

Rings, Chains and Helices: New Silver Coordination Compounds with (Iso-)Nicotinic acid Derivatives

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Silver is used since centuries as a disinfectant. Today, due to the increase of resistivity of the bacteria against antibiotics, silver and its derivatives enjoy a regain of attention for their possible applications in the field of medicine.

New silver coordination complexes have been synthesized with the goal of using them for their antibacterial properties.

To generate new silver (I) coordination compounds, a class of biocompatible ligands, synthesized with short polyethylene glycol and functionalized at both ends with (iso-)nicotinic acid groups have been used. The flexibility of the ligand was modulated via the length of the polyethylene glycol part. Then, the use of the nicotinic or the isonicotinic derivatives permitted to change the direction of the elongation of the complexes.

Other parameters have been modified, such as the ligand-to-metal ratio and the choice of the counter ion.

A large variety of patterns, such as symmetric, asymmetric or interpenetrated metallacycles, single or double helices, single or double chains have been obtained. Structural isomers have been described. All those new structures have been identified via single-crystal structure determination.

In a second step, the antibacterial effect and the biocompatibility of some compounds have been tested. They all exhibited strong antimicrobial properties. Unfortunately, the therapeutic window seemed to be too small for implant coatings. However, all those compounds remain candidates for external antimicrobial agents.

Jury:

Prof. Dr. Katharina M. Fromm (thesis supervisor)

Prof. Dr. Rosa Carballo Rial (external co-examiner)

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Prof. Dr. Marco Lattuada (president of the jury)