

Nucleotides and saccharide syntheses

L. F. Leloir

1

It has been found recently that nucleotides play an important role in saccharide syntheses.

Plant enzymes ~~lead~~ catalysing the formation of sucrose ^{or glucose} from uridine diphosphate glucose (UDPG) have been studied. ~~It was known already that ~~any~~ other enzymes can lead to the synthesis of polysaccharides from sucrose so that a two enzyme system might produce polyglucos from UDPG or polyfructos from UDPG plus free fructose.~~

A

VA

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} of glucose - galactose inter-conversion and ~~the~~ ⁱⁿ lactose synthesis.

By adding the reactions catalysed by known enzymes one obtains the equation:



Oxidation of UDPG leads to UDP-glucuronic acid which ~~is involved~~ ^{is important} in acts as glucuronic acid donor in several reactions -

Another compound of the family is UDP-acetyl glucosamine. The reactions which lead to its synthesis have been studied. Starting with ~~from~~ fructose 6 phosphate it is possible to

obtain glucosamine 6 phosphate by two routes.

and from it ~~to~~ ~~only~~ UDP acetyl glucosamine.

The latter substance can be converted to

UDP acetyl galactosamine which is presumably involved in chondroitin sulfate synthesis +

Other UDP-sugar compounds, containing pentoses and amino sugars, are known as well as

guanosine diphosphate mannose. All these substances ^{plays a role} are suspected to be involved in saccharide synthesis.

A

It was already known that other enzymes can lead to the synthesis of polyglucoses and polyfructoses ~~so that~~ from sucrose so that it would be possible to obtain polysaccharide synthesis with two enzymes ~~starting~~ from UDPG and fructose.

(B) a series of enzymes is known which can transform glucosamine 6 phosphate to UDP acetyl galactosamine ~~which can be converted to UDP-acetyl galactosamine. ~~to these are~~~~ which is involved in ^{amino} ~~mono~~ polysaccharide synthesis, and in the formation of acetyl galactosamine.