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## **Biomedical, and pharmaceutical applications of dendrimers as a promising architectural nanostructure in gene and drug delivery**

### **Abstract:**

Dendrimers, which are a type of hyper-branched, three-dimensional, and nanostructural architecture polymers, exhibit a range of unique characteristics such as enhanced drug solubility, uniform size, surface multifunctional groups, and high loading capacity. These properties make dendrimers adaptable and biocompatible, and they have been gaining significant attention in the pharmaceutical industry as potential drug carriers for targeting, delivery, and controlled release systems. Dendrimers can be used for a broad range of therapeutic agents, and their well-defined structure, along with their synthesis, which is controlled through a stepwise method, enables them to overcome the challenges that have arisen during drug development, such as solubility, bioavailability, targeting, and permeability. Dendrimers are widely recognized as a useful nanostructure that can enhance drug solubility and reduce cytotoxicity problems. Polyamidoamine PAMAM and poly(propylene) imine PPI are the two most commonly employed dendritic polymers in the formulation of various therapeutic agents. This review examines the applicability of dendrimers in the pharmaceutical and biomedical sectors, their advantages, limitations, and their synthesis.

### **Biography**

**Suren Azad Ramadhan** is a pharmaceutical specialist in pharmaceutics. I hold a Bachelor's degree in Pharmaceutical Sciences, and a Master's degree in Pharmaceutics, and I am currently pursuing a PhD in the same field. Additionally, I am a health awareness activist. I work as a Lecturer of Industrial Pharmacy, Cosmeceutical Sciences, Pharmacy Management, and Biopharmaceutics & Pharmacokinetics at the College of Pharmacy, Pharmaceutics Department at Knowledge University. Since 2016, I have been active in the Kurdistan pharmaceutical market, assuming various roles until I arrived at my current position as a Product and Marketing Manager in March 2021. Throughout my professional career, I have had the privilege of being involved in numerous national and international symposiums and conferences, taking on various roles such as attendee, speaker, and member of the organizing committee. These experiences have provided me with valuable opportunities to expand my knowledge, network with professionals in my field, and contribute to the advancement of research and innovation.