SydPath
ST VINCENT'S PATHOLOGY

www.sydpath.com.au

UREA INFORMATION SHEET

PHYSIOLOGY

Urea is a by-product of protein breakdown which is produced when dietary or endogenous protein is metabolised. It is produced in the liver by the enzymes which form the urea cycle, and then released into the bloodstream. It is subsequently removed from the blood by the kidneys where it is freely filtered at the glomerulus and with partial resorption in the tubules. As the main influence on serum urea concentrations is changes in glomerular filtration rate (GFR) the concentration in serum can be used as a measure of kidney function, although serum creatinine is generally a superior marker. The ratio of serum urea to creatinine can be used as a rough marker of the cause of acute renal failure. With pre-renal causes the urea tends to rise faster than the creatinine, leading to a raised urea: creatinine ratio (> 0.1 mmol/umol) while intrinsic renal damage does not elevate the ratio. As there are other causes for differences in urea and creatinine this is a rough guide only. Serum urea can rise to high enough levels in blood to markedly affect serum osmolality. However, urea does <u>not</u> contribute to hypertonicity of blood (which causes movement of water out of cells) as it freely passes cell membranes. Serum urea concentration is used for calculated osmolality when calculating the osmolar gap (measured osmolality – calculated osmolality). Further information on this can be found on the SydPath osmolality page.
Urea is one of the main solutes in urine and is the main excretory pathway for nitrogen, balancing nitrogen intake in a healthy subject. The normal adult range quoted at SydPath is 3.0-8.5 mmol/L although this is dependent on dietary protein intake. Additionally, there is a gradual increase in expected values with increasing age in the adult population.

HIGH VALUES OF SERUM UREA:

<u>Increased production</u>	<u>Decreased removal</u>
High protein intake	Acute or chronic kidney disease from any cause.
Bleeding into the gastrointestinal tract	Decreased renal perfusion eg dehydration, shock or congestive cardiac failure
Hypercatabolic states such as trauma, post operative period, acute myocardial infarction	
Corticosteroids (causes protein catabolism)	

LOW VALUES OF SERUM UREA:

<u>Reduced production</u>
- Poor nutrition (low protein intake)
- Severe liver disease
- Urea cycle defects

<u>Dilution</u>
- Overhydration
- SIADH