Description for general public

The chlorosomes are considered to be the largest and most efficient dye systems in green sulfur bacteria, acting as the light harvesting antenna. The key photochemical element of their structure consists of bacteriochlorophyll molecules self-assembled into coaxial cylinders. Ability to form organized systems is one of the key factors responsible for both the photostability and the ability to harvest the light energy.

Lately, the demand for new alternative sources of energy escalated, which can be contributed to the diminishing reserves of oil and coal. This can be addressed by research designed to dramatically boost the efficiency of the available solar cells, which can be achieved by discovery and utilization of novel self-assembling biomimetic functional dyes.

While complexity of naturally occurring bacteriochlorophylls makes it difficult to engineer any modifications, we can modify their more accessible analogs so they will mimic their behavior and properties. Corroles, due to the existence of efficient, synthetic methodology, can be considered the molecules of choice. With preferable photophysical properties, and well defined protocols allowing full control over arrangement of substituents, they may be appropriate dyes for "Artificial Photosynthesis".

The goal of this project is to determine the impact of incorporation into the corrole ring different amide substituents on the ability to forge intermolecular hydrogen bonds. Utilization of small groups will promote formation of tightly organized systems, with unique optical properties. Photophysical properties of obtained corroles will be thoroughly studies, and the results may contribute in the future work on more effective light harvesting systems.