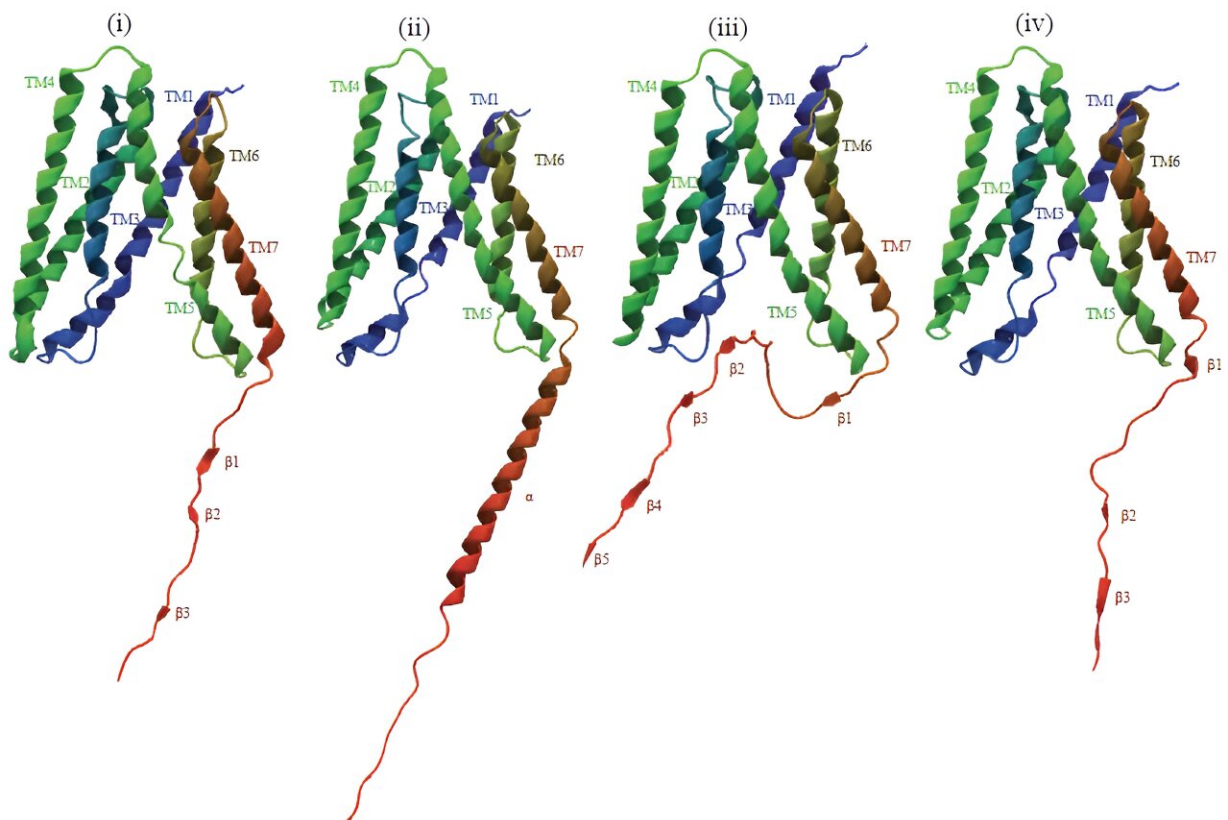


Savoring the sweetness: Unraveling pineapple's SWEET10 as a glucose transporter

October 9 2023



Three-dimensional structures of SWEET proteins. In the figure, the numbers i, ii, iii and iv represent AtSWEET8, AcSWEET6, AcSWEET8, and AcSWEET10 proteins, respectively. Credit: *Horticulture Research* (2023). DOI: 10.1093/hr/uhad175

Researchers from Professor Yuan Qin's group at Guangxi University have now harnessed cutting-edge AlphaFold technology to unveil the hidden secrets of sugar transporter proteins, known as SWEET (Sugars Will Eventually be Exported Transporters).

