

Table 3.1: Symptoms of failing energy

Symptom	How this symptom prevents us spending energy (much more about mechanisms later)	Tick this box if you experience this
Physical fatigue	Stops us spending the energy we have not got; we slow down and rest up	
Mental fatigue	The brain weighs 2% of body weight but consumes 20% of total body energy production. If energy delivery is impaired, nerve conduction is slowed. Mental processing slows and so multi-tasking, problem-solving and much else decline. This is the starting point of brain failure or dementia, now the commonest cause of death in Westerners	
Pain	When energy delivery mechanisms are impaired the body switches into anaerobic metabolism. In the very short term this generates a little extra energy but at the price of lactic acid production. Lactic acid burn in muscles is very painful; it prevents gold medals being won	
Chest pain	Lactic acid burn in the heart results in the symptom of angina	
Deeply unpleasant mental symptoms such as:	The brain cannot and does not perceive pain, so it has to manifest with other symptoms to slow us down. It is biologically plausible that lactic acid burn and/or lack of the energy molecule ATP, in the brain, drive other nasty symptoms such as:	
– feeling stressed	This deeply unpleasant symptom arises when the brain knows it does not have the reserves to deal with demands. It drives us to major strategic lifestyle, energy-conserving changes, such as selling houses and ditching spouses	
– feeling depressed	This makes us antisocial (social interactions are demanding of energy). The depressed patient wants to be left alone, curl up in a corner and be miserable. We all feel a bit like this in the winter and this represents a primitive drive to conserve energy and so survive the winter. Being happy is great fun but costs energy	

Table 3.1: Symptoms of failing energy (cont.)

Symptom	How this symptom prevents us spending energy (much more about mechanisms later)	Tick this box if you experience this
– feeling anxious	This is the symptom the brain generates when it believes it will not have the energy to deal with demands	
– being angry and irritable	This inhibits others from making demands of us	
– looking tired and stressed, appearing angry and anxious	The face is the mirror of the mind, reflecting precisely our precious energy stores. Facial expression allows others to see our energy reserves – another essential survival technique	
Using social addictions to cope	Addictions mask symptoms. This is dangerous practice. Symptoms protect us from ourselves. Addictions give us the temporary and false impression that all is well. But as the dose diminishes, the devil returns, until of course we take another dose of our addiction. The obvious addictions are to ‘illegal’ and ‘legal highs’, such as cocaine, speed, nicotine, caffeine and alcohol, but the worst addiction in terms of morbidity and mortality is to sugars and starches. Once recognised as such, much pathology of Westerners is explained, and this starts with fatigue	
Using prescription drug addictions to cope	Psychiatrists have yet to wake up to the fact that most mental disorders start with poor energy equity which is followed by masking with addiction. Most drugs for psychological conditions add to this addictive load with the usual short-term gain, long-term pain outcome	
Energy-saving behavioural changes	Procrastination, going slow, choosing energy-saving tools – such as riding rather than walking. I was upset recently by the sight of a spherical child on an electric scooter	

Table 3.1: Symptoms of failing energy (cont.)

Pick up every cough, cold and tummy bug	The immune system, when activated to fight, consumes much energy	
Poor libido	The business of procreation, in all its phases, is hugely demanding of energy. If this is lacking, babies will not survive	
Poor posture	Standing correctly requires muscle power to keep us straight – which needs energy. As we run out of energy, we curl up and this starts with stooping.	

Table 3.2: Indications that your energy balance is tipped in your favour

Mechanism	Symptom	Put a cross in this box if this is NOT true for you
Good energy delivery to the body	Wake naturally, feeling on top of the world Have lots of energy to spend on doing things Feel well even at the end of a busy day	
Good energy delivery to the brain...	Feel confident, optimistic, easy-going, relaxed, patient, generous, sociable	
	Accept criticism	
	Feel nothing is too much trouble	
	Have a good sense of humour	
	Are quick witted	
	Make good decisions	
	Give love freely and without conditions attached	
	Are altruistic	
	Always have a new horizon, new interest or hobby	
...which is reflected in the face	Smile and laugh	
	Look 'attractive', possibly even 'beautiful'	
...and actions	Sing, whistle or hum	
	Walk with a spring in the step	
	Have expansive body language	
Good energy delivery to the immune system	Resist all infection! When all around are going down with some ghastly bug you are left standing.	

Table 6.1: Do you have metabolic syndrome? Tick the box on the right if you have these symptoms and signs – the more ticks, the more trouble

	Question	Comments	Score: tick if yes to any of these
History	Which foods regularly appear in your shopping basket?	Staples: bread, potatoes, pulses, pasta, biscuits, pastry, fruit, cereals? Snacks: cereal bars, nut bars, sweets, crisps, chocolate, biscuits, cake, buns?	
	What do you eat for breakfast?	Cereal, porridge, toast, fruit juice, bagel, croissant?	
	Do you snack in the day...?	...on any of the above?	
	What do you drink in the day?	Anything other than water, black or green tea or coffee? Do you have pop, fruit juice, anything with artificial sweeteners?	
	Would you suffer if you missed a snack or meal?		
	Do you need a sweet pudding to feel satisfied after your main meal?		
	Do you snack in the evening...	...on any of the above?	
Symptoms	Do you have any symptoms of fatigue...	...as detailed in Chapter 3 (page 16)?	
Signs	Are you overweight OR Do you struggle to lose weight?		
	Do you have dental disease?	Such as dental plaque, fillings, gum disease, tooth loss?	

Table 6.1: Do you have metabolic syndrome? (cont.)

