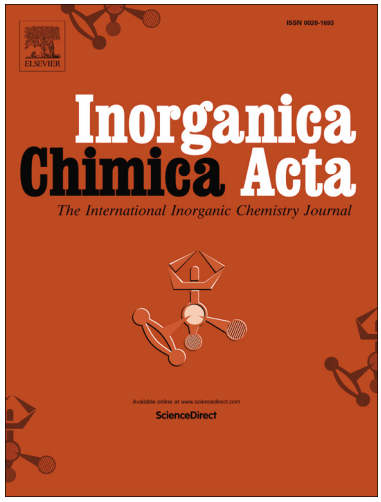

Research paper

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Synthesis, characterisation and cytotoxic properties of *N*-heterocyclic carbene silver(I) complexes

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Abstract

A benzimidazolium salt bearing hydroxyethyl group, **1a** and a new series of zwitterionic sulphonated benzimidazolium salts, **1b-e** were reacted with Ag_2O to produce Ag(I)-*N*-heterocyclic carbene (NHC) complexes, **2a-e** respectively. Synthesised silver(I)-*N*-heterocyclic carbene complexes were fully characterised by ^1H and ^{13}C NMR, elemental analysis and HRMS spectroscopic methods. Anti-cancer potential of both NHC salts and complexes were tested and the IC_{50} values of these NHC salts and complexes were determined by a proliferation BrdU enzyme-linked immunosorbent assay (ELISA) against HeLa (Human cervix carcinoma), HT29 (human adenocarcinoma) and L929 (mouse fibroblast) cell lines. The IC_{50} values are in the range of 11± 1 to 126 ± 3 μM show that all new Ag(I)-NHC complexes especially complex **2b** demonstrated remarkable cytotoxic activity against HeLa, HT29 and L929 while **1a-e** NHC salts are found to be inactive against HeLa, HT29 and L929. Also, the high IC_{50} value of complex **2b** against L929 cells can be interpreted high selectivity against healthy cells. This complex has been highlighted as new types of metalodrug.

Keywords: Anticancer activity; *N*-heterocyclic carbene; silver complex; sulfonated *N*-heterocyclic carbene

1. Introduction

Organometallic complexes (metalodrugs) have an important role as design of therapeutic agents in biomedical applications. Organometallic compounds with *N*-heterocyclic carbene (NHC) ligands have been used in organic transformations and metal based drugs lately [1,2]. The performance of organometallic compound in