

Synthesis of a New Class of Cationic Water Soluble Porphyrins

Nola Reine

Department of Chemistry

Abstract: In recent years water soluble cationic porphyrins have gained increased attention based on their wide range of applications that include telomerase inhibition, DNA binding, and cleavage, photodynamic therapy of cancer, chirality sensing, and as Magnetic Resonance Imaging contrast agents. The central metal ion in the cavity and cationic peripheral substituents are deemed to be important in these various applications. Hence, development of new class of cationic water soluble porphyrins is of immense interest. In the present study, we report the synthesis and characterization of a new class of water soluble cationic porphyrins, meso-tetrakis (N- methylimidazolium) porphyrin and its zinc derivative.¹ The meso-tetrakis para imidazolium porphyrin are synthesized by condensation of pyrrole with 4-(1H-imidazol-1-yl)-benzaldehyde followed by purification on column chromatography. The free-base porphyrins were metallated using zinc acetate and followed purification. Treatment of the zinc porphyrins with methyl iodide at elevated temperature afforded cationic water soluble porphyrins. The newly synthesized porphyrins are characterized by various spectroscopic and electrochemical methods, and their usage in the above mentioned applications is being sought out. Preliminary studies reveal that these porphyrins are able to bind to DNA as observed by optical absorption and emission spectroscopy, circular dichroism and gel electrophoresis studies.

- *URCAF 2009 first place winner of oral presentations in the Natural Science/Engineering section.*