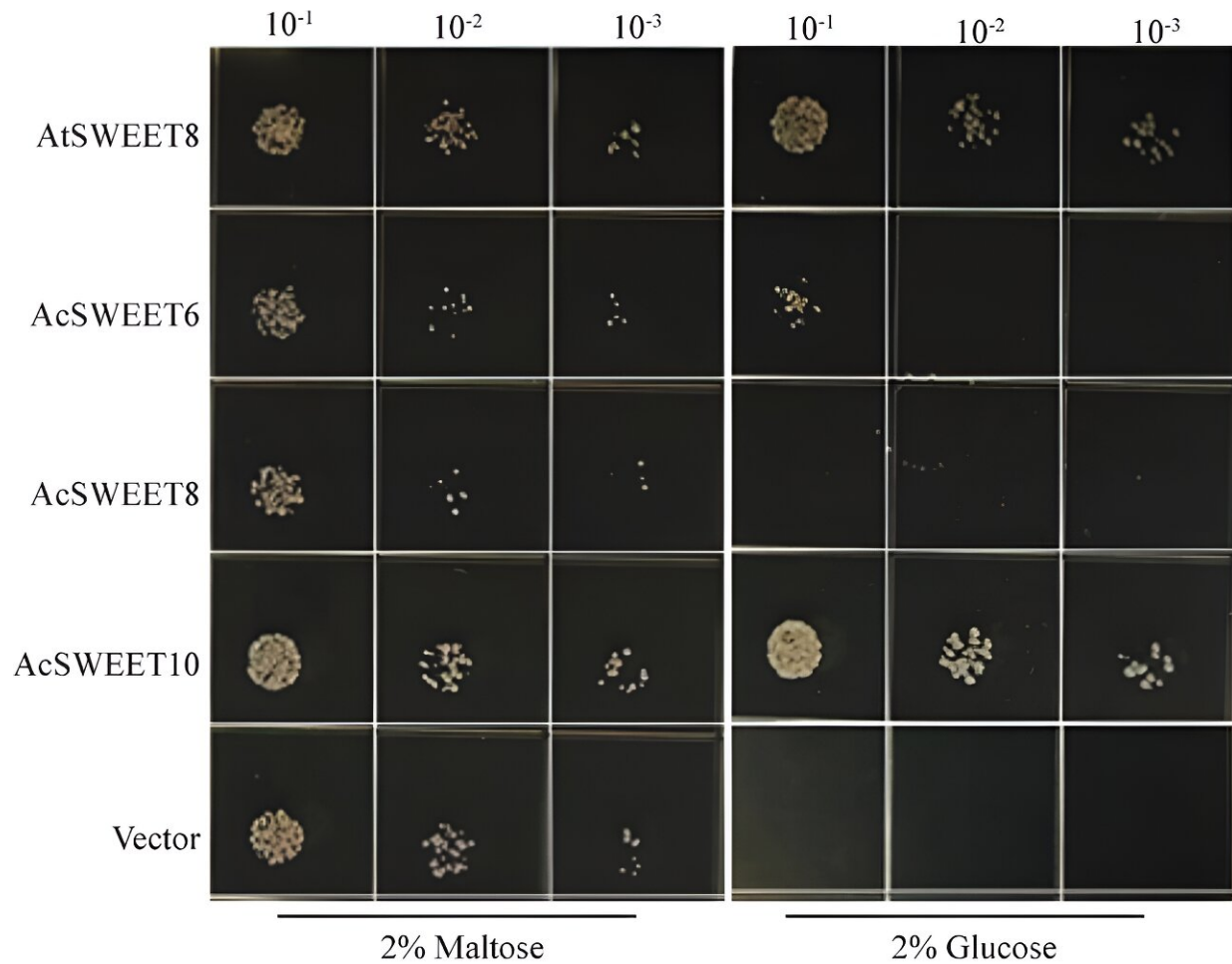
[The article](#) "Pineapple SWEET10 is a glucose transporter" has been published in *Horticulture Research*.

While previous studies mainly relied on linear [protein](#) sequences to understand the conservation of these transporters across various organisms, this [innovative research](#) plunged into the three-dimensional structures and substrate binding capacities of these vital proteins. The team used AlphaFold to understand the functionality of transporter proteins. By examining the 3D structures and functional capacities of these proteins, the group unlocked a new dimension of knowledge that was previously inaccessible through traditional methods.