	Question	Comments	Score: tick if yes to any of these
Signs	Is your jaw undershot?	You need to have or have had a dental brace, or been diagnosed with TMJ problems or poor bite (soft food means lack of chewing and so the jaw fails to develop)	
	Do you have 'man boobs'?		
Signs of fermenting gut	Do you suffer from indigestion, reflux or bloating?	See below	
	Are you apple shaped?	Beer bellies arise from the double whammy of high carbs and inoculation with yeast to ferment the carbs	
	Do you suffer from joint or muscle pain? Do you take paracetamol or NSAIDs?	Arthritis is also part of metabolic syndrome – I suspect this is an inflammatory process driven by microbes from the carb-fermenting upper gut	
Tests	Blood pressure high: >140/90 mm Hg		
	Fasting triglycerides >1.5 mmol/l		
	Low proportion of HDL to total cholesterol	Easily calculated by dividing HDL by total cholesterol; the result should be >35%	
	Fasting blood sugar >6.0 mmol/l		
	Glycosylated haemoglobin >36 mmol/l		
	Ultrasound shows fatty liver		

Table 6.2: The commonest reasons my patients give not to change

The patient's reason	My response
I already eat a healthy balanced diet with my five-a-day fruit and vegetables	You have been well and truly brainwashed by industry propaganda. Your education starts here. Health is defined by outcomes – and you are on your way to disease and premature death. 'Balanced' is without definition and so meaningless Fruit is a 'bag of sugar'. Many vegetables are a 'bag of carbs'
But I have always eaten like this – why change now?	It takes decades of metabolic syndrome before pathology bites. Lao Tsu, author of <i>The Art of War</i> , wrote ' <i>If you do not change direction you may end up where you are heading.</i> '
	Evolution is only interested in procreation – metabolic syndrome gets us that far then dumps us early on the evolutionary scrap heap, with cancer, heart disease and dementia. Nature does not care two hoots so long as the genetic Olympic flame has been passed on to the next generation
I wake late and have to leave for work so there is no time for anything other than a grabbed snack	Setting the alarm clock 30 minutes earlier is of proven benefit in improving sleep quality. Once established on the PK diet (see page 147), sleep improves further
I have no time to change my diet	Once established on the PK diet, you will only need two meals a day. You will not need to waste time on lunch and snacking
I have done the Atkins diet in the past and it did not work	The Atkins diet allows artificial sweeteners which maintain the sugar craving. It also allows dairy which is a common allergen

Table 6.2: The commonest reasons my patients give not to change (cont.)

The patient's reason	My response
I cannot prepare food for two different diets	If you really love your family, then they should all be eating PK! So should your dog and cat – meat, fish and eggs only please
I have tried this diet before and felt so ill that I could not carry on	That is a good sign – no addict can recover without going through withdrawal symptoms. Think of this as a healing crisis. If you really struggle to keto-adapt (see page 147), then you need our book <i>Ecological Medicine</i> as you may have a thyroid problem
I don't know what to eat	Read <i>The PK Cookbook</i> written by Yours Truly and Craig for precisely this reason
I just can't do it	If you do not do the PK diet, then really all other interventions are to no avail. The PK diet is non-negotiable. Do not waste my time (yes, I know that I am an angry, irritable old woman).

Table 7.1: Why mitochondria go slow and what to do about it

Mitochondria go slow because:	Car engines go slow because:	How to diagnose...	...and treat
They do not have the optimum fuel running...	You have put petrol into your diesel engine...	From the diet	PK diet
at the optimum rate	...and alternately starved the engine and/or flooded it	Ditto – wobbly blood sugar levels of metabolic syndrome	PK diet
They lack acetyl-L-carnitine which transports the acetate fuel from the body of the cell into mitochondria	The fuel pipe to the engine is narrowed	Blood tests for levels of acetyl-L-carnitine	Eat meat and/or supplement with up to 2 grams daily acetyl-L-carnitine
They lack oxygen to burn fuel where:	The air intake is narrowed		
<ul style="list-style-type: none"> • there is anaemia or poor circulation 		Blood test for anaemia	Find the cause of the anaemia
<ul style="list-style-type: none"> • there is severe obstructive airways disease 		Clinically obvious!	Find the cause
<ul style="list-style-type: none"> • there is poor blood supply 		Low blood pressure and/or symptoms of poor circulation	Find the cause
They lack vitamin B3 (niacin) and/or magnesium	The fuel cannot be ignited	Blood test for NADH	Niacinamide 1500 mg daily
		Blood test for red cell magnesium	Magnesium 300 mg daily. Vitamin D 10,000 iu daily

Table 7.1: Why mitochondria go slow and what to do about it (cont.)

Mitochondria go slow because:	Car engines go slow because:	How to diagnose...	...and treat
They lack co-enzyme Q10	There is no oil to reduce friction	Blood tests for coQ10	CoQ10 100-200 mg daily
They have been blocked by <ul style="list-style-type: none"> • a toxin or poison such as a heavy metal, pesticide or volatile organic compound (VOC)... • or immunoproteins stuck onto mitochondrial membranes 	<p>You have thrown a handful of sand into the workings, clogged it up in unpredictable ways, increased friction and accelerated ageing</p> <p>Ditto</p>	<p>Tests of toxicity – see our book <i>Ecological Medicine</i></p> <p>Look for a chronic infection – see our book <i>The Infection Game</i>. Suspect this if blood tests show inflammation – see Chapter 15, Getting your act together</p>	<p>Detox regimes work reliably well – see Chapter 12, The bare necessities</p> <p>Improve the immune defences. Use antimicrobials. Read <i>The Infection Game</i></p>
The control mechanisms are faulty	The accelerator pedal and gear box do not work	Read on for thyroid and adrenal problems	Take thyroid and adrenal glandulars

