

# **Fighting Cancer with Nanoparticle Medicines: How Size Can Matter**

by

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## **Abstract**

For centuries, cancer has been one of the most devastating diseases. Papyrus writings from 1600-1500 BC describe cancer and attempts at its treatment. Today, the molecular basis of cancer is being unraveled, and therapeutics are being developed to take advantage of this increasing knowledge. One new class of experimental therapeutics involves the use of nanoparticles, where the control of size dramatically determines performance. Given the long history of difficulties in developing cancer therapies, are nanoparticle medicines (nanomedicines) worth the hype? I discuss the current understandings of why engineered nanoparticle medicines (that are highly multifunctional chemical systems) have the potential to provide “game changing” ways to treat cancer. I then illustrate the various features and potentials of nanoparticle medicines using two different nanoparticles that we have translated from laboratory curiosities into experimental therapeutics in human clinical trials. I conclude with our new approach to bring therapy safely into the brain using nanoparticles.