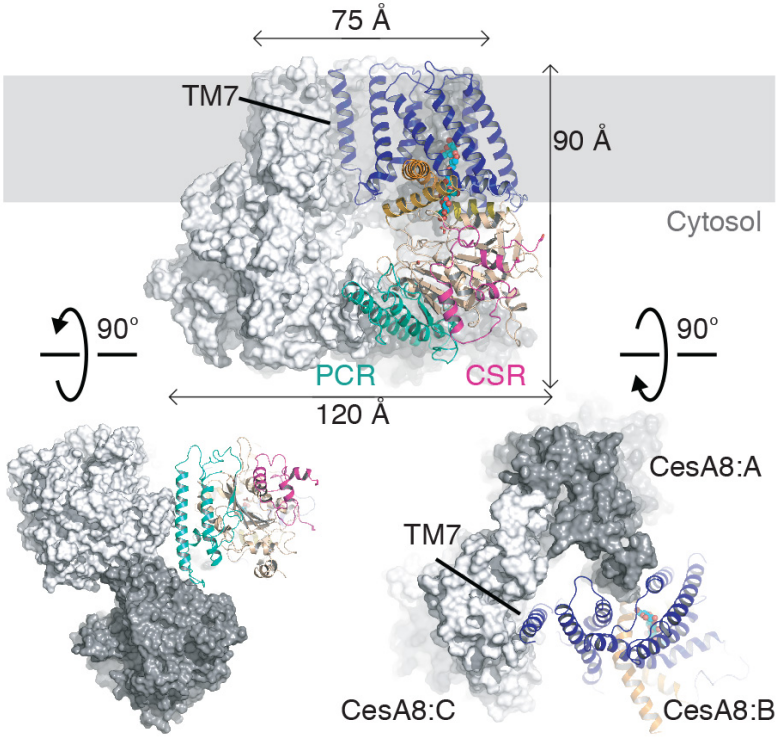
Cryo EM Structure of a Trimeric Cellulose Synthase Complex from Poplar

Scientific Achievement

The homo-trimeric structure of *Populus tremula x tremuloides* CesA8 was determined by cryo electron microscopy



Pallinti, P., Ho, R., Zimmer, J. 2020. Architecture of a catalytically active homotrimeric plant cellulose synthase complex. Science, DOI: 10.1126/science.abb2978

Significance and Impact

This is the first structure of a plant cellulose synthase at an intermediate state during cellulose biosynthesis. The structure provides a model for assembling cellulose synthase complexes responsible for cellulose microfibril formation.

Research Details

- Poplar CesA8 forms a stable and catalytically active trimeric complex.
- CesA's 'Plant Conserved Region' (PCR) stabilizes the trimer on the cytosolic side.
- Helical exchange within the membrane region further connects the trimer subunits.
- Each subunit forms a cellulose transmembrane channel occupied by a nascent polymer.
- The cellulose chains are steered towards a common exit point.
- A CesA trimer likely facilitates the alignment of three glucan chains into a protofibril that forms the repeat unit of a microfibril.