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Bridging the gap between natural & artificial light-harvesting : a structure-function investigation with MAS NMR

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Publications

S. Ganapathy, A. J. van Gammeren, F. B. Hulsbergen and H. J. M. de Groot (2007) "Probing secondary, tertiary, and quaternary structure along with protein-cofactor interactions for a helical transmembrane protein complex through ^1H spin diffusion with MAS NMR spectroscopy" *Journal of the American Chemical Society* 129: 1504-1505.

S. Ganapathy, M. Reus, A. Gomez Maqueo Chew, D. A. Bryant, A. R. Holzwarth and H. J. M. de Groot (2007) "Structural assessment of the bacteriochlorophyll *d* stacking in chlorosomes from a *C. tepidum* mutant with MAS NMR spectroscopy" in: *Photosynthesis. Energy of Sun: 14th International Congress on Photosynthesis Research* (J.F. Allen, E. Gantt, J. H. Golbeck and B. Osmond Eds.) Volume I: pp. 247-251.

S. Ganapathy, M. Reus, A. Gomez Maqueo Chew, D. A. Bryant, A. R. Holzwarth and H. J. M. de Groot (2007) "A comparative MAS NMR study of BChl *d* and BChl *c* producing mutants of *C. tepidum*" in: *Photosynthesis. Energy of Sun: 14th International Congress on Photosynthesis Research* (J.F. Allen, E. Gantt, J. H. Golbeck and B. Osmond Eds.) Volume I: pp. 257-260.

S. Ganapathy, G. T. Oostergetel, P. K. Wawrzyniak, M. Reus, A. Gomez Maqueo Chew, F. Buda, E. J. Boekema, D. A. Bryant, A. R. Holzwarth, and H. J. M. de Groot "Alternating *syn-anti* bacteriochlorophylls form concentric nanotubes in chlorosomes" *Manuscript submitted*.

S. Ganapathy, S. Sengupta, P. K. Wawrzyniak, V. Huber, F. Buda, U. Baumeister, F. Würthner and H. J. M. de Groot "MAS NMR investigation of self-assembled zinc chlorin dye stacks for artificial light harvesting" *Manuscript in preparation*.

Publications

S. Ganapathy, P. K. Wawrzyniak, M. Reus, A. Gomez Maqueo Chew, F. Buda, D. A. Bryant, A. R. Holzwarth and H. J. M. de Groot “Self-assembly of BChl *c* in chlorosomes of the wild-type of the green sulfur bacteria *C. tepidum*” *Manuscript in preparation*.

A. Pandit, P. K. Wawrzyniak, A. J. van Gammeren, F. Buda, S. Ganapathy and H. J. M. de Groot “Anomalous NMR secondary shifts of an oligomeric antenna protein are markers for local frustration of residues involved in higher-order stabilizing interactions” *Manuscript in preparation*.

Curriculum vitae

In August 1998 after my Higher Secondary Certificate examinations in science were completed, I joined the Fergusson College of Science where I completed my Bachelors Degree in Chemistry in April 2001. In August 2001, I started my Masters Degree program at the Department of Chemistry in the University of Pune specializing in Physical Chemistry. In 2002 in the Theoretical Chemistry Group under the supervision of Prof. S. R. Gadre, I did my Masters dissertation entitled "*Study of anion-cation interactions and cluster growth patterns through electrostatics*". I received my Masters Degree in May 2003 with distinction at the top of my class. Additionally, I was awarded the 2002-2003, Prof. S.S. Joshi commemoration scholarship fund for Physical Chemistry. In July 2004, I started my Doctoral studies in the solid-state NMR group at the Leiden University under the supervision of Prof. dr. H. J. M de Groot. During the course of my Ph.D. studies I had the opportunity to attend the *European school on solid-state NMR* held at Valencia in 2004 and the *Advanced NMR workshop "From data to structures"* held at Nijmegen and Utrecht in 2005. My research work was presented as posters at the *EUROMAR* (2005) in Veldhoven, *The 4th Alpine Conference on Solid-State NMR* (2005) in Chamonix, *The 22nd International Conference on Magnetic Resonance in Biological Systems* (2006) in Göttingen, *The 14th International Congress of Photosynthesis* (2007) in Glasgow, and at *The 49th Experimental NMR Conference* (2008) at Pacific Grove, CA. I also had the opportunity to present my work in the form of an oral presentation at the *Light Harvesting Processes* (2007) in Kloster Banz.

Nawoord

The last four years have flown by, almost like a dream and have been very good for me both professionally and personally. I enjoyed fruitful scientific collaborations with Prof. Alfred Holzwarth, Prof. Frank Würthner, Prof. Donald Bryant, and Dr. Francesco Buda for which I am grateful. I am especially grateful to Michael Reus at the Max-Planck-Institut für Bioanorganische Chemie for all the chlorosomal preparations, Gert Oostergetel at the Groningen Biomolecular Sciences and Biotechnology Institute for the cryo-EM measurement, several discussions and the thesis cover picture, Sanchita Sengupta at the Universität Würzburg for the chlorin samples and Piotr Wawrzyniak for the calculations. My doctoral work would not have been possible without the kind assistance of Fons, Kees, and especially Johan's at the 750.

Liesbeth, your smiling face and willing ear was something I looked forward to every morning! The time I spent with Adriaan, Alexey, Alia, Ania, Anjali, Arjan van Wijk, Eugenio, Francesco, Frans, Geertje, Ido, Jose-Luis, Jörg, Richard, Rob de Jong, Samira, Smitha, Suzanne and Thierry; my colleagues of past and present will always remain memorable. Piotr, our scientific discussions provided the impetus to keep going even when results were slow to come. Rob, Reinier, and Wim, our lunchtime coffee club ☺ made the post lunch dip bearable! Prashant and Geerten, sharing the think cell with you guys has been a pleasant experience, while Arjan, you still remain one of my most formidable opponents at scrabble! Niels our complaining sessions made the thesis writing period endurable! Dorota, even though our association was brief, I will always remember your warm and generous spirit. Shipra and Esha, I can only hope that other people are as fortunate as me to have found friends like you. Karthick; all your many stories and your constant optimistic view on life and Johan; all the times you made sure I reached home safely, especially at late hours are things I will never forget. Anna, you have been a very

good friend to me and the Europort experience, bingo and the Afsluitdijk are but a few of our cool adventures that I will treasure!

Mom and Vidyu, your constant love and support have helped me to arrive at where I am today. Dad, your love for science has inspired me to follow the path that I have chosen. Ani, I am glad you are in my life and am excited about the next chapter that we will embark on together!