

# Efficient Delivery of a DNA Aptamer-Based Biosensor into Plant Cells for Glucose Sensing through Thiol-Mediated Uptake

## Background/Objective

DNA aptamers have been widely used as biosensors for detecting a variety of targets. Despite their successful use in many applications, they have not been applied to monitor any targets in plants, largely due to a lack of efficient methods to deliver DNA into plant cells.

## Approach

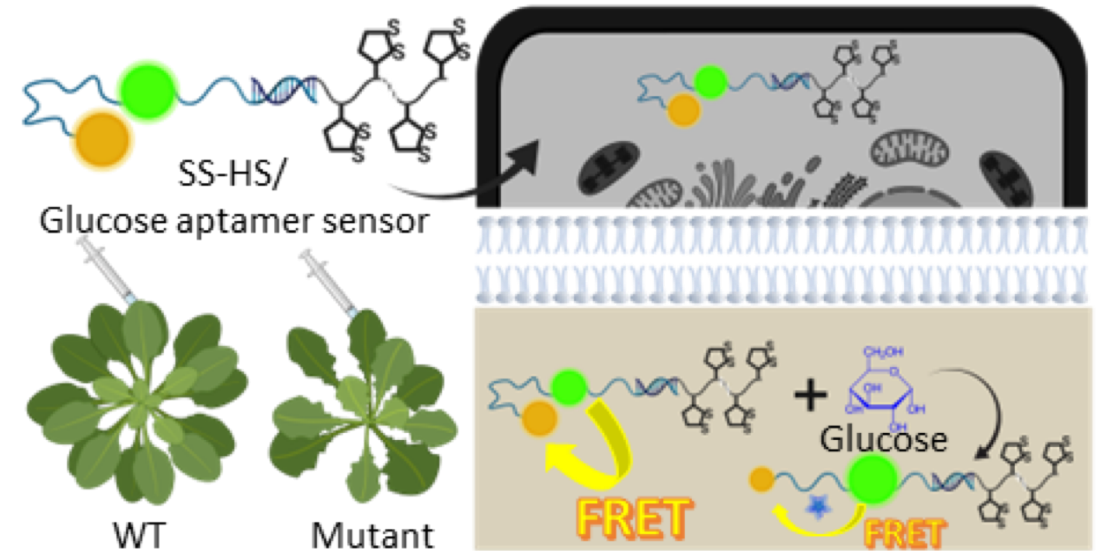
Developed a thiol-mediated uptake method to deliver DNA into plant leaf cells.

## Results

A DNA aptamer sensor was successfully and efficiently delivered into *Arabidopsis thaliana* wild type and *atsweet11;12* double mutant — and was used to observe their difference in glucose level.

## Significance/Impacts

Efficient delivery of nucleic acids will have a major impact on many areas of plant research — and different DNA aptamer sensors could be developed to monitor a wide range of targets (metabolites, plant hormones, metal ions, proteins) to better understand biological processes (detection and monitoring of metabolites, protein levels, ion nutrients). More broadly, thiol-mediated delivery may potentially deliver antisense DNA and RNA molecules for plant virus attenuation or gene knockdown for gene functional studies.



**Schematic illustration of the infiltration and uptake of SS-HS/glucose aptamer sensor, and the glucose aptamer sensor's FRET ratio change in WT Arabidopsis and Arabidopsis *atsweet11;12* double mutants.**

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