

## W0133

**Structural Description of Compensatory Mutations that Restore Proton Transfer to the L212Gln Mutant Reaction Center.** P.R. Pokkuluri, D.K. Hanson, P.D. Laible, M. Schiffer Biosciences Div., Argonne National Laboratory, Argonne, IL 60439.

When acidic residue L212Glu near the secondary quinone,  $Q_B$ , of the bacterial photosynthetic reaction center (RC) is mutated to Gln, proton transfer to  $Q_B$  is interrupted. We have determined the structures of two RCs derived from photocompetent revertants in which second-site mutations restore the proton transfer function to the mutant L212Gln (Q): Q+L227Leu to Phe revertant (Q+F) and Q+M44Asn to Asp revertant (Q+D). The M44Asn to Asp mutation was also observed in a revertant of the photosynthetically-incompetent L212Ala-L213Ala (AA) double mutant. The difference Fourier maps calculated with our wild type RC show that the E to Q mutation does not change the orientation of residue L212. In the Q+D revertant, the position of the M44 side chain does not change. The  $Q_B$  site is poorly occupied and is bound largely in the distal site in both revertants. In the Q+F revertant, the introduction of Phe led to a change in the position of M5Asn which resulted in the reorientation of H194Gln; these changes were previously observed in a revertant of AA that carries the M5Asn to Asp mutation. The common changes observed might indicate a similar mechanism for recovery of proton transfer in these two revertant RCs.

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