

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Biochemistry -- Faculty Publications

Biochemistry, Department of

---

7-2001

## Unexpected Post-Translational Modifications and Novel Sequence-Structure Relationships Revealed by the Crystal Structure of *Chlamydomonas reinhardtii* Rubisco

T. C. Taylor

*Swedish University of Agricultural Sciences*

A. Backlund

*Uppsala University*

R. J. Spreitzer

*University of Nebraska-Lincoln*, [rspreitzer1@unl.edu](mailto:rspreitzer1@unl.edu)

I. Andersson

*Swedish University of Agricultural Sciences*

Follow this and additional works at: <https://digitalcommons.unl.edu/biochemfacpub>



Part of the [Biochemistry, Biophysics, and Structural Biology Commons](#)

---

Taylor, T. C.; Backlund, A.; Spreitzer, R. J.; and Andersson, I., "Unexpected Post-Translational Modifications and Novel Sequence-Structure Relationships Revealed by the Crystal Structure of *Chlamydomonas reinhardtii* Rubisco" (2001). *Biochemistry -- Faculty Publications*. 33.

<https://digitalcommons.unl.edu/biochemfacpub/33>

This Article is brought to you for free and open access by the Biochemistry, Department of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Biochemistry -- Faculty Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

From: Abstracts of the 12th International Congress on Photosynthesis (Brisbane, Australia, August 18–23, 2001), published in *Photosynthesis Research* 69:1-3 (July, 2001), p. 143. Copyright © Elsevier B.V. Used by permission.

## Symposium S16. RUBISCO and carbon pathways

### Paper S16-003:

# Unexpected post-translational modifications and novel sequence-structure relationships revealed by the crystal structure of *Chlamydomonas reinhardtii* Rubisco

T. C. Taylor,<sup>1</sup> A. Backlund,<sup>2</sup> R. J. Spreitzer,<sup>3</sup> and I. Andersson<sup>1</sup>

1 Dept. Molecular Biology, Swedish University of Agricultural Sciences, BMC Box 590, S-751 24 Uppsala, Sweden. Fax: +46 18 536971, email: [tom@xray.bmc.uu.se](mailto:tom@xray.bmc.uu.se), [inger@xray.bmc.uu.se](mailto:inger@xray.bmc.uu.se)

2 Dept. of Pharmacognosy, Dept. of Medicinal Chemistry, Uppsala University, BMC Box 574, S-751 23 Uppsala, Sweden.

3 Dept. of Biochemistry, University of Nebraska-Lincoln, Lincoln, NE 68588-0664.

**Keywords:** rubisco, *Chlamydomonas*, crystallography, sequence analysis

The crystal structure of Rubisco from *Chlamydomonas reinhardtii* has been solved to 1.4 Å resolution. In addition to clear electron density for the carbamate on lys-201, the active site magnesium ion and the inhibitor 2-CABP, there was unexpected but unambiguous electron density for further specific post-translational modification. The N-terminus of the mature small subunit is methylated. The large subunit contains two methylcysteine residues (256 & 369) and two hydroxyproline residues (104 & 151). The small subunit from *Chlamydomonas* shows a structure more similar to that of the higher green plants than that from other algae of known structure. An extensive sequence analysis shows that small subunits fall into clear classes closely correlated with evolutionary relationships. A clear schism is observed after the release of the small subunit gene into the nuclear genome. Known small subunit structures support these results and suggests a pattern for sequence-structure relationships.