Table 7.2: How to look after your mitochondria

What to consider	How to optimise mitochondrial function
Fuel	PK diet
Acetyl-L-carnitine	Having sufficient should not be a problem for meat-eaters (meat is a rich source of carnitine) who are following a PK diet (you need an acid stomach to digest protein) Vegetarians should take acetyl-L-carnitine 500 mg daily Anyone on acid-blocking drugs should do the same
Co-enzyme Q10	100 mg daily is sufficient for most; take this with a fatty meal to enhance absorption With any pathology take 200 mg
Niacinamide	1500 mg daily With any pathology, from psychosis to heart disease, double the dose
D-ribose	Essential with any pathology Take 5-15 g daily but this must be part of the carbohydrate count of the PK diet (see Appendix 5)
Detox regime to get rid of toxic metals	Take a good multi-mineral, such as Sunshine salt, and combine with glutathione 250 mg Test for departing toxic metals by measuring urine elements following a dose of the chelating agent DMSA, 15 mg per kg body weight; this test is available through https://naturalhealthworldwide.com/lab-tests/
Detox regime to get rid of pesticides and VOCs	Once a week get very hot then wash sweat off in a bath or shower. If you are well enough to exercise then that is ideal, but sauna, far infrared sauna or a hot bath with Epsom salts are good too; these regimes are of proven benefit
Match energy demand to energy delivery	Read on – this is a thyroid and adrenal issue (see Chapter 8)
Enable service and repair	Read on – this is why sleep is so vital (see Chapter 9)
Work to increase numbers of mitochondria	Use it or lose it – <ul style="list-style-type: none"> • physical exercise produces lactic acid, and this stimulates the development of more mitochondria. • mental exercises such as crosswords, learning a new language or playing an instrument improve brain function. Thyroid hormones also determine the number of mitochondria (they give us a bigger engine)

Table 8.1: The dos and don'ts of using glandulars effectively

What	Why
You must be on a PK diet	With metabolic syndrome we see wobbly blood sugar levels. As blood sugar falls, adrenalin is released. Adrenalin plus glandulars may give all the symptoms of too much adrenalin – this is very uncomfortable and the commonest reason for intolerance of glandulars
Your average core temperature must be below 37°C. This is a reflection of thyroid function	Core temperature is a good measure of one's combined energy delivery mechanisms – i.e. the PK fuel in the tank, the mitochondrial engine, the thyroid accelerator pedal and the adrenal gear box. If core temperature is too high, then energy delivery is too fast. This occurs naturally when one runs a fever to deal with infection
The degree of wobble (the difference between the lowest temperature of the day and the highest) should be less than 0.5 of a degree C. This is a reflection of adrenal function	The adrenal gland matches energy delivery to demand on a second to minute to hours basis. Any mismatch is a waste of energy. That means there is less energy to spend on life
Your resting pulse rate must be below 85 bpm (beats per minute) (As you improve all energy delivery mechanisms, the pulse rate will come down to 70-75 bpm – this is because the heart can beat with greater power and so can run more slowly)	It is the thyroid gland that determines resting pulse rate. However, for patients who are severely fatigued, the resting pulse may be high – this is because when mitochondrial function is so poor the heart does not have the energy to beat powerfully so the only way it can increase output for basal metabolism is to beat faster. An extreme example of this is postural orthostatic tachycardia syndrome characterised by very low blood pressure that drops further on standing whilst the pulse races to compensate for the low cardiac output
Your resting blood pressure must be below 120/80 mm Hg	It is a feature of the severely fatigued patient that they have low blood pressure for the above reasons. High blood pressure is typical of metabolic syndrome (a further reason to go PK)
You are not functioning at your full potential because of fatigue	Keep a diary of which symptoms and how severe; it is easy to forget Note from Craig: From my experience, sometimes I forgot as a kind of internal coping mechanism, a way of surviving, almost a self-inflicted denial of how bad things were. My wife, Penny, tells me the same is true of childbirth

Table 8.2: The causes of thyroid dysfunction

Reasons for poor thyroid function	Why?	How to mitigate
There is no kick from the pituitary gland – this is called ‘secondary hypothyroidism’	This is the commonest form of hypothyroidism in my CFS patients. I suspect poisoning by chemicals, especially organophosphates (glyphosate – Roundup – is among these) and lack of vitamin B12 are important players	Avoid chemical exposure – try to eat organic Heating regimes to get rid of toxins
The thyroid gland lacks iodine to make thyroid hormones	Iodine deficiency is pandemic	Take iodine 1 mg daily
The thyroid has been poisoned by:		
• fluoride	...from fluoridated water, toothpaste and/or dental treatments	Avoid fluoride
• and/or bromide	...from polybrominated biphenyls (PBBs) used as fire retardants in soft furnishings	Avoid Heating regimes to get rid of bromides
• toxic metals: mercury, lead, cadmium and aluminium	These heavy metals bio-accumulate so past exposures are always significant: Mercury from dental amalgam, fish, vaccinations Lead from old water pipes, old paints Cadmium from cigarette smoke, water Aluminium from deodorants, vaccinations, cooking utensils	Avoid Take minerals, vitamin C and glutathione to help excrete these
• mycotoxins	...from water-damaged buildings and/or low-grade infection, most often chronic sinusitis	Avoid Measure urinary mycotoxins (see page 186)

Table 8.2: The causes of thyroid dysfunction (cont.)

Reasons for poor thyroid function	Why?	How to mitigate
The thyroid has been destroyed by autoimmunity	Autoimmune conditions now affect 20% of Westerners	The main risk factors for autoimmunity are vaccination, vitamin D deficiency and dairy products. Once the thyroid has been destroyed it cannot grow back; replacement therapy will be needed for life
The thyroid has been destroyed by infection	Infection may be viral, bacterial or fungal	Once the thyroid has been destroyed it cannot grow back; replacement therapy will be needed for life
Deficiency of selenium, zinc and/or iron	These minerals are necessary to allow the conversion of inactive T4 to active T3	Take daily multi-mineral such as Sunshine salt
Thyroid hormone receptor resistance (THRR)	The thyroid hormones are present, but the receptors are blocked; this may result in high levels of reverse T3 or toxic chemicals and heavy metals. I suspect there is an element of THRR as part of metabolic syndrome	Avoid toxic chemicals and heavy metals Mitigate toxic chemicals and heavy metals as above PK diet Measure reverse T3 – a high rT3 is one cause of THRR
A cocktail of some or all the above	...and this is usually the case!	Do your best with all the above Supplement with thyroid glandulars

