

## Urea cycle

Step	Reactants	Products	Catalyzed by	Location
1	$\text{NH}_4^+ + \text{HCO}_3^- + 2\text{ATP}$	Carbamoyl phosphate + $2\text{ADP} + \text{P}_i$	Carbamoyl phosphate synthetase I	mitochondria
2	Carbamoyl phosphate + Ornithine	Citrulline + $\text{P}_i$	Ornithine transcarbamoylase	mitochondria
3	Citrulline + Aspartate + ATP	Argininosuccinate + AMP + pyrophosphate	Argininosuccinate synthetase	cytosol
4	Argininosuccinate	Arginine + Fumarate	Argininosuccinase	cytosol
5	Arg + $\text{H}_2\text{O}$	Ornithine + Urea	Arginase	cytosol

## Urea cycle regulation

Urea cycle is regulated by the rate limiting enzyme carbamoyl phosphate synthase I, the first enzyme of the ammonia detoxification pathway. It is only active in presence of its allosteric activator N-methyl-glutamate amino acid. It catalyses the condensation of ammonium ions  $\text{NH}_4^+$ ,  $\text{CO}_2$  and ATP to form carbamoyl phosphate, a product that will condense with L-ornithine in order to initiate the urea cycle.

## Links

## Bibliography

MURRAY, Robert K. – BENDER, David A.. *Harper's Illustrated Biochemistry*. 29<sup>th</sup> edition. McGraw-Hill Companies, Inc., 2012. ISBN 978-0-07-176576-3.