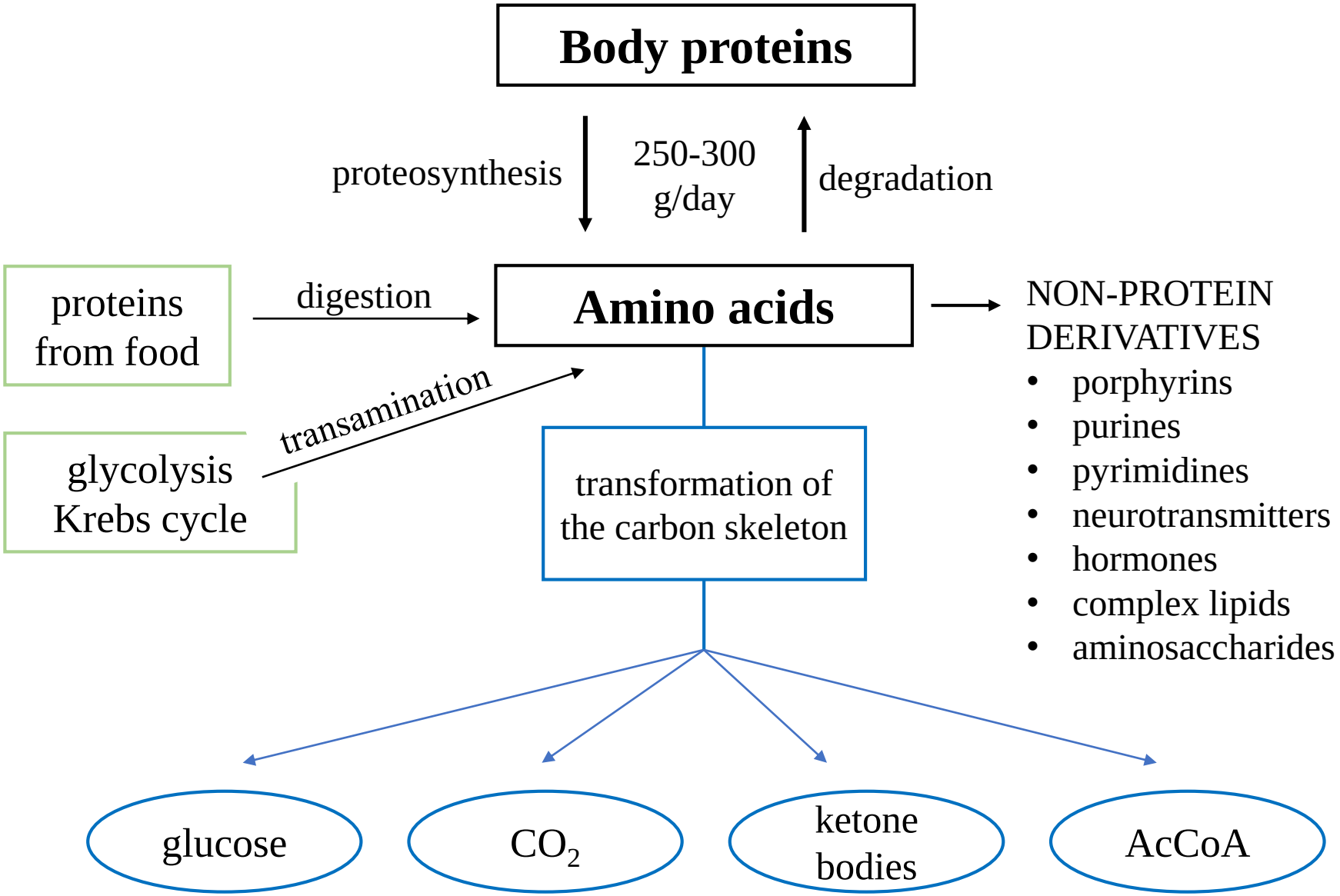
Ammonia detoxification, urea formation and protein metabolism

