Development of antibacterial and antifungal triazole chromium(III) and cobalt(II) complexes: Synthesis and biological activity evaluations

Murcia R.A.

Leal S.M.

Roa M.V.

Nagles E.

Muñoz-Castro A.

Hurtado J.J.

In this work, six complexes (2-7) of Cr(III) and Co(II) transition metals with triazole ligands were synthesized and characterized. In addition, a new ligand, 3,5-bis(1,2,4-triazol-1-ylmethyl)toluene (1), was synthesized and full characterized. The complexes were obtained as air-stable solids and characterized by melting point, electrical conductivity, thermogravimetric analysis, and Raman, infrared and ultraviolet/visible spectroscopy. The analyses and spectral data showed that complexes 3-7 had 1:1 (M:L) stoichiometries and octahedral geometries, while 2 had a 1:2 (M:L) ratio, which was supported by DFT calculations. The complexes and their respective ligands were evaluated against bacterial and fungal strains with clinical relevance. All the complexes showed higher antibacterial and antifungal activities than the free ligands. The complexes were more active against fungi than against bacteria. The activities of the chromium complexes against Candida tropicalis are of great interest, as they showed minimum inhibitory concentration 50 (MIC50) values between 7.8 and 15.6 ?g mL-1. Complexes 5 and 6 showed little effect on Vero cells, indicating that they are not cytotoxic. These results can provide an important platform for the design of new compounds with antibacterial and antifungal activities.

Antibacterial activity

Antifungal activity

Cobalt(II) and chromium(III) complexes

Triazole ligands

antifungal agent

antiinfective agent

chromium

cobalt

ligand

triazole derivative

bacterium

chemical structure

chemistry

drug effect

fungus

infrared spectroscopy

microbial sensitivity test

nuclear magnetic resonance spectroscopy

structure activity relation

synthesis

Anti-Bacterial Agents

Antifungal Agents

Bacteria

Chromium

Cobalt

Fungi

Ligands

Magnetic Resonance Spectroscopy

Microbial Sensitivity Tests

Molecular Structure

Spectroscopy, Fourier Transform Infrared

Structure-Activity Relationship

Triazoles