TITLE (max 20 words)
Adaptative mechanisms of cellulose synthesis under stress conditions

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ABSTRACT (max 400 words)

Cellulose is the main structural compound of the plant cell wall and the most abundant biopolymer on Earth **(Bar-On *et al* 2018)**. The essential role of cellulose in plant development and defence highlights the importance of understanding how its synthesis is regulated and will provide new tools to improve crop tolerance to biotic and abiotic stresses.
We identified that Tetratricopeptide Thioredoxin-Like (TTL) proteins function as scaffold components of brassinosteroid signalling components **(Amorim-Silva *et al* 2019)** and as new components of the Cellulose Synthase Complex (CSC) and describe its unique dynamic association with the CSC under cellulose-deficient conditions **(Kesten, García-Moreno, Amorim-Silva *et al* 2022)**. The TTL-CESA interaction at the plasma membrane significantly increased under conditions that cause reduced cellulose content, such as salt stress and structural alterations of the CSCs. The relocalization of cytosolic TTLs to the active CSCs allows cellulose synthesis, mediated by a stress-resilient cortical microtubule array and the stabilization of the CSCs at the plasma membrane. TTLs carry this out by interacting with Cellulose Synthase 1 and promoting the polymerization of microtubules, thus maintaining the stability and integrity of the complex. We propose that TTLs act as bridges connecting stress-mediated cell wall modification with the regulation of cellulose biosynthesis.
We are currently investigating novel components involved in TTL function and how this protein family is regulated. Recently, we have identified the 14-3-3

proteins as interactors of TTL3. The 14-3-3s are a family of proteins conserved in eukaryotes that target a wide number of proteins **(Huang *et al* 2022)**. An *Arabidopsis* line overexpressing 14-3-3λ present phenotypes under stress consistent with defects in cellulose biosynthesis. This study will elucidate a possible role of 14-3-3 proteins in TTL regulation and cellulose biosynthesis.

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