Cytoplasmic, periplasmic expression of Carbonic anhydrase from *Synechocystis* PCC6803 & *Escherichia coli*(K12) using recombinant *E.coli* system

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Carbonic anhydrase (CA) is a zinc containing metalloenzyme catalyzing the reversible hydration of carbon dioxide (CO_2 + $H_2O \rightarrow HCO_3^-$). CA is important in biological systems because the uncatalysed interconversion between CO_2 and HCO_3^- is slow. Its high efficiency catalysis is fundamental to many biological processes, such as photosynthesis, respiration. Also it has practical use in CO_2 fixation. In this study, we developed multiple localization-controlled biocatalyst which can express CA efficiently. At first, we built up vector system which can express CA of *synechocystis* PCC6803&*Escherichia coli* K12 at cytoplasm and periplasm and excuted cloning. (expressing CA of *synechocystis* PCC6803 at cytoplasm, periplasm and CA of *E.coli* K12 at cytoplasm, periplasm) Next, cloned recombinant vector was transformed BL21(DE3). Expressed protein(CA) was checked as western blotting. At the end, we could confirm CA expression at different vector system.