Table 15.1: The benefits of the key interventions for good health

Intervention	Mitochondria	Thyroid Adrenals	Fermenting gut	Liver and kidney detox Antioxidants	Healing and repair	Emotional hole	Immuno- logical hole
The PK diet: go ketogenic (high fat and fibre; low carb and no sugar)	Fat, short- chain fatty acids (SCFAs) and ketones are the preferred fuel		Fibre gives us free energy. Fat requires minimal processing. (Sugar and starch risk fermentation)	Natural antioxidants in vegetables, berries and nuts	Essential raw materials	The adrenalin associated with metabolic syndrome makes us anxious (Carbs are addictive)	Essential raw materials (Sugar feeds infection)
The PK diet: go Paleo (no dairy or gluten grains)			(Milk and sugar can be fermented)		(Dairy increases the risk of osteoporosis)	(Dairy and wheat are addictive for some)	(Dairy and gluten are high risk for allergy and auto- immunity)
Sleep: time for healing and repair	Essential	Essential		Essential	Essential	Essential	Essential
Exercise	Increases numbers of mitochondria			Mobilises toxins	Builds muscle and bone		

Table 15.1: The benefits of the key interventions for good health (cont.)

Sunshine	Warms and gives us free energy	Determines our circadian rhythm		Mobilises toxins from fat	Accelerates healing and repair	Makes us happy with free energy	Kills all infections
Basic package (see page 147)	Magnesium and other essentials	Essential raw materials		Multivitamins Minerals	Essential raw materials	Essential raw materials	Essential raw materials
Vitamin D					Prevents osteoporosis		Anti-inflammatory
Extra supplements	Co Q10 Vitamin B3 Acetyl-L-carnitine D ribose	Iodine Zinc Selenium Iron (Fe) Glandulars		Glutathione	Bone broth Silica Boron		
Vitamin C to bowel tolerance	Mops up free radicals from burning fuel	Vitamin C for steroid hormone synthesis	Kills upper gut fermenters	The master antioxidant	Raw material for connective tissue		Vitamin C kills all microbes (as does iodine)
Heating regimes: – FIR sauna – exercise + shower – hot bath with Epsom salts	Give us free energy			Mobilise toxins from fat	Improve circulation Reduce friction	The cooling down after encourages sleep	Kill all infections

Table 15.2: Healthy reference ranges for tests

Test	My healthy range	What it means	Action
Full blood count	Haemoglobin 130-145 g/l women 145-160 g/l men	Low means: anaemia; this will be either because you are losing blood OR you are not making it fast enough because you are deficient in a raw material or lacking the energy for manufacture	See a doctor for a faecal occult blood test to check for gut losses... And for faecal calprotectin both of which may indicate pathology Heavy periods? Test ferritin levels to check for iron deficiency
		High: Smoker? Polycythaemia rubra vera? Carbon monoxide poisoning?	Measure vitamin B12 Stop smoking and re-check Check appliances and install a carbon monoxide monitor See a doctor
	MCV (mean corpuscular volume) more than 95 fl	Either you are hypothyroid OR a poor methylator	You need to do thyroid function tests Measure homocysteine. It is possible your GP can do this test. High homocysteine is a risk factor for fatigue but also arterial disease, cancer and dementia SO, this is an important test not least of all because if positive then we must screen all first-degree relative as high homocysteine runs in families

Table 15.2: Healthy reference ranges for tests (cont.)

		Postal delay between blood taking and blood testing may cause a false macrocytosis (enlargement of red blood cells)	Check time between sample taking and testing
	MCV below 85 fl	Iron deficient? Thalassaemia?	Check ferritin
	WCC (white cell count) $4-6 \times 10^3$ ul	The normal range is positively skewed	Wait and repeat; if constantly high, look for a cause of inflammation
	WCC below 4×10^3 ul	White cells are being used up fast to fight infection AND/OR Lack of raw materials AND/OR Lack of energy to make white cells	Improve energy delivery mechanisms Improve nutritional status Identify the infection (see <i>The Infection Game</i>) – the commonest offenders in CFS are Epstein Barr virus ('mono'), Lyme and mycoplasma
	Neutrophils $<3.2 \times 10^9$ /l	High associated with bacterial infection	
	Lymphocytes $<2 \times 10^9$ /l	High associated with viral infection	
Neutrophil to lymphocyte ratio	>2.5	This points to inflammation...	...but this result does not tell us why. Inflammation is a major risk factor for cardiovascular disease
Platelet to lymphocyte ratio	>140	Ditto – inflammation	...but we know not why
ESR (erythrocyte sedimentation rate)	below 5 mm/hour	Often the 'normal' lab range is up to 20! Again this means inflammation...	...but we know not why. Ditto above. Work out the why and re-check

Table 15.2: Healthy reference ranges for tests (cont.)

Test	My healthy range	What it means	Action
C reactive protein (CRP)	Less than 1 nm/l	Often the 'normal' lab range is said to be <5, but this is too high This is another inflammatory marker	If you are consuming carbs then you will be in a state of mild to moderate inflammation so adopt the PK diet
Total cholesterol	4.5-7.0 mmol/l for men 5.0-8.0 for women	Cholesterol is an essential raw material for all membranes, the brain and immune system. 'Desirable' ranges are set far too low to encourage doctors to prescribe statins. Too high a total cholesterol is a symptom of vitamin D deficiency and/or hypothyroidism	Address vitamin D deficiency: we should all be taking at least 5000 and up to 10,000 iu daily Test for thyroid hormone levels
		Too low is a major risk factor for psychiatric disease including depression – cholesterol is essential for the brain; high cholesterol protects against dementia; too low suggests over-dosing with statins or similar	Eat a PK high-fat diet
– Low density lipoproteins (LDL)	3.0-4.5 mmol/l	LDL is an essential carrier to deliver cholesterol, phospholipids and triglycerides from the liver to cells for healing and repair; it is not a 'bad' fat. High LDL is inversely associated with mortality in most people over 60 years	Eat a PK high-fat diet

Table 15.2: Healthy reference ranges for tests (cont.)

