Universidad de Alcalá

SYNTHESIS OF DENDRITIC SYSTEMS OF NANOSCOPIC SIZE FOR APPLICATIONS IN BIOMEDICINE

TECHNOLOGY OFFER

Code

QUI_UAH_02

Application areas

- Biological Sciences

Type of collaboration

- Joint venture agreement
- License agreement

Main researches

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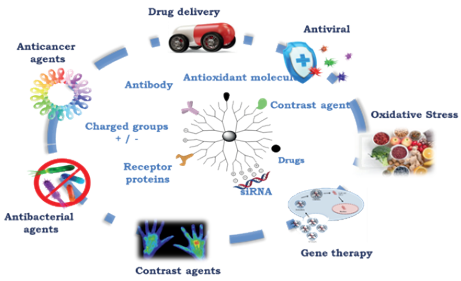

ABSTRACT

This technology consist in the synthesis and structural characterization of dendritic systems of nanoscopic size with applications in different fields of biomedicine. Among all of them the group launches the development of these systems for the transport and release of drugs as a vehicle of transfection in gene therapy or as therapeutic agents. The technology lies in the preparation of molecules of nanoscopic size based on dendritic systems or hyperbranched polymers that contains a carbosilane skeleton and are functionalized in the periphery with groups from different nature with the objective to provide them with activity focused in different biomedical aims. The group can emphasize the development of cationic dendrimers appropriate for the transport of anionic drugs or as non viral vehicles in transfection proces- ses in gene therapy, because of its capacity to join biomolecules with negative charge as oli- gonucleotides or siRNA.

These cationic systems can also act as therapeutic antibacterial agents or as anti-prionic agents. Cationic dendritic systems of carbosilane type are able to join by an electrostatic in- teraction oligonucleotides or small RNA of interference (si RNA), making complexes that have proved not to be toxic in concentration among 1-5 µm. These complexes are able to interna- lise the genetic material inside different types of cellular lines and in some cases they have showed a great efficiency in the inhibition of HIV. It is useful in processes of transfection of plasmids to different cellular carcinogenic lines in vitro and in vivo.

Regarding the antibacterial capacity of these cationic systems, the group has proved that they present a great activity against gram + bacteria and gram – bacteria, and in addition, there are signs of strengthening of the antibacterial activity of penicillin when it joins one of the dendritic systems. It allows also the preparation of anionic systems that present an im- portant antiviral activity, mainly against HIV. These

ADVANTAGES AND INNOVATIONS

- Cheaper preparation than other commercial transfection agents.
- Minor toxicity than other commercial transfection agents.
- Levels of transfection similar or superior to commercial alternatives (depending on the cellular line used)
- Antibacterial capacity against to a wide spectrum of bacteria
- Regarding the anionic systems developed, the competitive advantages are the following:
- They present a great antiviral capacity, mainly against HIV virus.
- They have antiinflammatory activity.
- They can be in use in the development of a microbicide gel of topic use.