



GDR MAPYRO

Dijon, July, Friday, the 19th 2019

Synthesis, Properties and Mysteries of Bacteriochlorins

Analogues of Nature's Near-Infrared Chromophores

Jonathan S. Lindsey

North Carolina State University



Tetrapyrrole macrocycles encompass a venerable set of enzymatic cofactors (heme, vitamin B₁₂, F₄₃₀) and photosynthetic pigments (chlorophylls, bacteriochlorophylls) of great interest across numerous disciplines including biology, chemistry, medicine, energy and materials sciences. To better understand and exploit tetrapyrroles, we have developed methods for the preparation and tailoring of porphyrins, chlorins, bacteriochlorins and some simple analogues of corrins. We also have begun investigating the biosynthesis of novel bacteriochlorins known as tolyporphins, which are found – mysteriously – in a novel cyanobacterial strain, with an ultimate goal of developing chemoenzymatic syntheses of diverse hydroporphyrins. In the meantime, we are exploiting syntheses of tetrapyrrole macrocycles to explore panchromaticity in novel dyads and development of a palette of tetrapyrroles suitable for use as fluorescent labels in clinical diagnostics. Among numerous tetrapyrroles, bacteriochlorins are of immense interest given their intense absorption in the little-investigated near-infrared spectral region, which matches the optical window for light penetration in soft tissue.