CHARACTERIZATION & BIOLOGICAL STUDIES OF ORGANOTIN(IV) COMPLEXES WITH TRIS[(HYDROXYMETHYL)AMINOMETHANE] LIGANDS

See Mun, Lee

Research Centre for Crystalline Materials, Faculty of Science & Technology, Sunway University, Malaysia

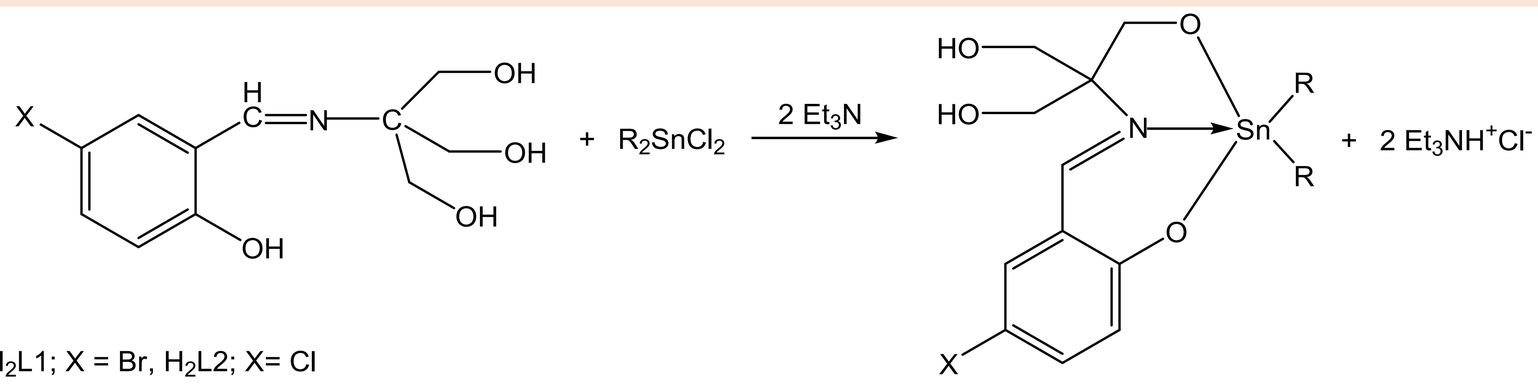
Email contact: annielee@sunway.edu.my

INTRODUCTION

Metal complexes have been successfully used in the treatment of numerous human diseases including cancer. Among these metal complexes, organotin(IV) have been widely studied for their biological activities. *Tris*(hydroxymethyl)aminomethane (TRIS) and its Schiff base derivatives are known to have a broad spectrum of biological activities including antitumour, antibiotic, anticancer, antihistamine, antifungal, anti-inflammatory, etc. In the present studies, several ligands were prepared by reacting TRIS with substituted salicylaldehydes. As the ligands are found to have potential biological activities, it is our objectives to focus on the investigation of the structural features and biological properties of the prepared diorganotin(IV) complexes. The *in vitro* cytotoxic activity of the ligands and complexes had been evaluated against several cancer cell-lines, namely HT-29, SKOV-3 and MCF-7.

EXPERIMENTAL AND RESULTS

Scheme 1: Preparation of TRIS diorganotin(IV) complexes



H_2L1; X = Br, H_2L2; X= Cl

R = CH_3 **(1, 7)**, C_4H_9 **(2, 8)**, C_6H_5 **(3, 9)**, C_6H_{11} **(4, 10)**, Bz **(5, 11)**, *p*-ClBz **(6, 12)**