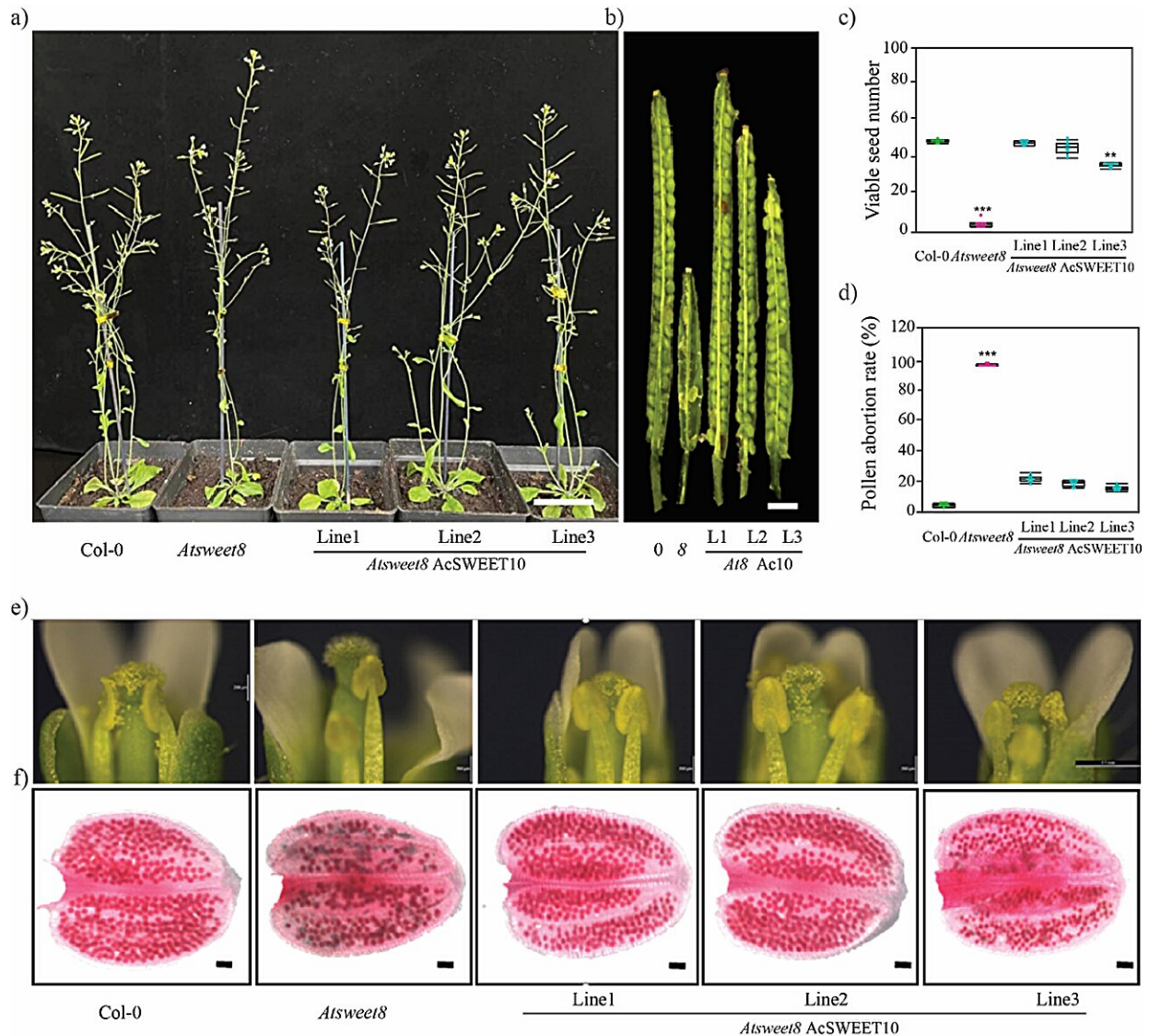
The study focused on expanding our understanding of sugar transporters, with a particular emphasis on their roles in the economically vital fruit crop [pineapple](#), which has not been extensively studied. Using AlphaFold they noticed that Arabidopsis SWEET8, a glucose transporter, shares a remarkable structural similarity with pineapple SWEET10. To put this newfound knowledge to the test, a heterologous transport assay was conducted, revealing that both Arabidopsis SWEET8 and pineapple SWEET10 possess similar glucose transport capabilities.

In contrast, structurally dissimilar pineapple transporters, SWEET6 and SWEET8, were found to be incapable of transporting glucose. Moreover, Arabidopsis sweet8 mutant has pollen growth defects, which is not complemented by structurally dissimilar pineapple SWEET6 and SWEET8 transporters. However, the breakthrough moment arrived when the researchers attempted to restore the Arabidopsis sweet8 mutant phenotype with structurally similar pineapple SWEET10. Pineapple

SWEET10 not only complemented the pollen phenotype of Atsweet8, but also the viable seed number phenotype.



AcSWEET10 transports glucose in yeast. Glucose complementation assay of AcSWEET6, AcSWEET8 and AcSWEET10 where AtSWEET8 (positive control) and vector (without insert) (as negative control) were expressed in the hexose transport-deficient yeast mutant EBY.VW4000. Credit: *Horticulture Research* (2023). DOI: 10.1093/hr/uhad175



AcSWEET10 functions as a glucose transporter and complements Arabidopsis sweet8 mutant. Credit: *Horticulture Research* (2023). DOI: 10.1093/hr/uhad175

This study paves the way for a deeper understanding of sugar transporters, offering the potential for improved crop breeding and agricultural practices. The utilization of AlphaFold in structural-based functional studies opens new avenues for research in the field of protein biology. The revelation of structural similarities and functional

differences among these proteins has [profound implications](#) for [plant biology](#) and agriculture.

This study not only showcases the power of AlphaFold but also underscores the importance of 3D [structural analysis](#) in unraveling the mysteries of essential biological processes. It is a leap forward in our quest to comprehend the inner workings of the natural world. Overall, these findings have important implications for understanding [plant physiology](#) and metabolism and developing strategies to improve crop yield and quality.

More information: Beenish Fakher et al, Pineapple SWEET10 is a glucose transporter, *Horticulture Research* (2023). [DOI: 10.1093/hr/uhad175](#)

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