

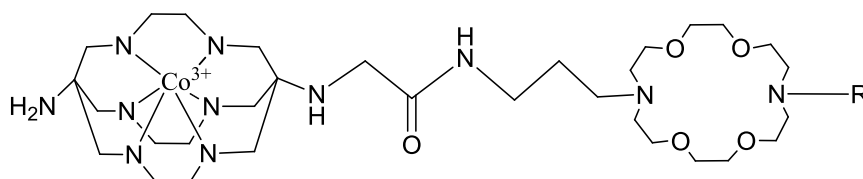
## Synthetic ion transporters: Membrane activity of amphiphilic cobalt - cage complexes with aza crown spacer.

Lorale J. Lalgee, Lebert Grierson, Richard A. Fairman, Gina E. Jaggernauth, Albert Schulte, Roland Benz, Mathias Winterhalter

Department of Chemistry – [lorale.lalgee@sta.uwi.edu](mailto:lorale.lalgee@sta.uwi.edu)  
The University of the West Indies, St. Augustine.

### Abstract

A series of novel amphiphilic cobalt - cage complexes, possessing a diaza-18-crown-6 ether moiety, has been assessed for their ion transport activity in folded and painted planar lipid bilayer membranes, in symmetrical 1M KCl, 1M MgCl<sub>2</sub>, and 1M CaCl<sub>2</sub> solutions. The presence of **1** – **3** provokes a range of activity which is dependent on the nature of the membrane: **1** disrupts the painted bilayer membrane via a detergent – like mode of action; whereas large, highly conducting “pores” with a long lifetime were observed for both compounds **2** in the folded membrane, and compound **3** in the painted bilayer membrane. Structure–activity studies, as well as a nonlinear dependence of conductance on the monomer concentration, suggest that the membrane active structures formed by **2** and **3** are dimeric. The apparent radii of the more persistent membrane openings were estimated in 1M KCl, 1M MgCl<sub>2</sub>, and 1M CaCl<sub>2</sub> for **2** and **3**. The evident formation of a larger structure in the presence of K<sup>+</sup> ions than with Ca<sup>2+</sup> and Mg<sup>2+</sup> is attributed to the preferential coordination of the more charge-dense cations to the aza crown moiety and amide group, which restricts the dynamic orientation of the cobalt cage headgroup.



**1**, R = C<sub>12</sub>H<sub>25</sub>; **2**, R = C<sub>16</sub>H<sub>33</sub>; **3**, R = C<sub>18</sub>H<sub>37</sub>

**Figure 1.** Structure of compounds **1** – **3** used in this study.