



BRUNEL HEALTH CORE TEN®

Brunel Health Core Ten Results for Sam Witter

Dear Sam,

Thank you for submitting a sample of your blood to be tested by Brunel Health.

We are pleased to say that there was enough viable sample to test all of the Brunel Health Core Ten® parameters, and the result is shown on the laboratory results form, as well as commented on by a Brunel Health Doctor on the following pages.

There is a comment on the role in your body of each successfully tested substance, with additional qualifications where appropriate to explain the possible significance of a high or low measurement. If any out of range results are recorded, it is important that you discuss the findings with your health practitioner, who will guide you on appropriate follow up action - which would usually be to contact your GP if a potential significant concern was revealed, but it is possible that further repeat testing could be recommended to shed more light on the available information.

If at any time you have any symptoms of ill health it is important that you do discuss them with your usual doctor or Brunel approved practitioner, and do not rely solely on the results of blood tests like these – which while convenient, accurate and reliable, are not intended to replace the opinion of a qualified medical practitioner that is fully aware of your personal medical history. If you have any questions regarding your results for the Doctors at Brunel Health, please submit them through your referring practitioner.

Best Regards,

Anne

Anne Davis
Office Manager
Brunel Health

Your Brunel Health Core Ten Results at a glance.		
Substance	Valid Sample?	Alert Flag
Ferritin	▶	▶
Magnesium	▶	▶
Sodium	▶	▶
Albumin	▶	▶
Calcium	▶	▶
TSH	▶	▶
FT4	▶	▶
Vitamin D	▶	▶
Vitamin B12	▶	▶
Folate	▶	▶

A Green Flag means that no further action is required.
A Yellow Flag requires you to read the relevant section.



Surname : **Witter**
Forename : **Sam**
Date of birth :
Patient ID Number :
Sex : Male
Lab No : 194703
Sample Dated : 13-Mar-18 Not know
Sample Received : 15-Mar-18 9:08 AM
Result Reported : 15-Mar-18 11:11 AM
Sample Type: Serum,

Test	Result	Normal Range	Units	Comment
Biochemistry				
Ferritin	116.0	30 - 400	ug/L	
Magnesium	1.07	0.66 - 1.07	mmol/L	
Kidney Function				
Sodium	143	136 - 145	mmol/L	
Bone Screen				
Albumin	42.4	35 - 52	g/L	
Calcium	2.31	2.15 - 2.50	mmol/L	
Corrected Calcium	2.26	2.12 - 2.52	mmol/L	
Thyroid Function				
TSH	1.90	0.27 - 4.20	mIU/L	
Free T4	15.30	12.0 - 22.0	pmol/L	
Vitamins				
Vitamin D (25 OH)	64	Deficient <25 Insufficient 25 - 50 Consider reducing dose >175	nmol/L	
Vitamin B12	H 690	Deficient <145 Insufficient 145 - 250 Consider reducing dose >569	pmol/L	
Serum Folate	19.50	8.83 - 60.8	nmol/L	



Ferritin - Normal



Ferritin is an iron storage compound. Iron is very important for all cells, particularly in the effective release of energy, and for oxygen transport in the pigment of the red blood cell known as haemoglobin.

A low Ferritin level may suggest iron deficiency. When low levels are detected, it is important to also check the blood count to determine whether anaemia is present too (anaemia is essentially poor quality red blood cells, a strong possibility with iron deficiency). There are many potential causes of iron deficiency – broadly encompassing blood loss, decreased intake of iron from the diet or decreased absorption of iron from the gut. Symptoms of low ferritin levels will include fatigue, shortness of breath and increased frequency of infection.

If the level is high it might suggest excess iron supplementation. Less commonly, higher ferritin levels can result from damage to bone marrow or liver, genetic conditions, following blood transfusion, and in chronic anaemias such as thalassaemia. Ferritin levels will also rise in the presence of inflammation – which may be the result of injury or infection. Symptoms of high ferritin levels will include fatigue, muscle aching and – if the cause is ‘reactive’ or a sign of inflammation – fevers or joint pains, or indeed the symptom of a specific infection, such as cough.

Magnesium - Normal



Magnesium is an essential electrolyte, particularly important for the maintenance of normal heart muscle contraction and nervous system performance.

Low levels of magnesium may be encountered with kidney disease. Other potential causes including a diet deficient in magnesium; poor absorption of magnesium as a result of bowel disorders, or from alcohol or laxative use; certain types of medication (in particular long term use of Proton Pump Inhibitor drugs such as omeprazole); endocrine (hormone) disorders and even pregnancy. Symptoms may include muscle weakness, confusion and heart rhythm problems.

