Examination of the Mechanism of Carbamate Kinase by Structural Analyses

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Carbamate kinase (EC 2.7.2.3) catalyzes the reversible reaction $NH_2COO^- + ATP \leftrightarrow NH_2COOPO_3^{2^-} + ADP$ serving to synthesize ATP from carbamoyl phosphate in microorganisms [1].

Since CK catalysis involve phosphoryl group transfer, the enzyme CK may have the residues which stabilize intermediate during phosphate transfer. To clarify this point we have determined the threedimensional structure of carbamate kinase of *Pseudomonas aeruginosa* bound to carbamoyl phosphate and ADP by X-ray crystallography. The structural analysis provides the information on substrate binding and catalysis in CK.

Comparing Apo form of CK with ADP&CP bound form, there's a large conformational changes that cover CP binding pocket. Detailed examinations of the part where the conformational changes happened showed some H-bond and ion pair with Phosphate group of Carbamyl phosphate drove these changes.

Through these structural data, we could suggest a procedure of Pa Carbamate kinase reaction and provide some insights of mechanism of reaction.

[1] Marshall M., Cohen P. P., *Methods Enzymol.*, 1970, **17**, 229. Keywords: carbamate kinase, mechanism, structure