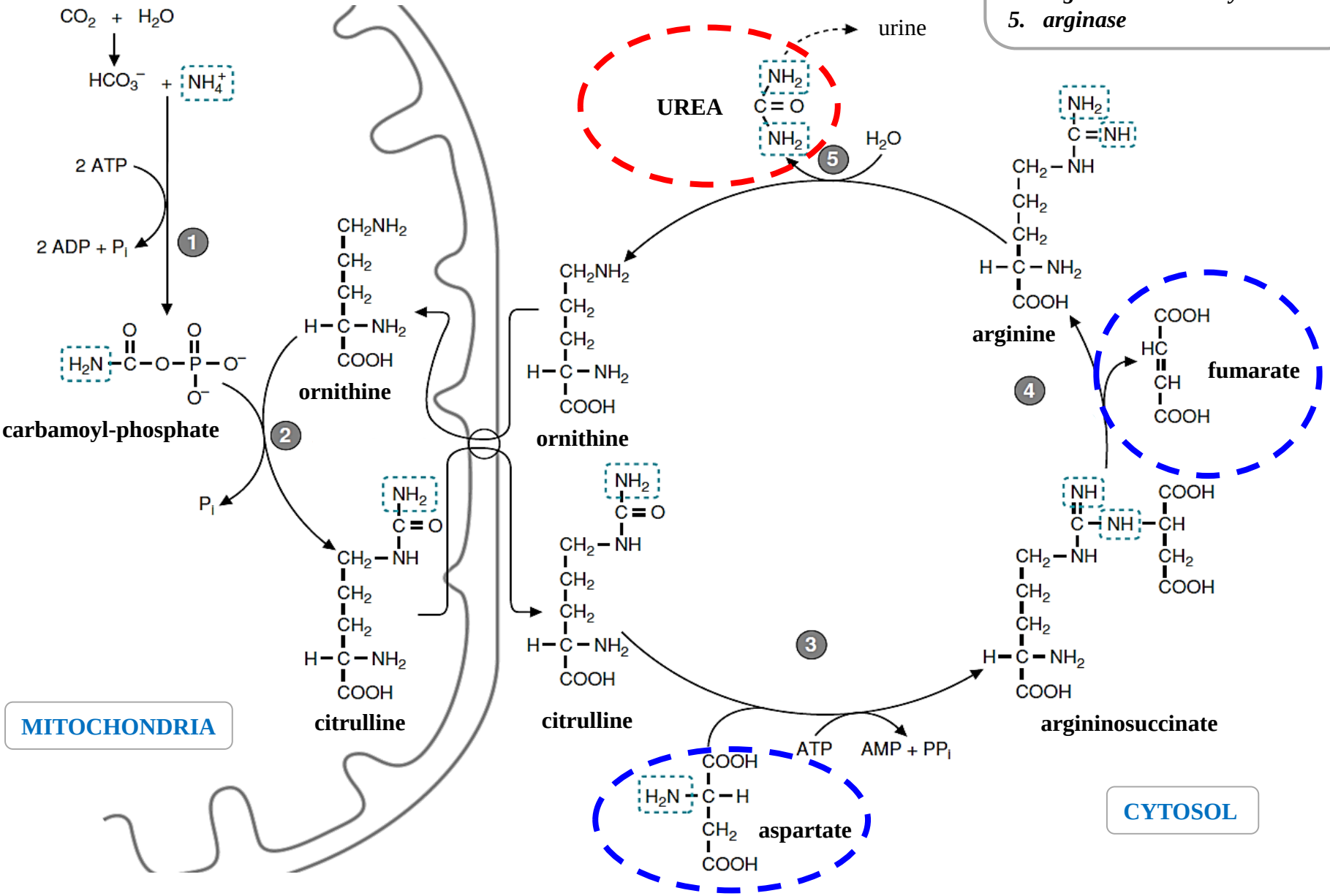
11th week

Metabolism of amino acids



Urea cycle

1. *carbamoyl-P synthetase I*
2. *ornithine transcarbamylase*
3. *argininosuccinate synthetase*
4. *argininosuccinate lyase*
5. *arginase*



Urea

- non-toxic, small neutral molecule, easily diffuses across the membrane, water soluble

- Serum**:** 2,5 - 8,3 mmol/L
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- Excretion: 500 mmol / 24 h

- Synthesis: in the liver, daily 20 – 40 g

Pathophysiological mechanisms affecting urea concentration

Increased concentration of urea in the serum

- increased protein breakdown (e. g. starvation)
- acute renal insufficiency of various etiology
- chronic glomerulonephritis and other chronic renal disease
- urinary tract obstruction, e.g. tumor
- decrease in blood flow to the kidneys – hypovolemia

Decreased serum urea concentration (less common)

- urea synthesis disorder
- increased urine loss
- consequence of disorders: hyperammonemia

Use for clinical purposes

1) Assessment of the body's hydration status

2) Kidney diseases

- serum urea level depends on glomerular filtration
- evaluation of the causes of oliguria
- in prerenal uremia, the concentration increases more than the creatinine concentration

3) The balance between the amount of ingested and degraded proteins