

# **Uronic Acid Pathway**

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- An alternative oxidative pathway for glucose & is also known as glucuronic acid pathway.
- Concerned with the synthesis of glucuronic acid, pentoses & vitamin-ascorbic acid (except in primates & guinea pigs).

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# Importance

- It provides UDP-glucuronic acid, which is the active form of glucuronic acid
- Conjugation of bilirubin
- Conjugation of steroids
- Conjugation of various drugs which will make them more water soluble and more easily excretable.
- Synthesis of glycosamino glycans (GAG).

# Formation and importance of UDP-glucuronate.

- Glucose 6-phosphate is first converted to Glucose 1-phosphate by phosphoglucomutase
- UDP-glucose is synthesized by the enzyme UDP-glucose pyrophosphorylase.
- UDP glucose dehydrogenase oxidizes UDPglucose to UDP-glucuronate.

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# Conversion of UDP-glucuronate to L-gulonate.

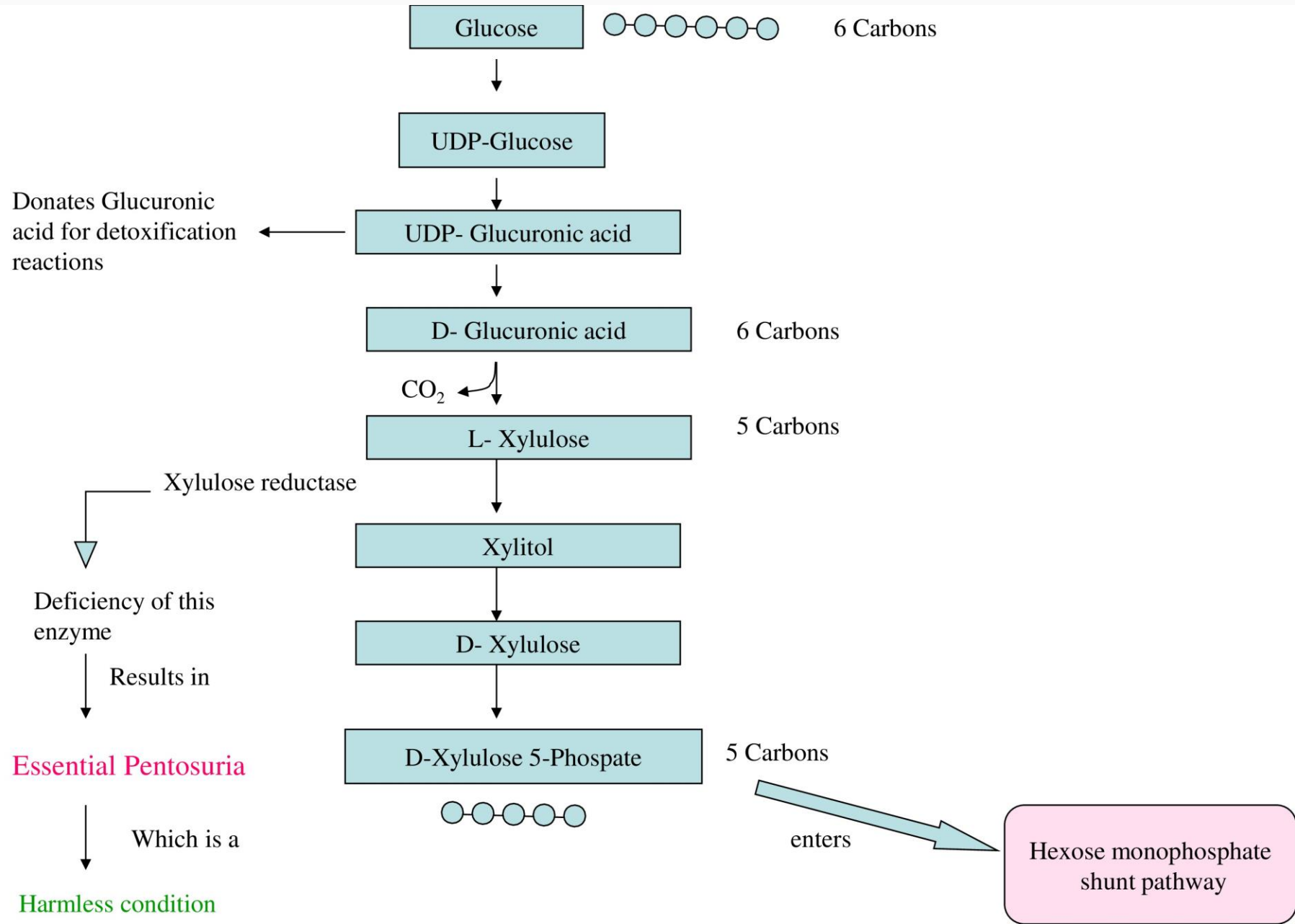
- UDP glucuronate loses its UDP moiety in a hydrolytic reaction and releases D glucuronate by the enzyme glucuronidase.
- D-glucuronate is reduced to L-gulonate by an NADPH-dependent reaction.

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# Synthesis of ascorbic acid

- L-gulonate is the precursor for the synthesis of ascorbic acid in many animals.
- The enzyme L-gulonolactone oxidase, which converts gulonate to ascorbic acid.
- L-gulonolactone oxidase is absent in man, other primates and guinea pigs.
- Vitamin C has to be supplemented in the diet for these animals.

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# Effect of drugs

- Administration of drugs (barbital, chloro butanol) increases the uronic acid pathway to achieve more synthesis of glucuronate from glucose.
- Certain drugs (aminopyrine, antipyrine) were found to enhance the synthesis of ascorbic acid in rats.

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# Essential Pentosuria

- Rare genetic disorder.
- Due to deficiency of the enzyme NADPdependent enzyme xylitol dehydrogenase.
- Due to this, L-xylulose cannot be converted to xylitol.
- The affected individuals excrete large amounts of L-xylulose in urine & gives a positive Benedicts test.

# References

- Textbook of Biochemistry-U Satyanarayana
- Textbook of Biochemistry-DM Vasudevan
- Textbook- Lehninger

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