading cause of death from an infectious disease worldwide. However, treatment of TB is affected by poor patient compliance due to the requirement for daily drug administration, for lengthy periods of time, often with severe drug-induced side effects. Nanomedicines have the potential to improve treatment outcomes by providing therapies with reduced drug doses, administered less frequently, under shortened treatment durations.

**Areas covered:** In this article, we present the pathophysiology of the disease, focusing on pulmonary TB and the characteristics of drugs used in treatment and discuss the application of nanomedicines within this scope. We also discuss new formulation approaches for TB nanomedicines and directions for future research.

**Expert opinion:** Nanomedicines have the potential to improve TB treatment outcomes. New approaches such as nanoparticle systems able to impact the immune response of macrophages and deliver drug intracellularly, as well as the use of polymer–drug conjugates for drug delivery, are likely to play an important role in TB nanomedicines in future. However, further research is required before TB nanomedicines can be translated to the clinic.

**Keywords:** bioavailability, multimodal nanoparticles, nanomedicine, polymer–drug conjugates, targeted drug delivery, tuberculosis