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***ttl* mutants are impaired in cellulose biosynthesis under osmotic stress**

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As sessile organisms, plants require mechanisms to sense and respond to the challenging environment, that encompass both biotic and abiotic factors that results in differential development. In these conditions is essential to balance growth and stress responses. As cell walls shape plant growth, this differential growth response cause alterations to the plant cell wall and cellulose is a major component. Therefore, understanding the mechanisms that regulate cellulose biosynthesis is essential to develop strategies to improve plant production. Previous studies have shown that the GSK3 kinase BIN2 modulate cellulose biosynthesis through phosphorylating cellulose synthases and that the expression of cellulose synthases are regulated by Brassinosteroids. Our previous work reveals that the tetratricopeptide-repeat thioreoxin-like (TTL) TTL1, TTL3, and TTL4 genes, in addition to their reported role in abiotic stress tolerance, are positive regulators of BR signaling. We observe association of TTL3 with most core components in traducing BR signalling, such as LRR-RLK BRI1, BIN2 and the transcription factor BES1 that positively regulate cellulose biosynthesis. We show that *ttl* mutants are affected in cellulose

biosynthesis, particularly in osmotic stress conditions. Furthermore, TTL3 associates with LRR-RLKs that have been shown to be important for cellulose biosynthesis such as FEI1 in the FEI1/FEI2/SOS5 pathway. We aim to investigate the mechanisms by which TTL proteins regulate cellulose biosynthesis using a combination of genetics, biochemical, and molecular and cell biology approaches.

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