Diagram: Structures of selected TRIS diorganotin(IV) complexes

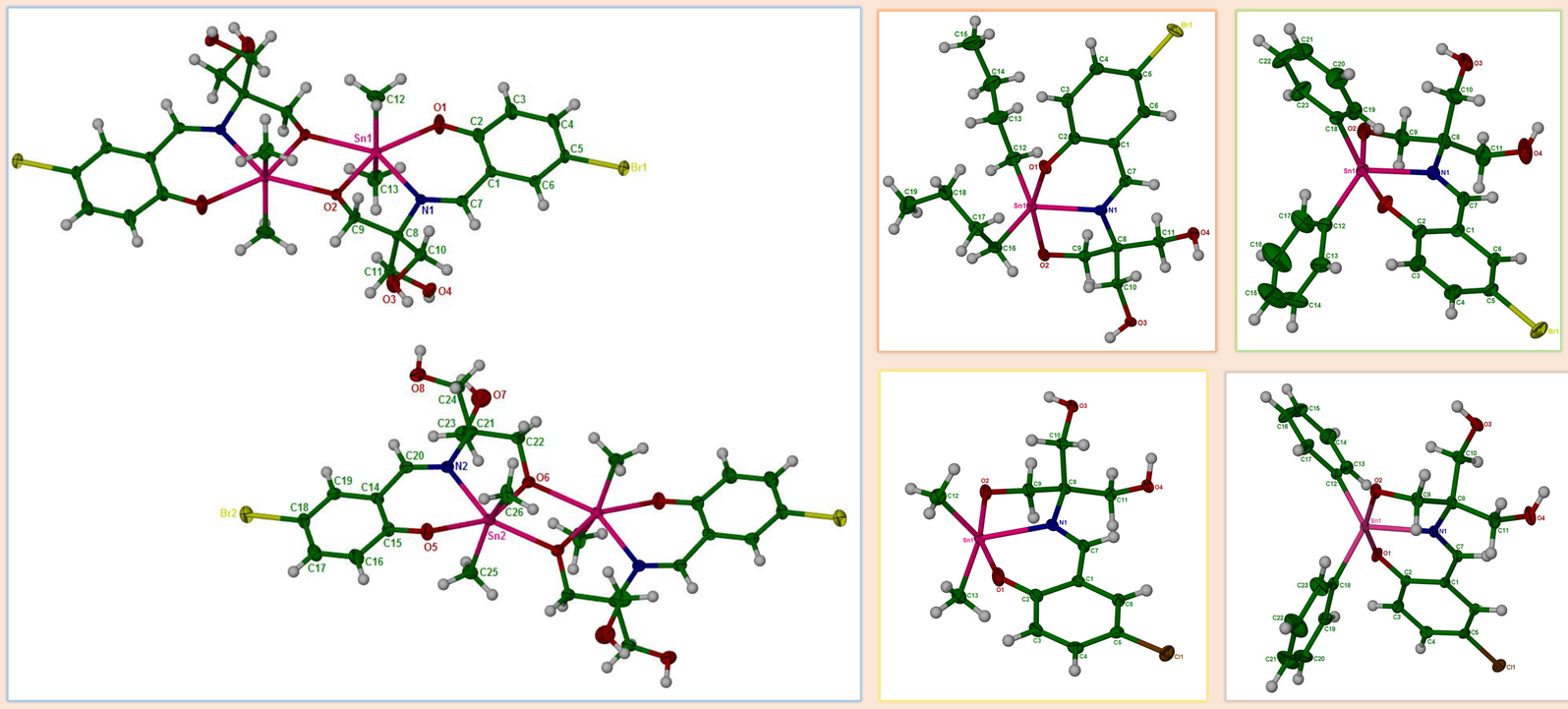


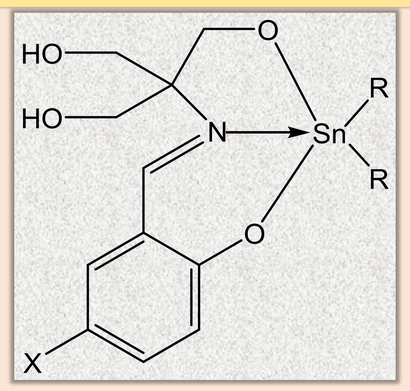
Table 1: Cytotoxic activity of TRIS ligands and complexes

Compound	Cell lines (IC_{50} *mg* ml^{-1})[a]		
	HT-29	MCF-7	SKOV-3
Cisplatin	5.0± 0	2.4 ± 0.6	1.4 ± 0
H_2L1	> 100	> 100	83.3 ± 0.8
1	> 100	> 100	72.3 ± 0.3
2	35.3 ± 0.6	6.7 ± 0.1	5.7 ± 0.1
3	34.7 ± 0.6	27.7 ± 0.3	5.6 ± 0.1
4	7.1 ± 0.3	3.6 ± 0.2	5.7 ± 0.1
5	> 100	> 100	> 100
6	> 100	> 100	> 100
H_2L2	> 100	> 100	100 ± 0
7	> 100	> 100	> 100
8	8.2 ± 0.2	2.2 ± 1.2	5.6 ± 0.1
9	41 ± 1	7.9 ± 0.1	5.7 ± 0
10	4.6 ± 0.1	8.2 ± 0.2	5.4 ± 0.1
11	> 100	> 100	> 100
12	> 100	> 100	> 100

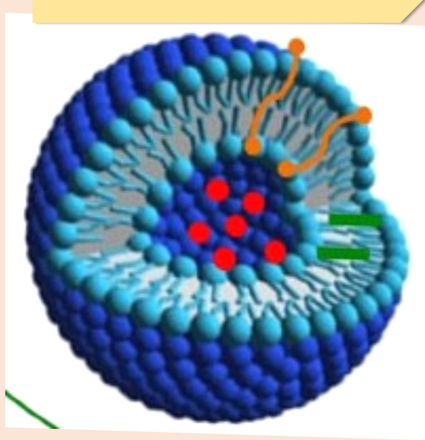
[a] IC_{50} values (μg ml^{-1}) = inhibition concentration at 50% *i.e.*, the concentration to reduce growth of cancer cells by 50%

ONGOING WORK

Potential Anticancer Drugs



Encapsulation



Drug delivery

Percentage of drug encapsulation (%EE) & drug loading (%DL)

Pharmaceutic

REFERENCES

[1] Lee SM et al. Inorg. Chim. Acta 2015, 429: 195
[2] Yassin AEB et al., Int. J. Med. Sci 2010, 7: 398
[3] Mak OW et al. J. Surfact Deter. 2015, 18(6): 973
[4] S. Shujah et al. J. Organomet. Chem. 2011, 696: 2772

ACKNOWLEDGEMENT: We would like to thank Sunway University, Malaysia for its financial support

Jeffrey Cheah Foundation
Nurturing the Seeds of Wisdom