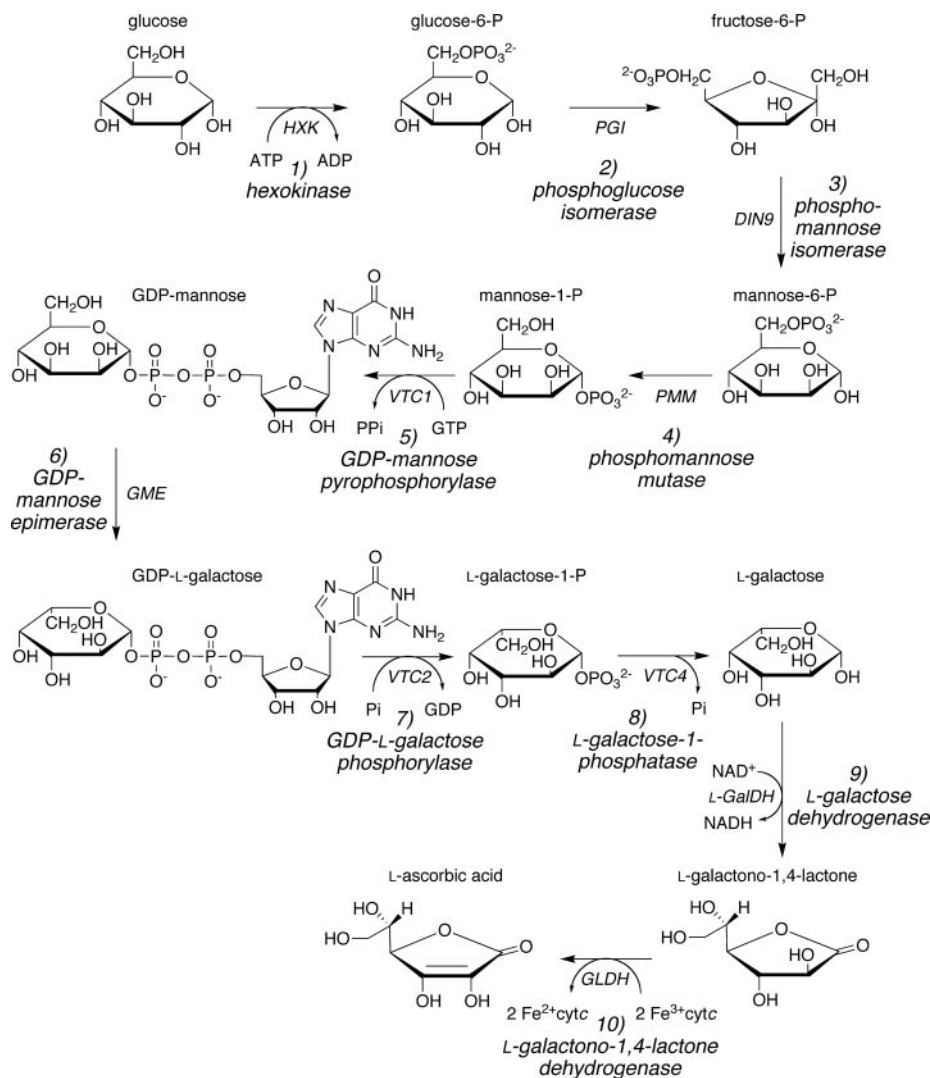


Papers of the Week

The Missing Link in Vitamin C Biosynthesis ♦



The Smirnov-Wheeler pathway for vitamin C biosynthesis.

Vitamin C is an important antioxidant and enzyme cofactor in both animals and plants. Humans, unable to synthesize the vitamin themselves, compensate by dietary intake, primarily from plants. Plants synthesize the vitamin via the Smirnov-Wheeler pathway which converts D-glucose to L-ascorbate in a 10-step process. The only step in the pathway that has not been linked to a gene product is the conversion of GDP-L-galactose to L-galactose 1-phosphate.

In this Paper of the Week, Carole L. Linster and colleagues show that the product of the *Arabidopsis thaliana* *VTC2* gene is the missing enzyme that catalyzes this step. Previous work had shown that *vtc2* mutants do not make vitamin C. In this manuscript, the authors cloned the *VTC2* gene from *A. thaliana* and expressed the recombinant protein. They found that *VTC2* is a member of the GalT/Apa1 branch of the histidine triad protein superfamily and showed that it catalyzes the conversion of GDP-L-galactose to L-galactose 1-phosphate in a reaction that consumes inorganic phosphate and produces GDP. The significance of this work rests on the fact that the enzymes catalyzing each of the 10 steps of the Smirnov-Wheeler pathway from glucose to ascorbate have now been identified.

♦ See referenced article, *J. Biol. Chem.* 2007, **282**, 18879–18885