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# **Technological Applications of Nano-Hybrid Composites**

**Virat Khanna, Prianka Sharma, and Priyanka Mahajan**

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# Technological Applications of Nano- Hybrid Composites

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# Chapter 8

## Exploring the Transformative Potential of Hybrid Nanoparticles in Biomedical Applications: Relevance of Hybrid Nanoparticles

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### **ABSTRACT**

*Hybrid nanoparticles are nanoscale particles that are composed by interaction between the different components, resulting in enhanced properties that can be harnessed for wide range of application across fields like medicine, electronics energy, and more. These nanoparticles are typically in the size range from 1-100 nanometers, which is advantageous. Because at this scale, they often exhibit novel behavior due to their quantum and surface effects. The choice of material and the way they are combined can be tailored to achieve specific goals. For example, in biomedical applications, hybrid nanoparticles can be engineered to have specific targeting abilities such as targeted drug delivery, theranostics, gene therapy, phototherapy, tissue regeneration, vaccines, antibacterial, biomolecules detection, imaging probes, tissue engineering, biosensing, and cancer treatment. They have enhanced qualities with increased target specificity and sensitivity, extended circulation times, and resistance to biological barriers.*

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