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Nucleotides and saccharide synthesis.

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It has been found recently that nucleotides play an important role in saccharide synthesis. Plant enzymes catalysing the formation of sucrose or sucrose phosphate from uridine diphosphate glucose (UDPG) have been studied. It was already known that other enzymes can lead to the synthesis of polyglucoses and polyfructoses from sucrose so that it would be possible to obtain polysaccharide synthesis with two enzymes starting from UDPG and fructose.

Another disaccharide can be formed from UDPG and glucose-6-phosphate. This is trehalose phosphate. Recent work by several authors have clarified the mechanism of action of UDPG in the glucose-galactose interconversion and in lactose synthesis. By adding the reactions catalysed by known enzymes one obtains the equation:

2 glucose + 3 ATP → lactose + 3 ADP + 3 P

Oxidation of UDPG leads to UDP glucuronic acid which acts as glucuronic acid donor in several reactions.

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Another compound of the family is UDP-acetylglucosamine. The reactions which lead to its synthesis have been studied. Starting with fructose 6 phosphate it is possible to obtain glucosamine 6 phosphate by two routes.

A series of enzymes is known which can transform glucosamine 6 phosphate to UDP acetylgalactosamine which is involved in amino polysaccharide synthesis and in the formation of acetylgalactosamine.

Other UDP sugar compounds containing pentoses and amino sugars are known as well as guanosine diphosphate mannose. All these substances are suspected to play a role in saccharide synthesis.