Yes we CAM:
The Crassulacean Acid Metabolism

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The world's population is expanding rapidly and expected to exceed 9 billion by 2050. Agriculture is therefore under pressure to meet the growing demand for food, particularly in the light of global climate change. One proposed solution is to use crops that utilise Crassulacean acid metabolism (CAM). This photosynthetic adaption improves the efficiency of both CO_2 fixation and water use compared to C3 photosynthesis, which is the type most widely used by major food crops. Bioengineering CAM into C3 crops has the potential to protect crop yields in a changing world.

However, achieving this is impeded by incomplete understanding of the adaptations of primary metabolic pathways and stomatal control associated with CAM. Particular knowledge gaps centre on the interface between the core circadian clock and temporal optimisation of the CAM mechanism, and on the mechanisms underlying stomatal opening in the dark and closure in the light.

In my research project, bioinformatic techniques will be used to interrogate genome sequence and quantitative RNA-seq datasets obtained from the leaves of *K. fedtschenkoi*, a CAM plant. We hypothesise that the stomatal guard cell signalling genes that are important for the stomatal regulation during CAM will display temporal patterns of regulation over the 24 h cycle that are the opposite of the temporal cycles in the C3 model species *A. thaliana*. Many of these have been identified in *A. thaliana*, but the temporal regulation and functions of the orthologous genes in *K. fedtschenkoi* leaves during CAM remain largely unknown.