

DNA nanostructures in biomedicine

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DNA nanotechnology has emerged as a potential branch of nanotechnology for the programmability and easy access to modification of nanostructures. DNA nanostructures are nanoscale artificial structures composed of synthetic or biologic DNA. Nanostructures can be categorised into static or dynamic nanostructures and are utilised based on the requirement. As these nanostructures are made of DNA, they possess better biocompatibility, also, they are biodegradable and non-cytotoxic. Besides, they can be used for designing and organising biomolecules owing to their nano size. They can be modified easily as per the requirements to carry different entities, such as dye molecules, proteins, nanoparticles and drugs. These properties and versatility of DNA nanostructures have made them suitable in diverse applications. DNA nanostructures serve as accurate tools in biomolecular sensing. Biosensors composed of signal transducers and chemical compounds are fused in the nanostructures. When biosensor molecules respond to their target molecules, nanostructures record them. These nanostructures have also been approached for the cellular imaging process owing to their programmable assembly and versatility. In a therapeutic drug delivery system, these DNA nanostructures have grabbed much attention. Nanostructures loaded with desired chemotherapeutics or ligands show more effective results and less cytotoxicity than the conventional process. Thereby, these are being used in cancer therapy, immunostimulation, gene editing, etc. Because of their unique and versatile properties, DNA nanostructures possess a prosperous future and potentiality in biomedicine.

Keywords: DNA, Nanotechnology, Biomedicine, Cellular imaging, Drug delivery

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