

Special Issue

Recent Advances in Antibacterial Nanomaterials

Message from the Guest Editor

Recent advances in antibacterial nanomaterials have opened new pathways to combat microbial resistance and infections. Nanomaterials such as silver, zinc oxide, copper oxide, titanium dioxide, and carbon-based nanostructures exhibit strong antibacterial properties due to their high surface area, enhanced reactivity, and ability to interact with bacterial membranes.

They function through various mechanisms; Multifunctional and hybrid nanomaterials are also being developed; Furthermore, green synthesis methods are garnering interest as they provide the means to produce nanomaterials in an environmentally friendly and sustainable manner, using plant extracts or microorganisms.

Despite significant progress, challenges remain regarding the long-term toxicity, environmental impact, and large-scale production of these nanomaterials. Currently, research is focused on addressing these issues and developing safer, more effective antibacterial solutions for medical devices, coatings, textiles, and water purification systems.

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