

## Terbium(III) complexes with N-alkyl-N-methylglucamine surfactants: characterization and in vitro Cytotoxicity activity in tumor cell line

Simone R. Silva<sup>1</sup>(PQ), Arshad Islam<sup>3</sup>(PG), Érica Correia Duarte<sup>2</sup>(IC), Frédéric Frézard<sup>3</sup>(PQ), Cynthia Demicheli<sup>2\*</sup>(PQ).

<sup>1</sup>Universidade Federal de Roraima, Departamento de Química. Av. Capitão Ene Garcez, 2413, Aeroporto. 69310000 - Boa Vista – RR-Brasil

<sup>2</sup>Universidade Federal de Minas Gerais, Instituto de Ciências Exatas, Departamento de Química. Av. Antônio Carlos 6627, Pampulha. 31270901 - Belo Horizonte, MG – Brasil

<sup>3</sup>Universidade Federal de Minas Gerais, Instituto de Ciências Biológicas, Departamento de Fisiologia e Biofísica. Av. Antônio Carlos 6627. Pampulha 31270-901 - Belo Horizonte, MG – Brasil

\*Autor correspondente: [cynthia.demicheli@pq.cnpq.br](mailto:cynthia.demicheli@pq.cnpq.br)

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### Abstract

Complexes of trivalent terbium, Tb(III), with a stoichiometric ratio 1:2 [Tb(III): L] were synthesized and characterized. The Tb(III) complexes have the general formula [Tb(L)<sub>2</sub>]Cl. The complexes, the free ligands and the corresponding metal salts were evaluated for their cytotoxicity in metastatic melanoma cell line B16F10 and murine fibroblast L292 cells.

### Introdução

In recent years, lanthanide complexes have attracted much attention for their biocidal efficacy and have been found to exhibit anticancer, antimicrobial and fungicidal activities<sup>1</sup>. In this work, we reported the synthesis of Tb(III) complexes with N-alkyl-N-methylglucamine surfactants including N-octanoyl-N-methylglucamine(L8), N-decanoyl-N-methylglucamine (L10) and N-dodecanoyl-n-methylglucamine(L12). The cytotoxic activity of these complexes, the free ligands and the corresponding metal salts in metastatic melanoma cell line B16F10 and murine fibroblast L292 cells in comparison with antitumor drug cisplatin has also been described.

### Resultados e Discussão

To obtain the complexes, TbCl<sub>3</sub>.6H<sub>2</sub>O (0.25 mmol) was dissolved in water following by the addition of the ligand (0.5 mmol). Acetone was added to yield a precipitate, which was filtered and washed with acetone. The data from elemental, and thermogravimetry analyses of the synthesized complexes indicate a 1:2 stoichiometry and conductivity values suggest 1:1 electrolytes. ESI-MS data also supports the formation of 1:2 Tb-ligand complexes. The infrared data suggests that Tb(III) is hexa-coordinated to two molecules of the asymmetric tridentate ligands, through the nitrogen of the amine, the oxygen atom of the carbonyl group and the deprotonated oxygen of the ligand, Figure 1. The cytotoxic effect of all the complexes, free

ligands and metal precursors was evaluated by the MTT [3-(4,5)-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide] assay (Table 1). TbL8 exerted the most pronounced cytotoxic effects against the B16F10 cells with IC<sub>50</sub> value of 38.34 μmol/L.

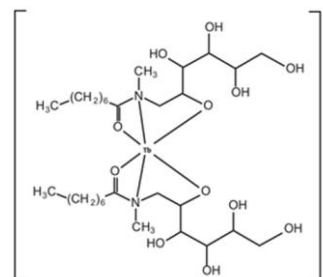


Figure 1. Complex Tb(L8)<sub>2</sub>Cl.

Table 1. IC<sub>50</sub> values MTT assays.

Complex	Murine fibroblast (L292)	Melanoma cell line (B16F10)
	IC <sub>50</sub> (μmol/L)	
Tb(L8) <sub>2</sub> Cl	> 50	38.34
[Tb(L10) <sub>2</sub> ]Cl.5H <sub>2</sub> O	> 50	59.93
[Tb(L12) <sub>2</sub> ]Cl.5H <sub>2</sub> O	30.76	53.45
Cisplatin	29.05	5.24

### Conclusões

The Tb(III) complexes with N-alkyl-N-methylglucamine have 1:2 stoichiometry where the surfactants act as tridentate ligands. The in vitro cytotoxic study showed that TbL8 complex was the most active agent among all the complexes studied in this work. This work needs further more detailed pharmacological evaluation.

### Agradecimentos

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<sup>1</sup>Kostova, I e Stefanova, T. J. Trace Elements in Medicine and Biology, 2010, 24, 7.