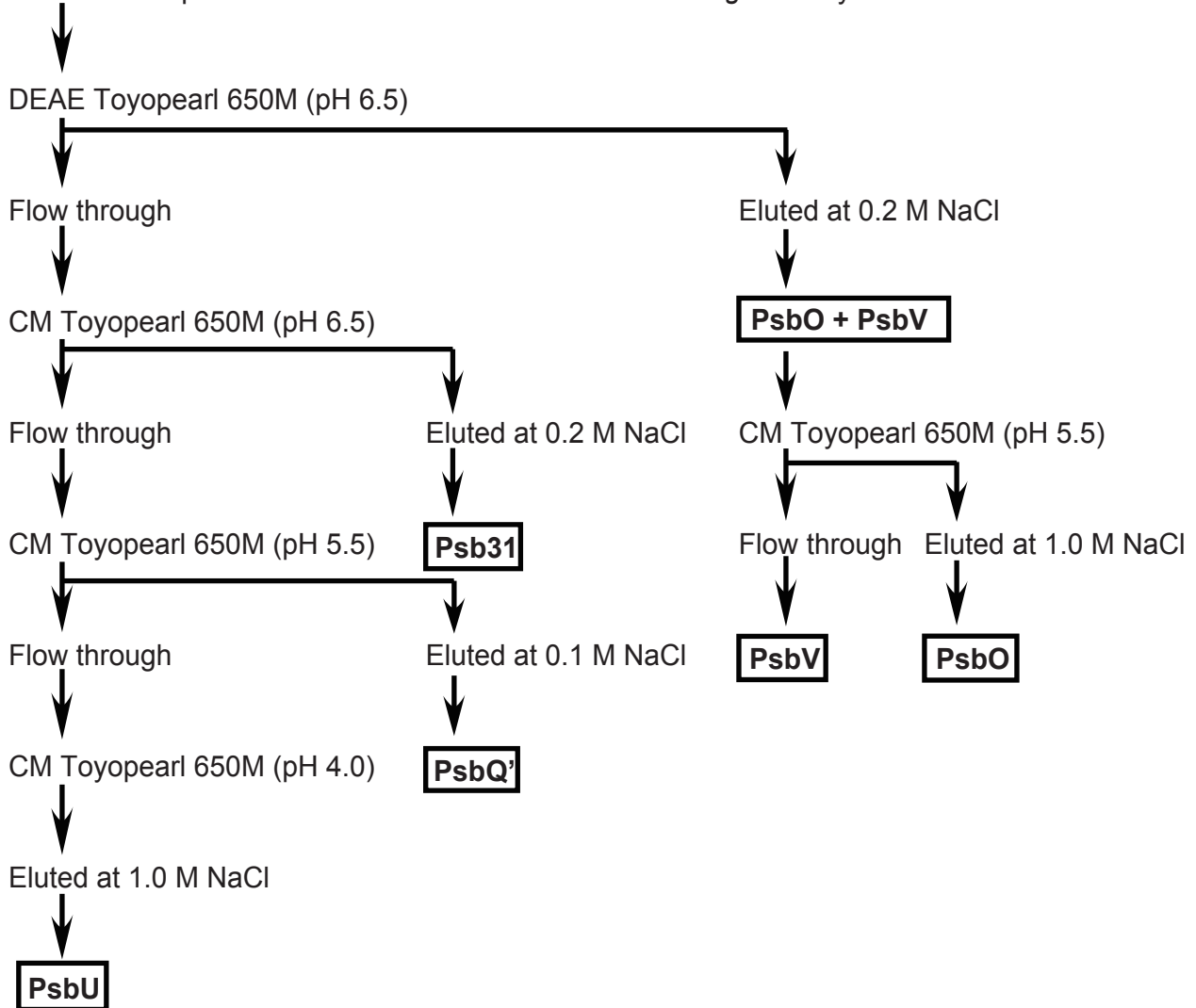


## Supplemental Data

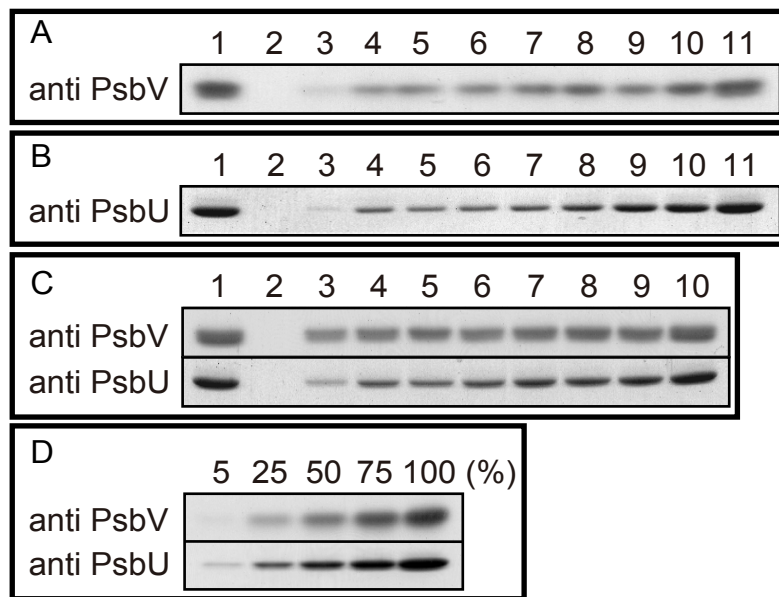
### Binding and functional properties of five extrinsic proteins in oxygen-evolving Photosystem II from a marine centric diatom, *Chaetoceros gracilis*

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Five extrinsic proteins released from the crude PSII of *C. gracilis* by alkaline Tris-treatment



**FIGURE S1.** Purification procedure for the five extrinsic proteins from a marine centric diatom, *Chaetoceros gracilis*. See text for details.



**FIGURE S2. Immunological quantification of the PsbV and PsbU proteins rebound.**

**(A) Reconstitution of urea/NaCl-treated PSII with each of the other four extrinsic proteins in combination with the PsbV protein.** Lane 1, purified PSII from a marine centric diatom, *Chaetoceros gracilis*; lane 2, 4 M urea/0.2 M NaCl-treated PSII; lanes 3-11, the urea/NaCl-treated PSII reconstituted with PsbV only (lane 3), PsbV + PsbO (lane 4), PsbV + PsbQ' (lane 5), PsbV + Psb31 (lane 6), PsbV + PsbO + PsbQ' (lane 7), PsbV + PsbQ' + Psb31 (lane8), PsbV + PsbO + Psb31 (lane 9), PsbV + PsbO + PsbQ' + Psb31 (lane 10) and all of the five extrinsic proteins (lane 11).

**(B) Reconstitution of urea/NaCl-treated PSII with each of the other four extrinsic proteins in combination with the PsbU protein.