

Biochemistry



Summary

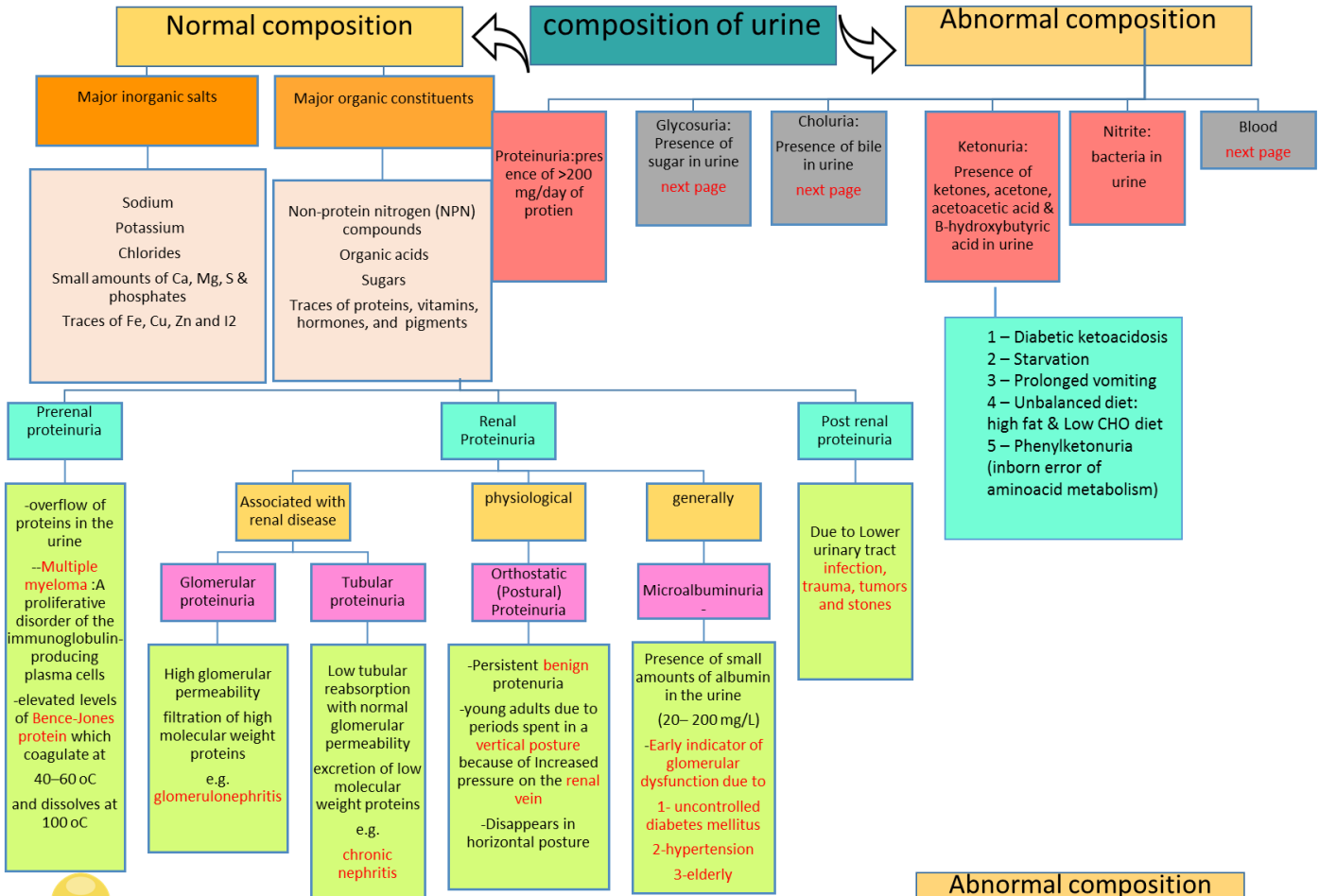


Don't take this file as a main source for studying please ..
Good luck

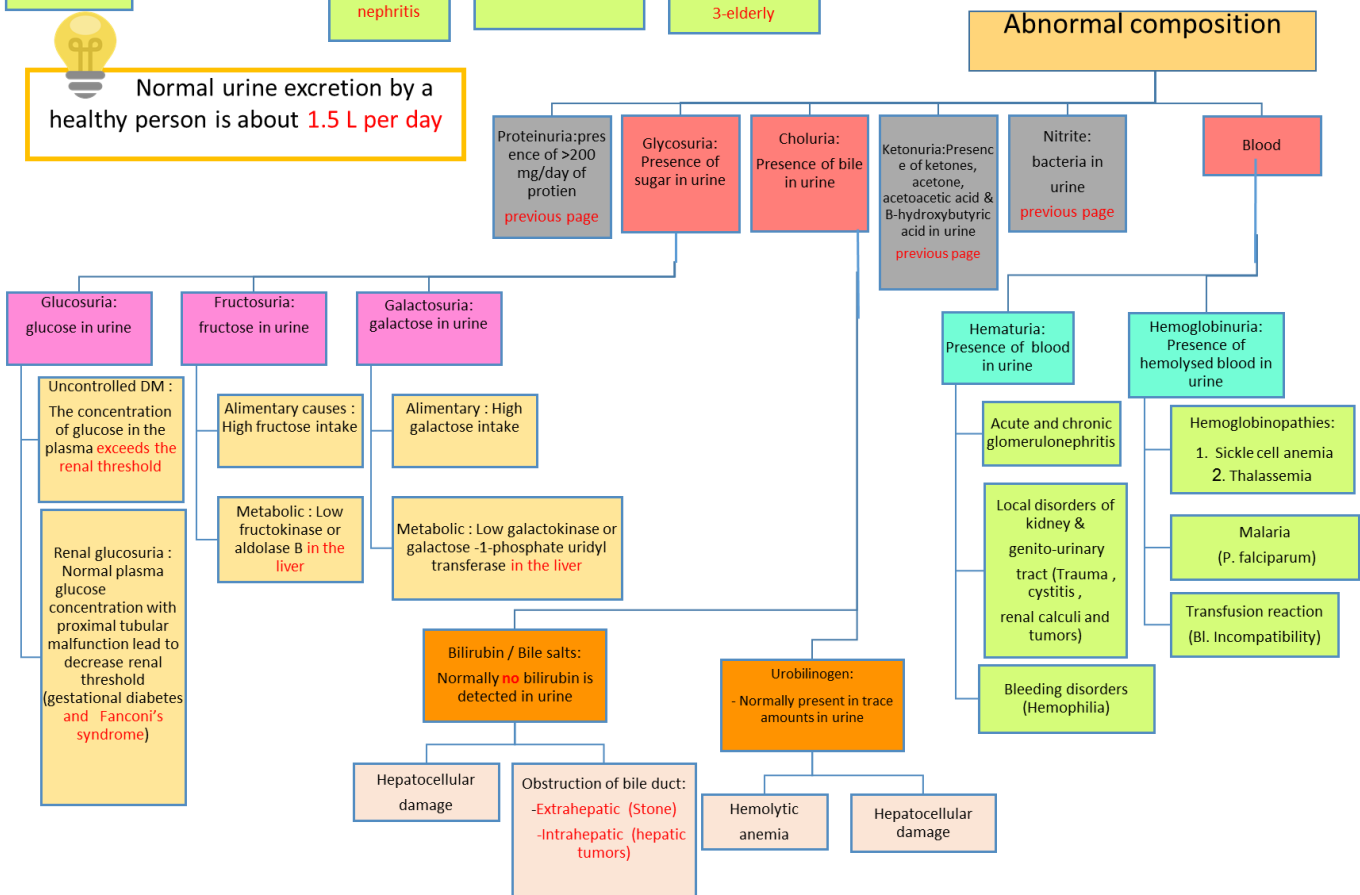
Kidney function test

Routine KFTs include the measurement of		
Serum creatinine (Cr).	Creatinine clearance.	Serum urea.
<p>(55-120 $\mu\text{mol/L}$ in adult):</p>	<p>males: 90-140 ml/min females: 80-125 ml/min</p>	<p>(2.5-6.6 mmol/L) in adult</p>
<p>✓ Creatinine= end product of creatine catabolism.</p> <p>✓ 98% of the body creatine is present in the muscles where it functions as store of high energy in the form of creatine phosphate.</p> <p>✓ About 1-2 % of total muscle creatine or creatine phosphate pool is converted daily to creatinine through the spontaneous, non enzymatic loss of water or phosphate.</p> <p style="color: red;">➤ Why is serum creatinine the best kidney function test?</p> <ul style="list-style-type: none"> • Creatinine in the plasma is filtered freely at the glomerulus and secreted by renal tubules (10 % of urinary creatinine). • Creatinine is not reabsorbed by the renal tubules. • Plasma creatinine is an endogenous substance not affected by diet. • Plasma creatinine remains fairly constant throughout adult life. 	<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 <p style="color: green;">clearance (ml/min) = $U \times V / P$</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 24hour urine collection . ✓ (potential for errors, but there is an alternative!) <p style="color: red; text-align: center;">Cockcroft-Gault