medical sciences forum

MDPI

Abstract

Are the Co(III) Complexes with Diamine Chelate Ligands a Response to New Antifungal Compounds? †

Katarzyna Turecka [1,*], Agnieszka Chylewska [2], Anna Kawiak [3] and Krzysztof Waleron [1]

[1] Department of Pharmaceutical Microbiology, Faculty of Pharmacy, Medical University of Gdansk, 80-416 Gdansk, Poland
[2] Department of Bioinorganic Chemistry, Faculty of Chemistry, University of Gdansk, 80-308 Gdansk, Poland
[3] Department of Biotechnology, Intercollegiate Faculty of Biotechnology, University of Gdansk and Medical University of Gdansk, 80-307 Gdansk, Poland
* Correspondence: katarzyna.turecka@gumed.edu.pl
† Presented at the 8th International Electronic Conference on Medicinal Chemistry, 1–30 November 2022; Available online: https://ecmc2022.sciforum.net/.

Abstract: Increasing resistance of fungi, especially *Candida* spp., has successively reduced the already short list of effective antifungal drugs used in clinical therapy. Thus there is an urgent need for new, non-toxic antifungals with novel modes of action. A very interesting and attractive group of compounds seems to be complexes of Co(III) with diamine chelate ligands due to their therapeutic uses as antiviral, antibacterial, antifungal, antiparasitic, or antitumor agents. Two Co(III) complexes with diamine chelate ligands ($[CoCl_2(dap)_2]Cl$ (1) and $[CoCl_2(en)_2]Cl$ (2)) (where dap = 1,3-diaminopropane, en = ethylenediamine) were synthesized and characterized using elemental analysis, an ATR technique, and a scan method and sequentially tested to evaluate the mode of action. The assessment of cell damage by the newly synthetized photosensitive fluorescein-labelled complex 1 ($[Co(dap)_2FLU]Cl_2$) was performed using fluorescent microscopy, which indicated cell membrane permeability and altered cell morphology. The study of the *C. albicans* survival in blood showed a slight reduction in the number of viable, colonizing cells in the sample compared to the results obtained for the substances with confirmed antifungal activity – ketoconazole. DNA cleavage ability of the Co(III) complexes using agarose gel electrophoresis against genomic DNA isolated from a *C. albicans* cells showed nuclease activity for both complexes. This study provides new data on potential antifungal drugs, especially against *Candida* species.

Keywords: *Candida* spp.; Co(III) coordination complexes; antifungal activity; confocal microscopy; nuclease activity

Citation: Turecka, K.; Chylewska, A.; Kawiak, A.; Waleron, K. Are the Co(III) Complexes with Diamine Chelate Ligands a Response to New Antifungal Compounds? *Med. Sci. Forum* **2022**, *14*, 131. https://doi.org/10.3390/ECMC2022-13231

Academic Editor: Alfredo Berzal-Herranz

Published: 1 November 2022

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/ECMC2022-13231/s1, slides/poster.

Author Contributions: Conceptualization, methodology, and investigation, K.T. and A.C.; the biological component, K.T.; the chemical component, A.C.; formal analysis, K.T.; writing—original draft preparation, K.T.; writing—review, A.C., A.K. and K.W.; editing, K.T. and A.C. All authors have read and agreed to the published version of the manuscript.

Funding: This work was financially supported by the Ministry of Science and Higher Education Republic of Poland from the quality-promoting subsidy under the Leading National Research Centre (KNOW) programme 2012–2017 Faculty of Pharmacy with Subfaculty of Laboratory Medicine [dec. MNiSW-DS-6002-4693-23/WA/12].

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.