

kidney function tests

what is creatinine?

- the end product of creatine catabolism
- 98% of the body creatine → in muscles as creatine phosphate
- 1-2% of total muscle creatine → converted daily to creatinine through the spontaneous non enzymatic loss of water or phosphate

routine KFTs

serum creatinine	creatinine clearance	serum urea
55 - 120 μmol/L (wide range)	males: 90 - 140 ml/min females: 80 - 125 ml/min	2.5 - 6.6 mmol/L
<ul style="list-style-type: none"> • endogenous(not affected with diet) • plasma creatinine remains constant throughout adult life • more accurate (?) it is a one time test there is no need to collect 24-hour sample collection • freely filtered at glomeruli + not reabsorbed + secreted by tubules (10%) 	<ul style="list-style-type: none"> • measurement of GFR • provides useful index of the number of functioning glomeruli • estimate the degree of renal impairment • recommended in: <ul style="list-style-type: none"> ○ patient with early (minor) renal disease ○ assessment of possible kidney donors ○ detection of renal toxicity of some nephrotoxic drugs 	<ul style="list-style-type: none"> • amino acids → ammonia (deamination) • ammonia → urea (in the liver) • serum urea is inferior to serum creatinine (why?) <ul style="list-style-type: none"> • ↑ serum urea in: <ul style="list-style-type: none"> ■ dehydration ■ high protein diet (*amino acids) ■ any condition causes ↑ proteins catabolism: <ul style="list-style-type: none"> ✓ cushing syndrome ✓ diabetes mellitus ✓ starvation ✓ thyrotoxicosis • 50% or more of urea filtered at the glomerulus is passively reabsorbed by the renal tubules.
<ul style="list-style-type: none"> • ↑ serum creatinine → impaired renal function • normal serum creatinine → does not always indicate normal renal function (it may not be elevated until GFR is fallen by as much as 50%) 	<p style="text-align: center;">clearance (ml/min) = $\frac{U \times V}{P}$</p> <ul style="list-style-type: none"> • The average in old adults is 110 ml/min • It falls to 70 ml/min in individuals over 80 years • in children, GFR should be related to surface area. when this is done results are similar to those found in young adults • measured by using 24-hour urine collection (potential for errors, but there is an alternative!) 	
	cockcroft-gault formula for estimation of GFR	
	<p style="text-align: center;">GFR = $\frac{K \times (140 - Age) \times Body\ weight}{serum\ creatinine}$</p> <ul style="list-style-type: none"> • K is constant that varies with sex (muscle mass) • it is an alternative methode to calculate creatinine clearance using parameters such as: serum creatinine, sex, age, body weight • it shouldn't be used if (limitations): <ul style="list-style-type: none"> ○ serum creatinine is changing rapidly ○ the diet is unusual (strict vegetarian) ○ low muscle mass (muscle wasting) ○ obesity <p>note: the first 3 points will affect serum creatinine level. while obesity masks the increased serum creatinine and shows normal GFR.</p>	

kidney function tests are used to:

- ❖ confirm the diagnosis of renal disease
- ❖ give an idea about the severity of the disease
- ❖ follow up treatment