Formula</p> <p style="text-align: center; font-size: small;">GFR = $\frac{K \times (140 - \text{Age}) \times \text{Body weight}}{\text{serum creatinine}}$</p> <ul style="list-style-type: none"> • K is constant that varies with sex (muscle mass) • it is an alternative method 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, e.g., strict vegetarian ✓ Low muscle mass, e.g., muscle wasting ✓ Obesity note:the first 3 points will affect serum creatinine level. while obesity masks the increased serum creatinine and shows normal GFR. 	<p>Urea is formed in the liver from ammonia released from deamination of amino acids.</p> <p style="color: red;">As a kidney function test, serum urea is inferior to serum creatinine because:</p> <ul style="list-style-type: none"> • High protein diet increases urea formation. • Any condition of \uparrow proteins catabolism (<i>Cushing syndrome, diabetes mellitus, starvation, thyrotoxicosis</i>) $\rightarrow \uparrow$ urea formation. <p>• 50 % or more of urea filtered at the glomerulus is passively reabsorbed by the renal tubules.</p>
<p>✓ A raised serum creatinine is a good indicator of impaired renal function .</p> <p>✓ But normal serum creatinine does not necessarily indicate normal renal function as serum creatinine may not be elevated until GFR has fallen by as much as 50%.</p> <p style="color: red;"><u>Serum Cr is a better KFT than creatinine clearance because:</u></p> <ul style="list-style-type: none"> • Serum creatinine is more accurate. • Serum creatinine level is constant throughout adult life 		

