

METAL NANOPARTICLES STABILIZED WITH CARBOSILANE DENDRONS FOR THE TREATMENT OF INFECTIOUS DISEASES AND CANCER

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Type of Collaboration

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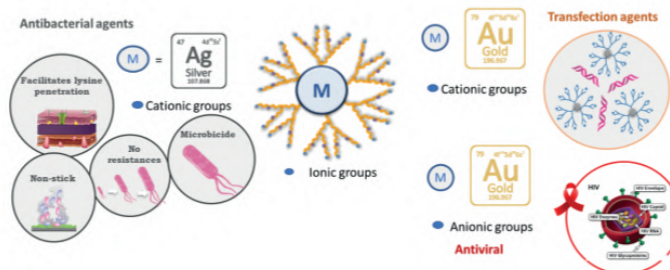
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ABSTRACT

The present invention provides metal nanoparticles coated with dendrons of carbosilane structure which are functionalized at their periphery with anionic groups (such as carboxylate, sulfonate or sulfate), that give the macromolecule a negative net charge, or cationic (ammonium) that give the dendrimer a positive net charge. Preferably, the nanoparticles are made of gold and silver and the carbosilane dendrons have been functionalized by thiolene addition.

The process of obtaining the NPs of the invention allows, by a simple process, the synthesis of cationic or anionic systems, and also the possibility of synthesizing heterofunctionalized NPs, that consists in introducing also some dendron with one or more of its branches substituted by different groups, such as chromophore groups. Useful in biomedicine, specifically in the treatment of infectious diseases or cancer. These include the use of cationic derivatives as non-viral transport agents for the transfection or internalization of nucleic material within different cell lines in gene therapy processes or also the use of these cationic or anionic compounds as therapeutic agents, for example, as antibacterial, antiviral or antiprionic agents.

Cationic compounds are used as antimicrobial agents. Thus, they can be used for the prevention and / or treatment of bacterial infections. It can be used for the prevention and / or treatment of diseases of viral origin, such as AIDS, Herpes, Influenza or others.

ADVANTAGES AND INNOVATIONS

In the state of the art there are metallic nanoparticle applications and dendritic systems in biomedicine, but there are very few examples of dendronized nanoparticles, that combine the properties of these two types of compounds, metal nanoparticles and dendrimers.

This invention provides a first example of dendronization of metal nanoparticles with ionic carbosilane dendritic systems and the obtained results show improvements over the use of the individual components separately.

Metal nanoparticles (NP) can be heterofunctional, with the advantage of being able to perform more than one function simultaneously. Thus, for example, the anionic NPs more than having only antiviral capacity because of their negative charge, they may be marked to facilitate their monitoring or may also have target groups that direct the dendrimers specifically to their place of action.

Likewise, heterofunctional cationic NPs may simultaneously have, for example, positive charges for the transport of nucleic acids or anionic drugs and targeting groups such as an antibody to direct these dendrimers to a specific site, or also fluorophores or other drugs.