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

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

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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.