Chemical examination of urine



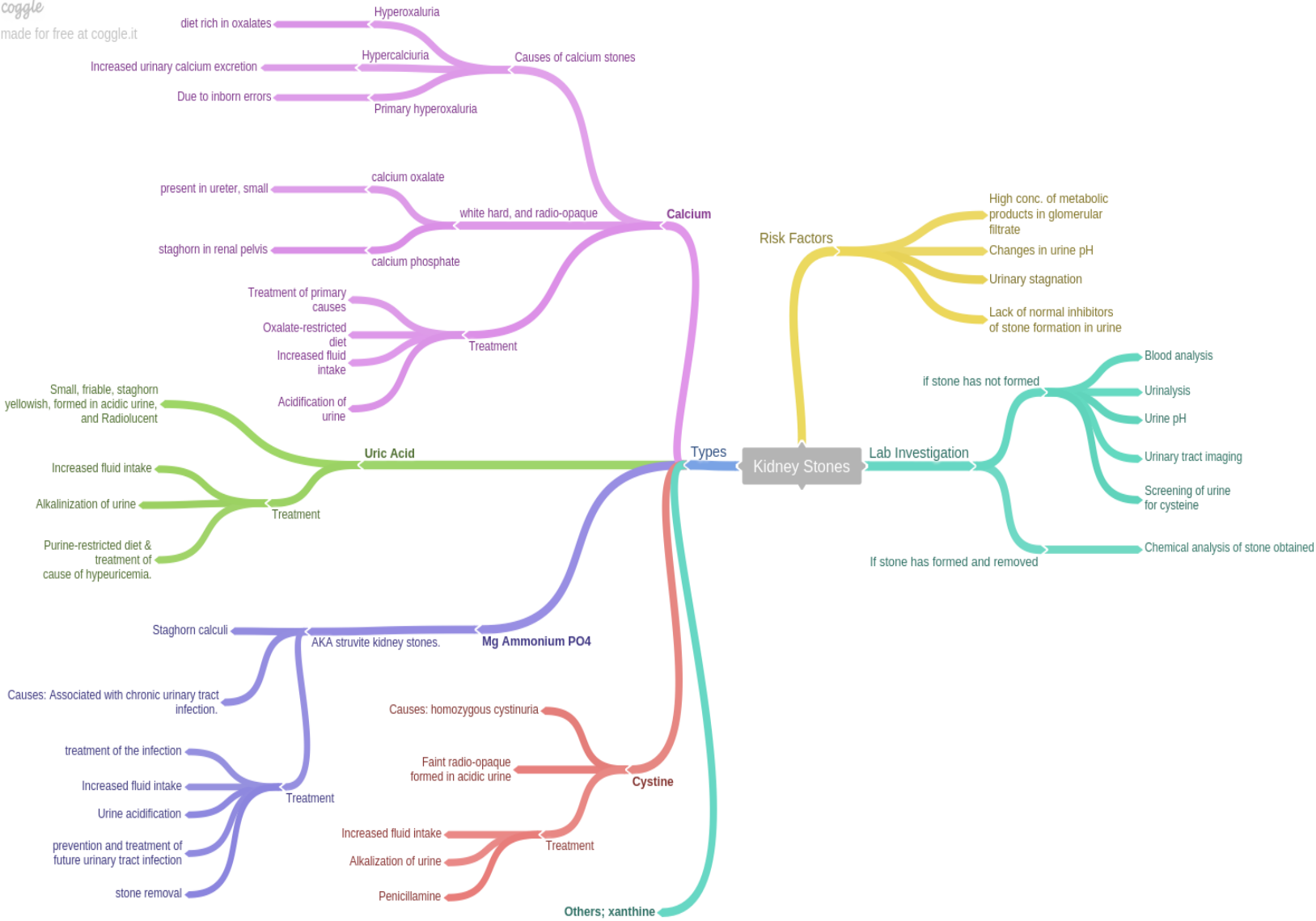
Normal urine excretion by a healthy person is about **1.5 L per day**