– Tri-glycerides	Less than 1 mmol/l (this must be a fasting sample)	Insulin brings down blood sugar by shunting it into storage as triglycerides; high triglycerides occur with high-carb diets	Eat a PK high-fat diet
HDL as a %age of total cholesterol (high-density lipoprotein, calculated by dividing HDL cholesterol by total	>40% of total cholesterol	If the percentage of the friendly HDL is low, this means HDL is being used up in the business of healing and repairing arteries – i.e. they are being damaged by something; this may be metabolic syndrome and/ or high homocysteine and/or chronic inflammation	Put in place interventions then repeat test to check progress. The higher this result, the better – on a good PK diet I expect this to be 40%. A poor HDL %age is a symptom of arterial disease, not a cause
Electrolytes:			
– Sodium	139-142 mmol/l	If low this suggests lack of salt in the diet or losing salt due to diuretics or kidney failure	Adopt a PK diet – on a PK diet the need for salt increases – aim for 5 grams daily of Sunshine salt (page 150)
– Potassium	4.0-4.4 mmol/l Below 4.0	If very high this may be due to a delay in transport Too little in diet	Check time between sample taking and testing The body cannot store potassium – you have to eat it daily; there is plenty in a PK diet and Sunshine salt
– Serum magnesium	At least 0.8 mmol/l	Rarely done. Not a reliable test of body stores. Most doctors do not understand the difference between a serum magnesium and a red cell magnesium. Serum levels must be kept within a tight range, or the heart stops. Therefore, serum levels are maintained at the expense of red cell levels	If below 0.6 then you are in serious trouble and need urgent medical attention To correct take magnesium 300 mg daily and vitamin D 10,000 iu daily Improve energy delivery mechanisms

Table 15.2: Healthy reference ranges for tests (cont.)

Test	My healthy range	What it means	Action
– Creatinine	Below 115 umol/l	High protein diet and/ or high muscle mass Poor kidney function	Reduce protein intake and re-check Look for causes of kidney damage – glyphosate is one such
	Above 65 umol/l	Low protein diet and/ or low muscle mass Many CFS/ME patients have low creatinine as they have low muscle mass and cannot exercise	If there is no good reason for low muscle mass, then increase the protein intake
- Urea	4-7 mmol/l	High means dehydration May accompany high creatinine	You need water AND fat AND salt to be properly hydrated
- Uric acid	Below 320 umol/l (men) and 260 (women)	Uric acid is also a mycotoxin	If high, look for a fungal issue, possibly fermenting gut. Many anti-gout drugs work because they are antifungal
12-hour fasting glucose	Below 5.0 mmol/l	If higher you are starting to lose control of your blood sugar and are on the way to diabetes	Adopt a PK diet
Glyco-sylated haemoglobin	Less than 5.5% Less than 34 mmol/mol (Ranges have changed recently because nearly all Westerners eat too much carb and are on the way to diabetes)	A very useful test of average blood sugar over the previous three months. This is a great test of how well you are doing a PK diet	Adopt a PK diet and stick to it

Table 15.2: Healthy reference ranges for tests (cont.)

		How does the NHS deal with this? By moving the goal posts. It is now considered acceptable to have a fasting glucose up to 7 mmol/l and a glycosylated Hb of 48	
Liver function tests:			
- GGT - AST - ALT	Below 20 U/l Below 20 U/l Below 20 U/l	If high then this is enzyme induction to deal with toxins, not liver damage	Look out for the source of the toxins: – from alcohol or other such drugs? – from toxins from the outside world? – from products of the upper fermenting gut?
– Alkaline phosphatase	Below 80 U/l	If high suggests tissue damage, typically liver, gallbladder or bones	Find the cause
– LDH	Below 175	Ditto above. May also indicate muscle or heart damage I suspect where there are poor energy delivery mechanisms with early switch into anaerobic metabolism, this enzyme is induced	Find the cause Improve energy delivery mechanisms
– Bilirubin	Below 10 umol/l	Higher suggests poor detoxification via the glucuronide pathway so you will be more susceptible to toxic stress. When it is above 19 this is called Gilbert’s syndrome	Identify the cause of the toxic stress and mitigate – see Chapter 13. Take glutathione 250 mg for life to improve liver detox. Since we live in a toxic world, I think we should all be taking this

Table 15.2: Healthy reference ranges for tests (cont.)

Test	My healthy range	What it means	Action
Bone: – Corrected calcium	2.35-2.45 mmol/l	Any lower suggests vitamin D deficiency. This is very common; we all need to take 5-10,000 iu daily	Sunshine salt has 5000 iu of vitamin D per 5 gram daily dose. Do not take calcium supplements – there is plenty in food - you just need to be able to absorb it with vitamin D. Too much calcium blocks magnesium absorption
		Normal ‘bone markers’ do not exclude osteoporosis	The best test for osteoporosis is a heel bone density scan which is accurate and involves no dangerous X-rays
Ferritin	100-250 pmol/l (for women) 150-350 pmol/l (for men and post-menopausal women) (Menstruating women run a lower ferritin level. Many doctors consider that a ferritin as low as 12 pmol/l is acceptable)	You are losing blood OR lacking iron (possibly due to lack of iron in the diet (meat) or malabsorption – you need an acid stomach to absorb iron. One cause of this is upper fermenting gut due to too much carb in the diet)	Adopt a PK diet Vitamin C to bowel tolerance
PSA (prostate specific antigen)	Age 40-49: up to 2.5 ng/ml Age 50-60: up to 3.5 ng/ml Age 60-70: up to 4.5 ng/ml (‘ng/ml’ and ‘µg/l’ are the same)	The PSA reflects the amount of prostate tissue; it is the rate of change that suggests malignancy	Do the PK diet – the growth promoters are carbs and dairy. Re-check at one-month intervals to see the rate of change

Table 15.2: Healthy reference ranges for tests (cont.)

