Uric Acid

- Measures uric acid levels, which can indicate kidney health and potential gout issues.

Uric acid represents the end product of purine metabolism in humans and higher primates, a consequence of a mutation that inhibits the gene responsible for producing the enzyme uricase. Historically, uric acid was regarded as a vital natural antioxidant within the human body, primarily tasked with the removal of reactive oxygen species. However, contemporary research has indicated that uric acid does not play a significant role in the regulation of oxidative stress. Instead, it is believed to participate in immune surveillance and the regulation of blood pressure and intravascular volume.[1]

As a weak organic acid, uric acid predominantly exists in its ionized form, monosodium urate (MSU), at a physiological pH of 7.4. This ionized form exhibits lower solubility due to elevated sodium concentrations. In acidic conditions, such as those found in urine, uric acid appears in its nonionized form, which is even less soluble within the physiological range. This reduced solubility can lead to the formation of uric acid crystals and stones in the urinary tract, differentiating them from MSU crystals associated with gout.[2]

The majority of urate in the body is synthesized endogenously in the liver, with a minor contribution from the small intestine. Renal excretion plays a crucial role in regulating the body's urate levels under steady-state conditions, as the glomerulus filters nearly all urate. In cases of hyperuricemia, the urate pool increases.[3]

In males, the normal urate concentration ranges from 800 to 1000 mg, while in females, it ranges from 500 to 1000 mg. The daily turnover of urate is between 500 and 1000 mg. During male puberty, serum urate levels rise to reach adult levels, whereas urate concentrations remain lower in premenopausal women. This difference is attributed to the effects of estrogen on renal urate transporters, leading to decreased renal reabsorption and increased clearance in women.[4] However, after menopause, urate levels in women tend to approach those of adult males, potentially influenced by hormone replacement therapies.

References

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