

CYTOTOXIC EFFECTS OF SELECTED GOLD(III) COMPLEXES ON THE MURINE BCL-1 B LINEAGE LEUKAEMIA CELL LINE

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CITOTOKSIČNI EFEKTI IZABRANIH KOMPLEKSA TROVALENTNOG ZLATA NA ČELIJSKU LINIJU MURINE BCL-1 B LEUKEMIJE

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Received / Primljen: 21. 03. 2012.

Accepted / Prihvaćen: 21. 08. 2012.

ABSTRACT

In recent years, gold(III) complexes have attracted great interest because of their cytotoxicity to cancer cells.

We investigated the cytotoxic effects of three newly synthesised gold(III) complexes, [Au(en)Cl₂]⁺ (dichloride (ethylenediamine) aurate(III)-ion), [Au(dach)Cl₂] (dichloride (1,2-diaminocyclohexane) aurate(III)-ion) and [Au(bipy)Cl₂]⁺ (dichloride (2,2'-bipyridyl) aurate(III)-ion), on the murine BCL-1 B lineage leukaemia cell line.

The cytotoxicity of these gold(III) complexes was evaluated by cytotoxic assay (MTT test).

The results showed that all of the tested gold(III) complexes displayed a cytotoxic effect on BCL-1 cells. The concentration decrease was followed by a marked increase in BCL-1 cell viability. At a concentration of 125 μM, which we suppose could be used in vivo, the [Au(bipy)Cl₂]⁺ complex showed the greatest cytotoxic effects among the tested gold(III) complexes and similar cytotoxicity as to the cisplatin that we used as control. Among the tested gold(III) complexes, [Au(en)Cl₂]⁺ was the least cytotoxic to BCL-1 cells.

In line with the obtained results, we suggest that the [Au(bipy)Cl₂]⁺ complex should be tested in vivo in experimental models of B cell leukaemia.

Key words: gold(III) complexes, cytotoxicity, BCL-1 cells

SAŽETAK

Poslednjih nekoliko godina rade brojna istraživanja u cilju ispitivanja citotoksičnosti jedinjenja zlata radi njihove eventualne primene u onkologiji.

Mi smo ispitali citotoksičnost novosintetisanih jedinjenja zlata [Au(en)Cl₂]⁺ (dichloride (ethylenediamine) aurate(III)-ion), [Au(dach)Cl₂] (dichloride (1,2-diaminocyclohexane) aurate(III)-ion) i [Au(bipy)Cl₂]⁺ (dichloride (2,2'-bipyridyl) aurate(III)-ion) na BCL-1 liniji V ćelijske miše leukemije.

Citotoksičnost je analizirana primenom MTT testa.

Naši rezultati pokazuju da sva novosintetisana jedinjenja zlata pokazuju citotoksičan efekat na BCL-1 liniji koji je dozno zavistan (smanjenje koncentracije korelira sa porastom proliferacije BCL-1 ćelija). Pri koncentraciji 125 μM, za koju smatramo da treba testirati in vivo, najbolji citotoksični efekat je pokazao kompleks [Au(bipy)Cl₂]⁺. Citotoksičnost ovog kompleksa je bila približna citotoksičnošću cisplatine koju smo koristili kao kontrolu. Među ispitivanim kompleksima najslabiju citotoksičnost na liniji V ćelijske miše leukemije je pokazao [Au(en)Cl₂]⁺.

U skladu sa dobijenim rezultatima, smatramo da in vivo treba ispitati terapijski efekat [Au(bipy)Cl₂]⁺ u eksperimentalnom modelu V ćelijske leukemije.

Ključne reči: jedinjenja zlata, citotoksičnost, BCL-1 ćelije

INTRODUCTION

The success of cisplatin, carboplatin and oxaliplatin, which now play a major role in established medical treatments of cancer, has aroused great interest in the study of the cytotoxic effects of metal complexes that are isostructural to these platinum complexes [1-3].

During the last twenty years, much research has focused on gold(III) complexes, which are square-planar d₈, isoelectronic

and isostructural to platinum(II) complexes. Many *in vitro* and *in vivo* studies have been conducted to investigate and precisely describe the mechanism underlying the anti-tumour effects of gold(III) complexes [3-7]. Although the results were encouraging and gold(III) compounds appeared to be very good candidates for anticancer drugs [4-7], because of their reductive potential, these complexes were not stable under physiological conditions [8]. Therefore, the selection of a suitable ligand to stabilise the complex became a foremost challenge in the de-

UDK: 616-006.04-085:546.59 / Ser J Exp Clin Res 2012; 13 (3): 99-102

DOI: 10.5937/SJECR-1721

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