Vitamin B12	I like to see this above 1000 pg/ml ('Normal' ranges simply reflect the level which prevents pernicious anaemia)	You need more for optimum biochemistry	Sunshine salt has 5000 mcg per daily dose (the risible RDA for B12 is set at 1-3 mcg)
Homo-cysteine	I like to see this below 10 µmol/l (many lab reference ranges are less than 15)	High homocysteine means poor methylation. This is an essential biochemical tool to allow one to 'read' DNA, detoxify, synthesise enzymes and proteins and do much more. Being a poor methylator is a MAJOR risk factor for arterial disease, dementia, cancer and degenerative disease	To normalise you need methylated B vitamins – that is to say, methyl B6 (pyridoxal 5 phosphate), methyl folate (methyl tetrahydrofolate) and methyl B12
Thyroid hormones:			
– TSH	I like to see this below 1.5 mU\l (The 'normal' range is negatively skewed. In the UK treatment is not given until the TSH is above 10)	A TSH tells us little but it is relied upon too heavily by many doctors to determine the dose of thyroid hormone.	See Chapter 8 plus our book <i>Ecological Medicine</i> for much more detail
– Free T4	I like to see this above 16 pmol/l		See Chapter 8 plus our book <i>Ecological Medicine</i> for much more detail

Table 15.2: Healthy reference ranges for tests (cont.)

Test	My healthy range	What it means	Action
	(My lab range is 12-22; some NHS ranges are 7-14. But some people do not feel well until running at 30 pmol/l)		
– Free T3	I like to see this above 4.0 pmol/l	Where there is thyroid hormone receptor resistance blood tests are misleading	See Chapter 8 <i>See Ecological Medicine for much more detail</i>
		If T3 is low compared with T4, this suggests poor conversion of inactive T4 to the active T3 – that is, T3 hypothyroidism	See Chapter 8 <i>See Ecological Medicine for much more detail</i>
– Reverse T3	10-24 ng/dl	A high level relative to the free T3 points to thyroid hormone receptor resistance – in this event the blood tests are not helpful	You must rely on the clinical picture to determine the dose of thyroid hormone. See <i>Ecological Medicine</i> for much more detail
– All		If TSH is high despite good levels of T4 and T3 then this points to thyroid hormone receptor resistance	See Chapter 8 <i>See Ecological Medicine for much more detail</i>

Table A2.1: Groundhog Basic

What to do	Notes
The Paleo-ketogenic diet – high fat, high fibre, very low carb – probiotic foods like kefir and sauerkraut – no dairy or grains – two meals a day with no snacking	See our books <i>Prevent and Cure Diabetes – delicious diets not dangerous drugs</i> for the WHY and <i>The PK Cookbook – go paleo-ketogenic and get the best of both worlds</i> for the HOW
A basic package of nutritional supplements – multi-vitamins, multi-minerals and vitamin D	A good multi-vitamin and Sunshine salt 1 tspn daily with food. 1 dsp hemp oil
Vitamin C	Dissolve 5 g vitamin C (ascorbic acid) in 500 ml mineral water and sip throughout the day; vitamin C has a short half life
Sleep 8-9 hours between 10:00 pm and 7:00 am	More in winter, less in summer
Exercise at least once a week when you push yourself to your limit	It is anaerobic exercise that produces lactic acid and stimulates the development of new muscle fibres and new mitochondria
Herbs, spices and fungi in cooking	Use your favourite herbs, spices and fungi in cooking and food, and lots of them – Yum yum!
If fatigue is an issue – address energy delivery mechanisms as best as you can	See our book <i>Diagnosing and Treating Chronic Fatigue Syndrome and Myalgic Encephalitis: it's mitochondria not hypochondria</i>
Heat and light	Keep warm; sunbathe at every opportunity
Use your brain	Foresight: Avoid risky actions like kissing,* unprotected sex Caution: Avoid vaccinations; travel with care Circumspection: Do not suppress symptoms with drugs; treat breaches of the skin seriously.

Table A3.1: Groundhog Acute

What to do	Why and How
<p>The Paleo-ketogenic diet</p> <ul style="list-style-type: none"> – high fat, high fibre, very low carb – probiotic foods like kefir and sauerkraut – no dairy or grains – two meals a day with no snacking 	<p>See our books <i>Prevent and Cure Diabetes – delicious diets not dangerous drugs</i> for the WHY and <i>The PK Cookbook – go paleo-ketogenic and get the best of both worlds</i> for the HOW</p>
<p>You may consider a fast – this is essential for any acute gut infection. Drink rehydrating fluids – that is, Sunshine salt 5 g in 1 litre of water ad lib</p>	<p><i>‘Starve a cold; starve a fever’</i> (No, not a typo – starve any short-lived infection)</p>
<p>Vitamin C to bowel tolerance. The need for vitamin C increases hugely with any infection. Interestingly our bowel tolerance changes so one needs a much higher dose to get a loose bowel motion during an infection. If you do not have a very loose bowel motion within one hour of taking 10 g, take another 10 g. Keep repeating until you get diarrhoea. Most of us need 3-4 doses to abolish symptoms</p>	<p>Vitamin C greatly reduces any viral, or indeed any microbial, load in the gut (be aware that some of the infecting load of influenza virus will get stuck onto the sticky mucus which lines the lungs and is coughed up and swallowed). Vitamin C improves the acid bath of the stomach. Vitamin C protects us from the inevitable free-radical damage of an active immune system (see Appendix 5 for more detail.)</p>
<p>A good multi-vitamin Sunshine salt 1 tspn daily in water 1 dsp hemp oil</p>	<p>Sunshine salt in water because you should be fasting at a ratio of 5 g (1 tsp) in 1 l water to provide a 0.5% solution</p>
<p>Take Lugol’s iodine 12%: 2 drops in a small glass of water every hour until symptoms resolve. Swill it round your mouth, gargle, sniff and inhale the vapour</p>	<p>It is well documented that 30 seconds of direct contact with iodine kills all microbes</p>

Table A3.1: Groundhog Acute (cont.)