** Lane 1, purified PSII from a marine centric diatom, *Chaetoceros gracilis*; lane 2, 4 M urea/0.2 M NaCl-treated PSII; lanes 3-11, the urea/NaCl-treated PSII reconstituted with PsbU only (lane 3), PsbU + PsbO (lane 4), PsbU + PsbQ' (lane 5), PsbU + Psb31 (lane 6), PsbU + PsbO + PsbQ' (lane 7), PsbU + PsbQ' + Psb31 (lane8), PsbU + PsbO + Psb31 (lane 9), PsbU + PsbO + PsbQ' + Psb31 (lane 10) and all of the five extrinsic proteins (lane 11).

**(C) Reconstitution of urea/NaCl-treated PSII with each of the other three extrinsic proteins in combination with both the PsbV and PsbU proteins.** Lane 1, purified PSII from a marine centric diatom, *Chaetoceros gracilis*; lane 2, 4 M urea/0.2 M NaCl-treated PSII; lanes 3-11, the urea/NaCl-treated PSII reconstituted with PsbV + PsbU (lane 3), PsbV + PsbU + PsbO (lane 4), PsbV + PsbU + PsbQ' (lane 5), PsbV + PsbU + Psb31 (lane 6), PsbV + PsbU + PsbO + PsbQ' (lane 7), PsbV + PsbU + PsbQ' + Psb31 (lane8), PsbV + PsbU + PsbO + Psb31 (lane 9), and all of the five extrinsic proteins (lane 10).

**(D) Quantification of the amount of PsbV and PsbU proteins.** For immunological quantification in (A)-(C), comparative immunostaining using a series of dilutions (5, 25, 50, 75, 100%) of PsbV and PsbU were carried out, which were used as the calibration standard.