Synthesis, structural characterization, and biological evaluation of oxorhenium(V) complexes with a novel type of thiosemicarbazones derived from N-[N?,N?-dialkylamino(thiocarbonyl)]benzimidoyl chlorides

Nguyen H.H., Jegathesh J.J., Da S Maia P.I., Deflon V.M., Gust R., Bergemann S., Abram U.

Department of Chemistry, Hanoi University of Sciences, 19 Le Thanh Tong, Hanoi, Viet Nam; Freie Universit??t Berlin, Institute of Chemistry and Biochemistry, Fabeckstrasse 34-36, D-14195 Berlin, Germany; Instituto de Qu??mica de S?o Carlos, Universidade de S?o Paulo, CP 780, S?o Carlos - S?o Paulo, Brazil; Institute of Pharmacy, K??nigin-Luise-Strasse 2 and 4, 14195 Berlin, Germany; Freie Universit??t Berlin, Institute of Chemistry and Biochemistry

Abstract: Reactions of N-[N?,N?-dlethylamino(thiocarbonyl)]benzimidoyl chloride with 4,4-dialkylthiosemicarbazides give a novel class of thiosemicarbazides/thiosemicarbazones, H_2L, which causes a remarkable reduction of cell growth In in vitro experiments. These strong antiproliferative effects are also observed for oxorhenium(V) complexes of the general composition [ReOCl(L)], which are formed by reactions of the potentially tridentate ligands with $(NBu_4)[ReOCl_4]$. A systematic substitution of the alkyl groups In the thiosemlcarbazone building blocks of the ligands do not significantly Influence the biological activity of the metal complexes, while the replacement of the chloro ligand by a PPh_3 ligand (by the replacement of the oxo unit by a nitrido ligand) completely terminated the cytotoxicity of the metal complexes. ?? 2009 American Chemical Society.

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Correspondence Address: Abram, U.; Freie Universit??t Berlin, Institute of Chemistry and Biochemistry, Fabeckstrasse 34-36, D-14195 Berlin, Germany; email: abram@chemie.fu-berlin.de
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1. Nguyen, H.H., Department of Chemistry, Hanoi University of Sciences, 19 Le Thanh Tong, Hanoi, Viet Nam, Freie Universit??t Berlin, Institute of Chemistry and Biochemistry
2. Jegathesh, J.J., Freie Universit??t Berlin, Institute of Chemistry and Biochemistry, Fabeckstrasse 34-36, D-14195 Berlin, Germany
3. Da S Maia, P.I., Instituto de Qu??mica de S?o Carlos, Universidade de S?o Paulo, CP 780, S?o Carlos - S?o Paulo, Brazil
4. Deflon, V.M., Instituto de Qu??mica de S?o Carlos, Universidade de S?o Paulo, CP 780, S?o Carlos - S?o Paulo, Brazil
5. Gust, R., Institute of Pharmacy, K??nigin-Luise-Strasse 2 and 4, 14195 Berlin, Germany
6. Bergemann, S., Institute of Pharmacy, K??nigin-Luise-Strasse 2 and 4, 14195 Berlin, Germany
7. Abram, U., Freie Universit??t Berlin, Institute of Chemistry and Biochemistry, Fabeckstrasse 34-36, D-14195 Berlin, Germany

References:

1. Campbell, M.J.M., (1975) Coord. Chem. Rev., 15, p. 279
2. West, D.X., Padhye, S.B., Sonawane, P.A., (1991) Struct. Bonding (Berlin), 76, p. 1
3. Casas, J.S., Garc??a-Tasende, M.S., Sordo, J., (2000) Coord. Chem. Rev., 209, p. 49
4. Klayman, D.L., Scovill, J.B., Bartosevich, J.F., Bruce, J., (1983) J. Med. Chem., 26, p. 39
5. Dobek, A.S., Klayman, D.L., Dickson, E.T., Scovill, J.P., Oster, C.N., (1983) Arzneim.-Forsch., 33, p. 1583
6. Klayman, D.L., Scovill, J.P., Mason, C.J., Bartosevich, J.F., Bruce, J., Lin, A., (1983) Arzneim.-Forsch., 33, p. 909
7. Klayman, D.L., Scovill, J.P., Bartosevich, J.F., Mason, C.J., (1979) J. Med. Chem., 22, p. 1367
8. Shipman Jr., C., Smith, S.H., Drach, J.C., Klayman, D.L., (1986) Antiviral Res., 6, p. 197
9. Miertus, S., Filipovic, P., (1982) Eur. J. Med. Chem., 17, p. 145
10. Saryan, L.A., Mailer, K., Krishnamurti, C., Atholine, W., Petering, D.H., (1981) Biochem. Pharmacol., 30, p. 1595
11. Sartorelli, A.C., Agrawal, K.A., Tsiftsoglou, A.S., Moore, E.C., (1977) Adv. Enzyme Regul., 15, p. 117
12. Scovill, L.P., Klayman, D.L., Lambrose, C., Childs, G.E., Notsoh, J.D., (1984) J. Med. Chem., 27, p. 87
13. Garcia Santos, I., Abram, U.Z., (2004) Anorg. Allg. Chem., 630, p. 697
14. Nguyen, H.H., Maia, D.S., Deflon, V.M., Abram, U., (2009) Inorg. Chem., 48, p. 25
15. Alberto, R.T., (2004) Comprehensive Coordination Chemistry II, p. 127. , McCleverty, J. A., Meyer, T. J., Eds.
16. Elsevier: Amsterdam, The Netherlands
17. Abram, U.R., (2003) Comprehensive Coordination Chemistry II, 5, p. 271. , McCleverty, J. A., Meyer, T J., Eds.
18. Elsevier: Amsterdam, The Netherlands
19. Nguyen, H.H., Grewe, J., Schroer, J., Kuhn, B., Abram, U., (2008) Inorg. Chem., 47, p. 5136
20. Farrugia, L.J., (1997) J. Appl. Crystallogr., 30, p. 565
21. Chen, J., Huang, Y.-W., Liu, G., Afrasiabi, Z., Sinn, E., Padhye, S., Ma, Y., (2004) Toxicol. Appl. Pharmacol., 197, p. 40
22. Alberto, R., Schibli, R., Egli, A., Schubiger, P.A., Herrmann, W.A., Artus, G., Abram, U., Kaden, T.A., (1995) J. Organomet. Chem., 217, p. 492

23. Chatt, J., Falk, C.D., Leight, G.J., Paske, R.J., (1969) J. Chem. Soc. A, p. 2288
24. Sreekanth, A., Fun, H.-K., (2005) J. Mol. Struct., 737, p. 61
25. Beyer, I., Widera, R., (1982) Tetrahedron Lett., 23, p. 1881
26. Beyer, L., Hartung, J., Widera, R., (1984) Tetrahedron, 40, p. 405
27. Sheldrick, G.M., (1997) SHELXS-97 and SHELXL-97, Programs for the Solution and Refinement of Crystal Structures, , University of G??ttingen, G??ttingen, Germany
28. Bernhart, G., Reile, H., Birnb??ck, H., Spruss, T., Sch??nenberger, H., (1992) Cancer Res. Clin. Oncol., 118, p. 35
29. Reile, H., Birnb??ck, H., Bernhardt, G., Spruss, T., Sch??nenberger, H., (1990) Anal. Biochem., 187, p. 262
30. Marmur, J.A., (1961) J. Mol. Biol., 3, p. 208