



Acetobacter xylinum

University of Ottawa iGEM 2009

Acetobacter bacteria have been commonly found in symbiotic relationships with many different plants such as sugarcane and coffee plants and consequently isolated¹. *Acetobacter xylinum* is a gram-negative, aerobic bacterium that has long served as a model organism for the study of bacterial cellulose synthesis, primarily because of the large quantities it produces². A single *A. xylinum* cell is capable of polymerizing 200 000 glucose molecules per second into β -1,4-glucan chains which are then excreted into the surrounding medium forming ribbon-like bundles of microfibrils². The produces crystalline fibres resemble in width and structure average fibrils form many plants and algae².

The fibres are formed in the membrane by cellulase synthase and consequently secreted from a row of 50 – 80 pore-like synthetic sites along the longitudinal axis of the cell^{2,3}. The formation of this floating cellulose matrix is thought to allow *A. xylinum*, an obligate aerobe, to grow in the higher oxygen tension at the surface of the medium^{2,3}.

The cellulose synthase operon (*asc*) has been characterized by Saxena et al⁴. The operon contains three genes, *acsAB* which codes for a 168 kDa polypeptide which is the cellulose synthase, and *acsC* and *acsD* which are involved in cellulose production and crystallization⁴.

The purpose of our project is to express the *A. xylinum* cellulose synthase genes in *L. Plantarum* to promote the formation of bacterial cellulose from glucose in the human gut.

References:

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