Advancing *Rhodobacter sphaeroides* as a platform for expression of functional cellulose synthase and other membrane proteins

**Scientific Achievement**

We show that *R. sphaeroides* can express bacterial cellulose synthase BcsAB complex in functional form, as well as a variety of other membrane proteins.

Compared to *E. coli, Rhodobacter sphaeroides* has 10X larger membrane area available to express foreign membrane proteins, and it makes no inclusion bodies.

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**Significance and Impact**

This study advances our ability to express cellulose synthase in a catalytically active form, to advance our understanding cellulose formation. Our study also provides a platform for expressing functional forms of many membrane proteins that have so far eluded expression.

**Research Details**

- Increased biomass of *Rhodobacter* 4-fold by employing photoheterotrophic growth;
- Showed strong expression of recombinant membrane proteins using the light sensitive puc promoter, normally controlling expression of a light antenna protein – unused membrane available for the recombinant proteins;
- Increased yield of functional, BcsAB cellulose synthase 10-fold over *E. coli* – based system;