What to do	Why and How
<p>With respiratory symptoms, put 4 drops of Lugol's iodine 12% into a salt pipe and inhale for 2 minutes; do this at least four times a day. Apply a smear of iodine ointment inside the nostrils</p>	<p>As above, 30 seconds of direct contact with iodine kills all microbes. This will contact-kill microbes on their way in or on their way out, rendering you less infectious to others</p>
<p>Apply iodine ointment 10% to any bite, skin break or swelling</p>	<p>Again, iodine contact-kills all microbes and is absorbed through the skin to kill invaders</p>
<p>Consume plenty of herbs, spices and fungi</p>	<p>If you are still struggling, then see <i>The Infection Game – life is an arms race</i> for effective herbal preparations and how to deal with complications of infection</p>
<p>Rest – listen to your symptoms and abide by them – sleep is even more important with illness</p>	<p>I see so many people who push on through acute illness and risk a slow resolution of their disease with all the complications that accompany such. The immune system needs the energy to fight! I find vitamin C to bowel tolerance combined with a good night's sleep has kept me cold free and flu free for 35 years</p>
<p>Heat – keep warm</p>	<p>Fevers kill all microbes. Some people benefit from sauna-ing. Do not exercise!</p>
<p>Light – sunshine is best</p>	<p>Sunbathe if possible</p>
<p>Use your brain – do not suppress symptoms with drugs</p>	<p>Symptoms of infection help the body fight infection. Anti-inflammatory drugs inhibit healing and repair – they allow the microbes to make themselves permanently at home in the body</p>
<p>If you develop other acute symptoms...</p>	<p>...see <i>The Infection Game – life is an arms race</i> But all treatments start with Groundhog Acute.</p>

Table A3.2: What to keep in your Battle First Aid box

When	What
For acute infections	Vitamin C as ascorbic acid at least 500 g (it is its own preservative so lasts for years) Lugol's iodine 15% – at least 50 ml (it is its own preservative so lasts for years)
Conjunctivitis, indeed, any eye infection	Iodine eye drops e.g. Minims povidine iodine 5% OR 2 drops of Lugol's iodine 15% in 5 ml of water; this does not sting the eyes and is the best killer of all microbes in the eye
Upper airway infections	Lugol's iodine – to be used in steam inhalation, OR Salt pipe into which drizzle 4 drops of Lugol's iodine 15% per dose
Skin breaches	Salt – 2 tsp (10 g) in 500 ml water (approx 1 pint) plus 20 ml Lugol's iodine 15%. Use ad lib to wash the wound. Once clean, allow to dry and then smother with iodine oil (coconut oil 100 ml with 10 ml of Lugol's iodine 15% mixed in) . Plaster or micropore to protect
Fractures	If the skin is broken – as for Skin breaches above Immobilise If the limb is fractured, wrap in cotton wool to protect and bandage abundantly with vet wrap to splint it Next stop... casualty
Burns	As for skin breaches above If a large burn, then use cling film to protect once cleaned (put the iodine ointment on the cling film first, then apply to the burn) Protect as per fracture above. For a very large burn... next stop casualty
All injuries involving skin breaches	Sterile dressings: Melolin is a good all-rounder Large roll of cotton wool Crêpe bandages (various sizes) Micropore tape to protect any damaged area from further trauma Vet wrap bandage – this is wonderful stuff, especially if you are in the wilds, to hold it all together

Table A3.2: What to keep in your Battle First Aid box (cont.)

When	What
Gastroenteritis	Sunshine salt: To make up a perfect rehydration drink mix 5 g (1 tsp) in 1 litre of water to give a 0.5% solution
Urine infections	<p>Multistix to test urine</p> <p>D-mannose: One typical product is Now Foods D-Mannose (available from iHerb), 500 mg, 120 veg capsules – take 3 x 500 mg capsules one to three times a day</p> <p>Potassium citrate: some example products with their respective doses are:</p> <ul style="list-style-type: none"> • Effervescent tablets (brand Effercitrate) – take two tablets, up to three times a day, dissolved into a whole glassful of water. • Liquid medicine (brand Cymaclear) – take two x 5 ml spoonfuls, stirred into a whole glassful of water. You can take up to three doses a day. • Sachets (brand Cystopurin) – empty the contents of one sachet into a whole glassful of water. Stir it well before drinking. Take one sachet, three times daily
Bacterial infections	<p>Consider acquiring antibiotics for intelligent use. These should not be necessary if you stick to Groundhog Basic and apply Groundhog Acute</p> <p>BUT I too live in the real world and am no paragon of virtue, so, if you slip off the band wagon:</p>
– Dental	Amoxil 500 mg x 21 capsules
– ENT and respiratory	Cephalexin 500 mg three times daily
– Diverticulitis	Doxycycline 100 mg twice daily (DO NOT USE IN PREGNANCY OR FOR CHILDREN)
– Urinary	Trimethoprim 200 g twice daily
– Any	If you are susceptible to a particular infection, then make sure you always hold the relevant antibiotic; the sooner you treat, the less the damage, but always start with Groundhog Acute

