

20 Disorders of the Urea Cycle and Related Enzymes

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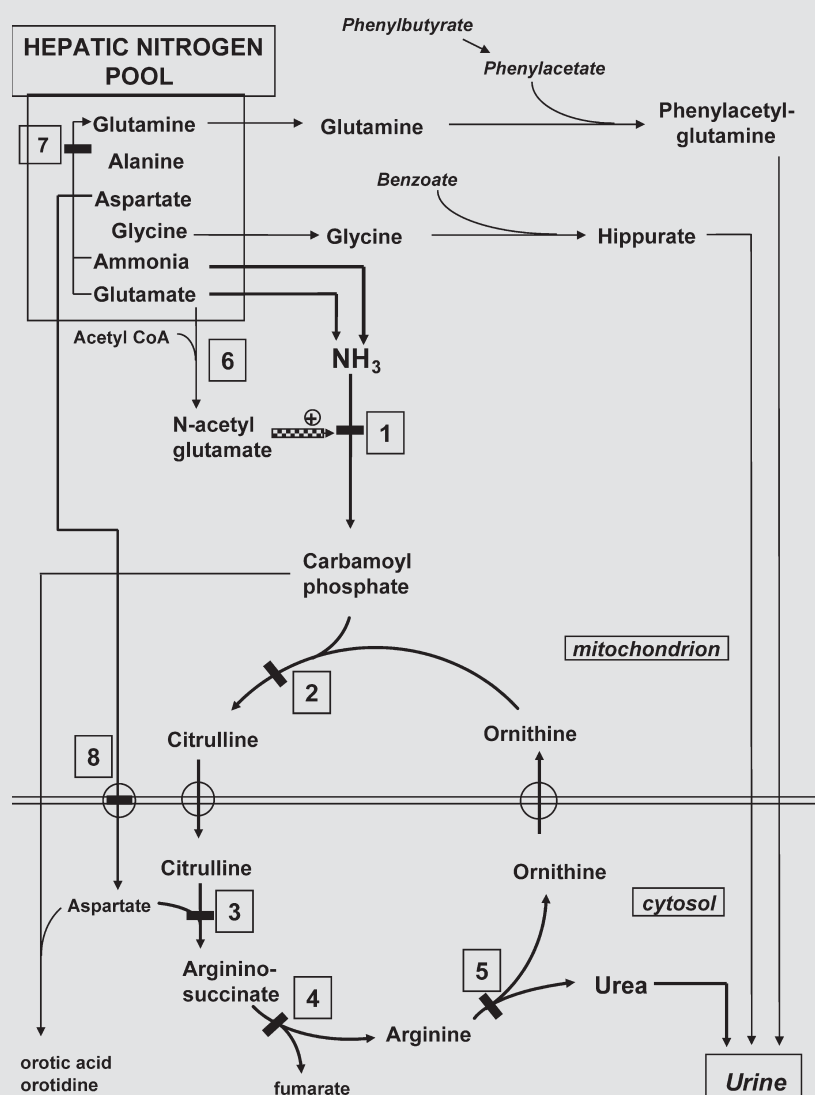
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The Urea Cycle

The urea cycle (■ Fig. 20.1) which, in its complete form, is only present in the liver, is the main pathway for the disposal of excess of nitrogen. This sequence of reactions, localised in part in the mitochondria and in part in the cytosol, converts the toxic ammonia and other nitrogenous compounds into the non-toxic product, urea, which is excreted in the urine. Genetic defects of each enzyme of the urea cycle are recognised and all

are responsible for hyperammonaemia. Genetic defects of other metabolic pathways may also lead to secondary inhibition of the urea cycle. Alternative pathways for nitrogen excretion, namely conjugation of glycine with benzoate and of glutamine with phenylacetate can be exploited in the treatment of patients with defective ureagenesis.



■ **Fig 20.1.** The urea cycle and alternative pathways of nitrogen excretion. Enzymes: **1**, carbamoyl phosphate synthetase; **2**, ornithine transcarbamoylase; **3**, argininosuccinate synthetase; **4**, argininosuccinate lyase; **5**, arginase; **6**, N-acetylglutamate

synthetase; **7**, glutamine synthetase; **8**, Citrin (mitochondrial aspartate-glutamate carrier); + denotes stimulation. Defects are depicted by solid bars across the arrows