A true elevation in magnesium is rare, and is usually caused by supplementation. Hypermagnesia is more likely to occur if there is pre-existing kidney disease. Small elevations are of little concern, particularly if kidney function is known to be normal.



Sodium - Normal



Sodium is a substance found in abundance throughout the body. It has many roles, and is essential for normal cell function. It has a major role in regulating water movement between blood and tissues, ensuring it is appropriately distributed between all the compartments of the body. Sodium is lost through sweating, or vomiting and diarrhoea – and gained from the diet (table salt is our most obvious direct source of sodium). Sodium levels can give an insight into general health (state of hydration for example), kidney function and they may point to some hormonal issues (pituitary or adrenal gland disease in particular).

A low sodium level (hyponatraemia – from ‘natrium’, Latin for sodium) may be caused by an excess of water the blood, which effectively dilutes the sodium so that the concentration appears low. This type of hyponatraemia can be the result of chronic conditions such as kidney failure (when excess fluid cannot be efficiently excreted) and heart failure, in which excess fluid accumulates in the body. Excess anti diuretic hormone (ADH – produced by an overactive pituitary gland) can result in a rare condition known as diabetes insipidus, in which the sodium level drops again from accumulation of water. Some tumours can also produce ADH, and SIADH (syndrome of inappropriate anti-diuretic hormone) will also lead to retention of water in the body. Hyponatraemia can also be caused by severe burns, prolonged sweating, and severe vomiting and diarrhoea. Other conditions that can also be associated with hyponatraemia are adrenal insufficiency, hypothyroidism, and chronic liver disease. Some medicines can also lower blood sodium levels. Examples of these include diuretics, some diabetic medication and ACE inhibitors. Symptoms of low sodium include weakness, fatigue; and ultimately convulsions and coma if the level is very low.

On the other hand, a high sodium level (hypernatraemia) will usually indicate an excessive intake of salt from the diet, or reduced water intake giving the impression of too much sodium. Some medicines can cause dehydration too – diuretics in particular – which again will give the impression of a high level of sodium but is actually a sign of dehydration. Vomiting and diarrhoea may also result in a rise in the sodium level, for the same reasons. Kidney and adrenal gland disease may also lead to hypernatraemia. Symptoms of high sodium levels include thirst, weakness, and later confusion, muscle spasm and loss of consciousness.



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Albumin - Normal



Albumin is a protein with a number of important roles in the body. It provides the building block from which other proteins are manufactured, has a role in transporting a number of hormones and drugs to their targets, and is instrumental in maintaining the correct balance of water between blood and tissues.

A low level of Albumin can be sign of liver disease - the liver is the site of albumin production, so a drop may imply reduced manufacture of albumin. Low levels can be also be caused by kidney impairment (albumin leaks from the blood into the urine) and in situations of inflammation, shock, and malnutrition. Conditions in which the body does not properly absorb and digest protein, such as Crohn's disease or coeliac disease, or in which large volumes of protein are lost from the intestines, can also lead to low albumin levels. Symptoms include oedema (swelling of soft tissues, typically the lower limbs), weight loss and general malaise.

A high level is more often than not simply a sign of mild dehydration, which is not likely to be a concern – although it is important to maintain a good level of hydration for optimal body performance of course. A recent high intake of a high protein meal can push albumin levels up in the short term.



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Corrected Calcium - Normal



Calcium is found abundantly in the body and is vital for normal cell function. Bones and teeth derive much of their strength from incorporated calcium ions; and muscle contraction, nerve conduction and blood clotting all depend on the presence of normal calcium levels. Looking at blood test results, the corrected calcium level is the important one, and an elevation in the total level alone is not concerning. Brunel Health therefore only report on Corrected Calcium.

Hypoparathyroidism is the most common cause of persistently low adjusted calcium levels (the adjusted level is the important measure). This is caused by a deficiency of production of parathyroid hormone (PTH) from the parathyroid glands (located in the neck near the thyroid gland). Other rarer causes include malnutrition, low albumin and high phosphate levels. Ricketts and osteomalacia (both of which result from long term Vitamin D deficiency) can also lead to low calcium states. Symptoms of low calcium include numbness around the lips, muscle spasm, and in severe cases convulsions and heart rhythm disturbances.

