

P010 The *PPCK* gene family in maize

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Phosphoenolpyruvate carboxylase (PEPC) is responsible for the primary fixation of CO₂ in the leaves of C₄ plants. In addition, different PEPC isoforms perform several other roles in plant metabolism. PEPC is allosterically inhibited by malate and activated by glucose 6-phosphate. Modulation of PEPC activity is achieved via phosphorylation by PEPC kinases (PPCKs); this reduces the sensitivity of PEPC to malate inhibition. The phosphorylation state of PEPC is controlled by the activity of PPCK, which in turn is regulated at the level of synthesis/degradation. In C₄ leaves PEPC phosphorylation in the light is essential to allow CO₂ fixation at the high malate concentrations in mesophyll cells.

We have cloned four *PPCK* genes from maize. *PPCK1* is responsible for the light activation of PEPC in C₄ metabolism. Its mRNA is restricted to mesophyll cells, abundant in the light and low in the dark. The role of *PPCK2* is unclear. *PPCK2* transcripts are more abundant at night but are still present in the day and are enriched in bundle sheath cells. *PPCK3* and *PPCK4* transcripts are present in lower amounts, and these genes may play specific roles in flower or seed development.