Kidney stones (Nephrolithiasis)

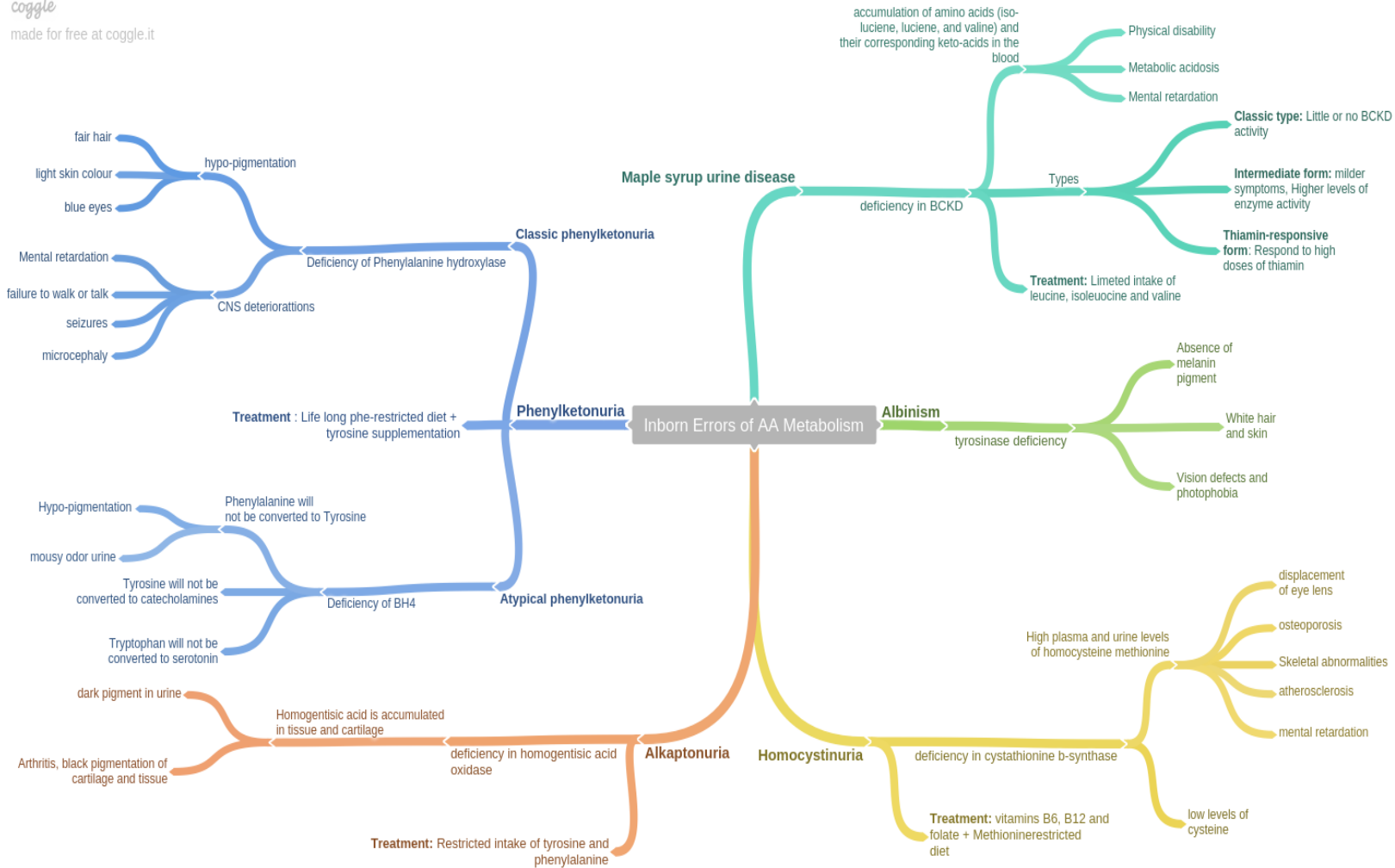
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Inborn errors of Amino acids

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Good Luck ..