A small rise in calcium is not an uncommon finding, and may simply result from tourniquet pressure. Repeat sampling again would determine whether there is a true elevation or not. There are a number of potential causes of elevated calcium levels in the blood, including (most commonly) hyperparathyroidism - nearly always caused by overactive parathyroid glands producing too much of the aforementioned PTH. Possibly 99% of all persistently elevated calcium states are attributable to PTH excess. Other causes, which will often lead to more significant elevations in calcium levels, include forms of cancer (especially myeloma or cancer that has spread to bones) and a disorder of bone growth known as Paget's disease. Symptoms of high calcium levels include bone and abdominal pains, depressed mood, increased urine output and later (in severe situations) coma and even cardiac arrest.



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TSH - Normal

FT4 - Normal



The thyroid gland produces hormones that regulate the body's metabolic rate.

If the thyroid function is significantly overactive (usually high Free T4 and low TSH, but sometimes low TSH only) most people will experience symptoms such as diarrhoea, weight loss, rapid heart rate, and sweating and anxiety. If it is underactive (usually low Free T4 and high TSH, but sometimes high TSH only) symptoms will include tiredness, constipation, depression, and weight gain.

Sometimes, the TSH level will rise briefly in response to other illnesses – and in these situations the thyroid gland should not be considered to be at fault.



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Vitamin D - Sufficient Level



Vitamin D is a fat soluble vitamin that, unlike most other vitamins, can be created by the body – in this case from the action of sunlight on the skin. It is important for the regular functioning of a number of systems including bone and teeth integrity, and the immune system.

Lower level Vitamin D deficiency can lead to a number of non specific symptoms, including possibly chronic fatigue (experts have for many years noted an association between sufferers of chronic fatigue syndrome or myalgic encephalitis (CFS or ME) and low blood levels of Vitamin D). It has been estimated that between 50-70% of people living in the northern Europe (where daylight length reduces your chances of receiving adequate sunlight in the winter) are deficient in this vitamin by March each year. Symptoms of vitamin D deficiency include chronic pain, weak bones, frequent infections (recent research has detected an association between vitamin D deficiency and severe pneumonia), depression and fatigue. Persistently low Vitamin D levels will ultimately lead to low calcium levels too, but on the other hand high calcium caused by excess PTH will lead to a fall in Vitamin D in most cases.

High levels are usually the result of excess supplementation, but may rarely indicate the presence of sarcoidosis or lymphoma. Very high levels of Vitamin D may be toxic so it is important that guidelines regarding dosing are followed carefully.



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Vitamin B12 - High Level



Vitamin B12 is a water soluble vitamin that can be obtained easily through diet. It plays an important role in brain and nervous system function and in the formation of red blood cells.

The Vitamin B12 level is elevated. This is not likely to represent significant overdose, as B12 is well tolerated by the great majority of people – even in very high concentrations (as indeed are most water soluble vitamins). Excess levels are usually a result of supplementation or from following a diet rich in the vitamin. A few exceptions to this rule include those who suffer from a rare hereditary eye complaint known as Leber's disease. Too much vitamin B12 in these individuals can lead to damage of the optic nerve, which might lead to blindness. Anyone who is allergic to cobalt should also avoid taking vitamin B12 – as the vitamin contains a significant amount of this element. Rarely, high dose supplements or injections of Vitamin B12 cause diarrhoea, itching, blood clotting and allergic reactions. Liver disease and myeloproliferative disease (disorder of the bone marrow) can lead to elevated levels of B12. However, some practitioners advocate high doses of Vitamin B12 to help sufferers from Chronic Fatigue Syndrome (CFS) and to combat the development of Alzheimer's disease, amongst other conditions.

Folate - Normal



Folate (folic acid) is one of the B group of vitamins, and indeed is sometimes referred to as Vitamin B9. It is found abundantly in green vegetables in particular. The body's reserves of folate, unlike vitamin B12, are low and only sufficient for about four months.

Causes of deficiency include reduced intake from the diet or from poor absorption through the gut; increased

demand for folate (for example, pregnancy) and side effects of some medication (eg methotrexate). Symptoms include fatigue, mild sensation changes and depression. Prolonged lack of folate results in megaloblastic anaemia (in which the red blood cells are characteristically large).

Folate, as a water soluble vitamin like Vitamin B12, is well tolerated by the body, even in excess. In fact, high levels usually indicate simply excess supplementation. Excess folate in the presence of low Vitamin B12 levels can lead to problems however – the B12 deficiency can be masked by the action of folate which will apparently resolve the megaloblastic anaemia caused by deficiency of either vitamin, but will not resolve the effects of B12 lack. It is important therefore to ensure that the Vitamin B12 level is acceptable if a high Folate level is detected.