

Cellulose synthase 'class specific regions' are intrinsically disordered and functionally undifferentiated

Scientific Achievement

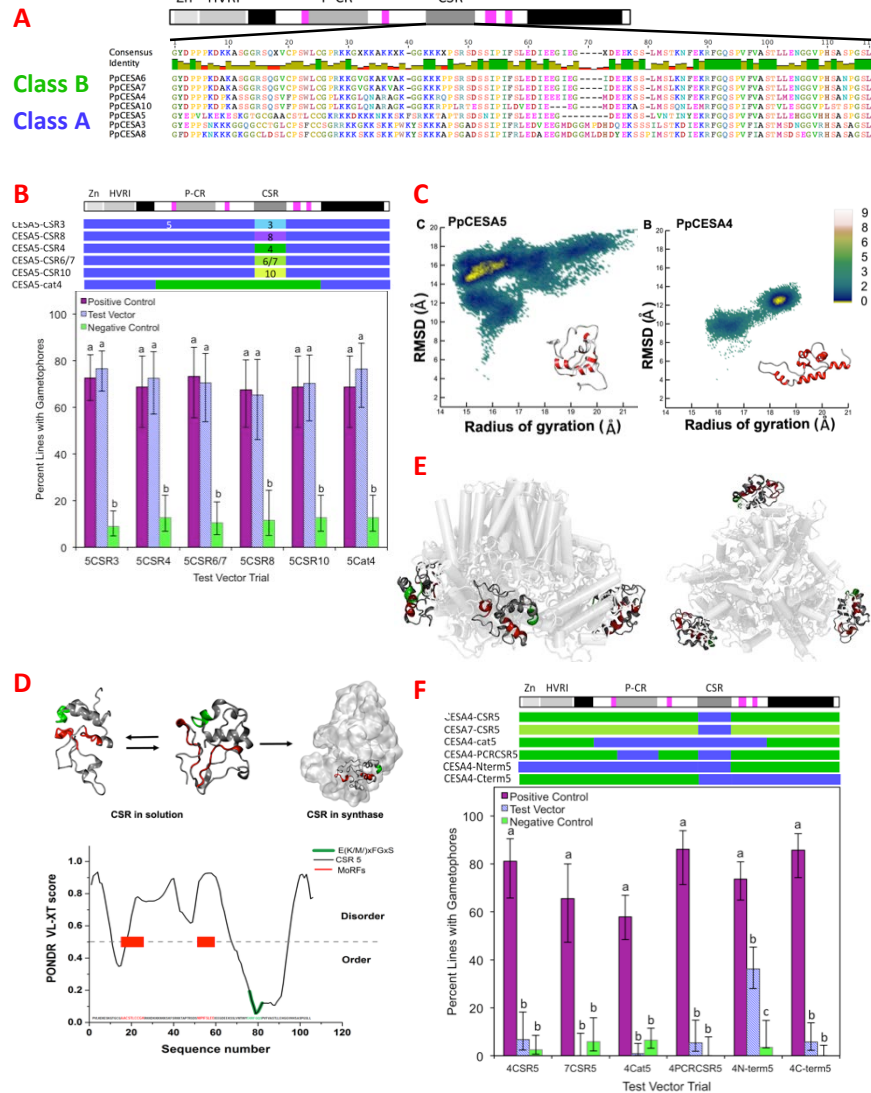
Cellulose Synthase (CESA) Class-Specific Regions (CSRs) are predicted to be Intrinsically Disordered Regions (IDRs) and contain Molecular Recognition Features (MoRFs), consistent with a role in CESA oligomerization. Unexpectedly, CSRs do not confer class-specific CESA function.

Significance and Impact

CESAs interact through multiple interfaces, including some that do not discriminate between isoforms. MoRFs are potential targets for manipulating CESA-CESA interfaces, and thereby altering microfibril structure.

Research Details

(A) *Physcomitrella patens* has two CESA classes. (B) Complementation analysis of chimeric CESAs shows that CSRs do not determine class-specific function. (C) Molecular Dynamics analysis indicates that CSRs are highly flexible. (D) CSRs are predicted to be IDRs and to contain MoRFs, which undergo disorder to order transition upon binding. (E) CSRs may form interfaces between CESA trimers. (F) The N-terminus (also largely disordered) partially confers class-specific function.



Work was carried out at the University of Rhode Island and North Carolina State University. Scavuzzo-Duggan, T., et al. (2018) J Integr Plant Biol (DOI: 10.1111/jipb.12637)