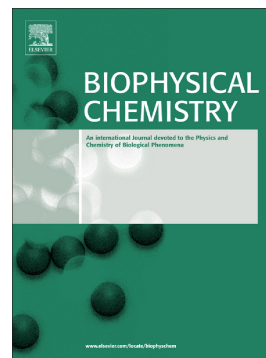


Accepted Manuscript

Hydrogen bonds in the vicinity of the special pair of the bacterial reaction center probed by hydrostatic high-pressure absorption spectroscopy

Liina Kangur, Michael R. Jones, Arvi Freiberg

PII: S0301-4622(17)30015-7
DOI: doi: [10.1016/j.bpc.2017.04.003](https://doi.org/10.1016/j.bpc.2017.04.003)
Reference: BIOCHE 5981
To appear in: *Biophysical Chemistry*
Received date: 11 January 2017
Revised date: 6 April 2017
Accepted date: 6 April 2017



Please cite this article as: Liina Kangur, Michael R. Jones, Arvi Freiberg , Hydrogen bonds in the vicinity of the special pair of the bacterial reaction center probed by hydrostatic high-pressure absorption spectroscopy. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Bioche(2017), doi: [10.1016/j.bpc.2017.04.003](https://doi.org/10.1016/j.bpc.2017.04.003)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Hydrogen Bonds in the Vicinity of the Special Pair of the Bacterial Reaction Center Probed by Hydrostatic High-Pressure Absorption Spectroscopy

Liina Kangur^a, Michael R. Jones^b, and Arvi Freiberg^{a, c *}

^a Institute of Physics, University of Tartu, W. Ostwald Str. 1, 50411 Tartu, Estonia

^b School of Biochemistry, University of Bristol, Biomedical Sciences Building, University Walk, Bristol, BS8 1TD, United Kingdom

^c Institute of Molecular and Cell Biology, University of Tartu, Riia 23, 51010 Tartu, Estonia

*Correspondence: arvi.freiberg@ut.ee

ABSTRACT

Using the native bacteriochlorophyll *a* pigment cofactors as local probes, we investigated the response to external hydrostatic high pressure of reaction center membrane protein complexes from the photosynthetic bacterium *Rhodobacter sphaeroides*. Wild-type and engineered complexes were used with varied number (0, 1 or 2) of hydrogen bonds that bind the reaction center primary donor bacteriochlorophyll cofactors to the surrounding protein scaffold. A pressure-induced breakage of hydrogen bonds was established for both detergent-purified and membrane-embedded reaction centers, but at rather different pressures: between 0.2 and 0.3 GPa and at about 0.55 GPa, respectively. The free energy change associated with the rupture of the single hydrogen bond present in wild-type reaction centers was estimated to be equal to 13- 14 kJ/mol. In the mutant with two symmetrical hydrogen bonds (FM197H) a single

Download English Version:

<https://daneshyari.com/en/article/7837030>

Download Persian Version:

<https://daneshyari.com/article/7837030>

[Daneshyari.com](https://daneshyari.com)