Table A4.1: Groundhog Chronic

What to do	Why	What I do
		<i>My patients always ask me what I do. I am no paragon* of virtue, but I may have to become one eventually!</i>
<p>The Paleo-ketogenic (PK) diet – high fat, high fibre, very low carb. Probiotic foods like kefir and sauerkraut. No dairy or grains. Two meals a day and no snacking. Source the best quality foods you can find and afford – organic is a great start!</p>	<p>See our books <i>Prevent and Cure Diabetes – delicious diets not dangerous drugs</i> for the WHY and <i>The PK Cookbook – go paleo-ketogenic and get the best of both worlds</i> for the HOW</p>	<p>Yes. I do the PK diet 95% of the time. Glass of cider at weekends! Other liberties if eating out or socialising. But my friends are all becoming PK adapted too!</p>
<p>Eat daily food within a 10-hour window of time...</p>	<p>...so 14 hours a day when stomach is empty – this keeps the stomach acid and so decreases the chances of microbes invading. Maintains ketosis.</p>	<p>Nearly there... breakfast at 8:00 am, supper 6.30 pm</p>
<p>Consider episodic fasting one day a week</p>	<p>This gives the gut a lovely rest and a chance to heal and repair</p>	<p>I do this some weeks. The trouble is I am greedy and love food!</p>
<p>A basic package of nutritional supplements – multi-vitamins, multi-minerals and vitamin D</p>		<p>A good multi-vitamin and Sunshine salt 1 tspn daily with food 1 dsp hemp oil</p>
<p>Glutathione 250 mg daily Iodine 25 mg weekly</p>	<p>We live in such a toxic world we are inevitably exposed. Glutathione and iodine are helpful detox molecules (some people do not tolerate iodine in high doses)</p>	<p>Yes</p>

Table A4.1: Groundhog Chronic (cont.)

What to do	How and Why	What I do
Vitamin C to 90% of bowel tolerance (BT); dissolve your bowel-tolerance amount in mineral water and sip throughout the day. Vitamin C has a short half life. Remember BT will change with age, diet and circumstance	With age, influenza becomes a major killer. With Groundhog you need never even get it!	I currently need 8 grams in 24 hours BUT I never get colds or influenza that last more than 24 hours
Lugol's iodine 15% 2 drops daily in water	Swill round the mouth and swallow last thing at night	Yes
Make sure your First Aid box is stocked	So, you have all your ammo to hand to hit new symptoms hard and fast	Yes – even when I go away, I take this – often to treat sickly others!
Sleep 8-9 hours between 10:00 pm and 7:00 am Regular power nap in the day	More in winter, less in summer Good sleep is as vital as good diet	Yes
Exercise within limits. By this I mean you should feel fully recovered next day. If well enough, once a week push those limits, so you get your pulse up to 120 beats per min and all your muscles ache. It is never too late to start!	No pain no gain. Muscle loss is part of ageing – exercise slows this right down Helps to physically dislodge microbes from their hiding places (I suspect massage works similarly)	Yes. Thankfully I am one of those who can and who enjoys exercise
Take supplements for the raw materials for connective tissue such as glucosamine. Bone broth is the best!	With age we become less good at healing and repair	Yes

Table A4.1: Groundhog Chronic (cont.)

Herbs, spices and fungi in cooking	Use your favourite herbs, spices and fungi in cooking and food, and lots of them!	Yes... Because I love food!
Consider herbs to improve the defences – see <i>The Infection Game: life is an arms race</i>	Astragalus, cordyceps and rhodiola	Sometimes when in stock and I remember
Address energy delivery mechanisms as below	See our book <i>Diagnosing and treating Chronic fatigue syndrome and myalgic encephalitis: it's mitochondria not hypochondria</i>	Yes Craig – I've got the book!†
Take the mitochondrial package of supplements daily vis: CoQ10 100 g, niacinamide slow release 1500 mg, acetyl-L-carnitine 500 mg. D ribose 5-10 grams at night if you have really overdone things	With age fatigue becomes an increasing issue because our mitochondrial engines start to slow. The ageing process is determined by mitochondria. Look after them!	Yes with the exception of carnitine because I eat meat and my digestion is good
Mitochondria may be going slow because of toxins – consider tests of toxic load to see if you need to do any detox	A good all-rounder is Genova urine screen with DMSA 15 mg per kg of body weight. You can get this test through https://naturalhealthworldwide.com/	This is the only test I have ever done on myself! It showed background levels of toxic minerals
Check your living space for electromagnetic pollution	You can hire a detection meter from Healthy House www.healthy-house.co.uk/electro/meters-and-monitors	Yes. The cordless phone has gone! I never hold a mobile phone to my ear – I use the speaker Turn wifi off at night

Table A4.1: Groundhog Chronic (cont.)

What to do	How and Why	What I do
<p>Review any prescription medication – they are all potential toxins The need for drugs is likely to be symptomatic of failure to apply Groundhog</p>	<p>Ask yourself why you are taking drugs? See our book <i>Ecological Medicine</i>. Once Groundhog is in place many drugs can be stopped. Taking prescription drugs is the fourth commonest cause of death in Westerners</p>	<p>I never take symptom-suppressing medication. This has allowed full and now pain-free recovery from three broken necks (horses again) and other fractures</p>
<p>Consider tests of adrenal and thyroid function since these glands fatigue with age and chronic infection</p>	<p>Thyroid bloods tests and adrenal saliva tests available through https://naturalhealthworldwide.com/ Core temperatures are helpful for fine-tuning adrenal and thyroid function with glandulars. See Chapter 8</p>	<p>I find glandulars very helpful and currently take thyroid glandular 60 mg in the morning and 30 mg midday Adrenal glandular 500 mg once daily</p>
<p>Heat and light</p>	<p>Always keep warm. Sunbathe at every opportunity. Holidays in warm climates with sunbathing and swimming are excellent for killing infections and detoxing</p>	<p>I am a pyromaniac! My kitchen is lovely and warm with a wood-fired range. I work in my conservatory with natural light. I sunbathe as often as wet Wales permits. Do not forget hyperthermia and light as a good treatment for chronic infections – see Chapter 11</p>
<p>Use your brain</p>	<p>Foresight: Avoid risky actions like kissing, unprotected sex. Caution: Avoid vaccinations. Choose travel destinations with care. Circumspection: Do not symptom-suppress with drugs; treat breaches of the skin seriously.</p>	<p>I have to say that with age this is much less of an issue! No vaccinations. No foreign travel except to the Continent to see my daughter and to do lectures.</p>