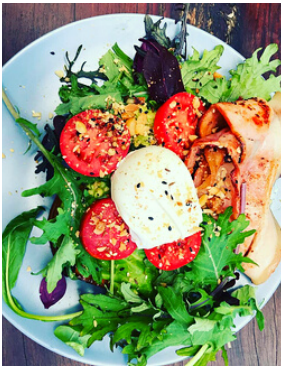
NUTRITION PRINCIPLES



GET FIT. GET STRONG. GET HEALTHY.

My food philosophy is pretty simple. I don't care which dietary pattern you follow, I just care that you get healthy, improve your relationship with food, that you find something that works for you and that it can be sustained long term. So whether you eat low fat, low carb, paleo or whatever you feel like; you can make it work with a little thought and planning.

When it come to food there are a few really important points to consider:

- there are no good or bad foods (food is amoral)
- you are not naughty for eating certain foods
- you didn't have a bad weekend if you enjoyed some meals out with your friends or family
- you're not better or worse for eating a certain way
- junk food can absolutely be included in a healthy diet
- alcohol can absolutely be included in a healthy diet
- there are many dietary paths to good health
- if you don't stick to it, it doesn't work
- your dietary preference is ultimately the key to long-term weight loss, as this will be what determines your ability to stick to it

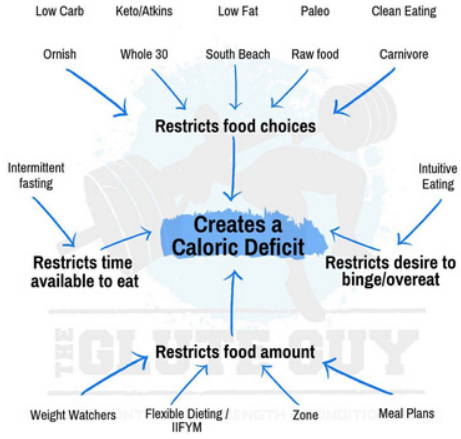
And, when it comes to losing weight there is only one thing that matters.....(DRUM ROLL) .....an energy deficit (or a calorie deficit)!

So far, we only know of one way to lose weight (outside of amputation, liposuction, giving birth etc. ☺) and that is to create an energy deficit with your food and your movement. The controversy that surrounds diets is NOT about creating an energy deficit; but rather with HOW we create that energy deficit. Low carb, low fat, keto, paleo etc. are all ways to achieve it, there is nothing inherently magical about any particular way of eating. What I have experienced, with low carb, is that it is particularly filling which means I don't eat as frequently. The higher fat and protein keeps me fuller for longer, so the energy deficit is achieved naturally through eating fewer meals.

There are two key ways to achieve an energy deficit: continuous energy restriction (usually achieved with calorie counting) or intermittent fasting (IF). My preference is for fasting, as I find it easier to stick to. You can read more about calorie counting and IF in my nutrition key concepts PDF and decide which one would suit you more.

In our programs, we don't care what method or diet you choose to follow, we will support and help you figure out what works best in your situation.

Below is an infographic that was shared on Bret Contreras' Instagram account recently. It nicely depicts that all diets achieve weight loss success via an energy deficit.



So to summarise, you can calorie count or intuitively eat - both are completely acceptable. Neither are right or wrong - they are only right or wrong for you.

And when it comes to which dietary pattern to follow, you can choose low carb, low fat, paleo or just refuse the label and just eat healthy for you! ☺

Over the next few sections, I will be sharing some information on the following topics:

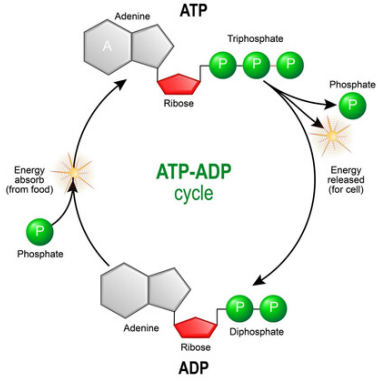
- energy
- macronutrients
- micronutrients
- water
- eating for health and weight loss

If you're only interested in getting your personalised nutrition data, then flick over to your Personalised Nutrition PDF where I have your calculations. Otherwise happy reading and I hope you learn a bit along the way!

What I have found, over the years, is that there is some confusion around what is meant by the term energy and how this is different to calories. Very simply put, calories (or kilojoules) is the unit of measure assigned to the energy in food. In a lab, this is measured by setting the food on fire and seeing how much it changes the temperature of a volume of water. The greater the increase in the temperature of water, the greater the energy in the food.

From an exercise perspective, we often talk about how many calories we're burning but this is not quite correct. The energy we get from food is actually in the wrong "currency" and we need to do an exchange. The human body does not use calories from food directly, but rather uses it to make a high-energy molecule called adenosine triphosphate (ATP). It is ATP that we use to fuel the 100 trillion cells in our body!

Over the next page, there is a very simple diagram explaining how this works.



Now you'll notice there is another molecule called ADP. This is adenosine diphosphate (i.e. two phosphates). We use the energy from food, to add another phosphate onto it, which makes it into adenosine triphosphate (i.e. three phosphates). ATP is the energy currency of the body. Next, the third phosphate breaks away, which frees the energy (the energy is stored in the bonds holding the molecules together) enabling all cellular processes to occur such as muscle contractions, hormone and enzyme synthesis, digestion etc.

This conversion of ADP to ATP is continual and happening everywhere in our body, trillions of times a day. It is limitless, so long as enough energy comes in from food.

And this brings me back to calories. When we calorie count, we base how much we can eat on an equation that predicts how much food energy (calories) we need each day to stay healthy (i.e. keep the ADP - ATP conversion happening), but in an energy deficit (to lose weight) or in energy balance (to maintain weight) or in an energy surplus (to gain weight). This equation is called an energy expenditure equation and was developed through a process called direct calorimetry. Direct caliometry measures energy expended in the form of heat by placing a person in a sealed room for 24 hours and measuring the production of body heat. The person is allowed to consume food during the 24 hour period and scientists are able to directly measure how much energy was consumed vs how much heat was produced. From this testing, energy balance was discovered and that to lose weight, an energy deficit was required (i.e. you need to be using up more energy than you're taking in).

However, keep in mind that direct calorimetry, for all its accuracy and specificity, is only accurate and specific to the situation it was measured in. As an example, if the testing was done in a room and your ability to move around was restricted, your energy expenditure is only reflective of this situation. When you're able to move freely around and have limitless choices for food, of course your energy expenditure will change as will your energy intake. This obviously makes energy expenditure in the real world more challenging to predict.

I also don't know about you, but for me, no two days are alike. One day I might live like a sloth, whereas other days I'm on my feet all day chasing around after kids (or clients). It can be incredibly varied.

This is where some common sense MUST come into the picture. Food is the fuel we need to move our bodies. If we move less, we eat less. If we move more, we eat more. On days when you're resting, you should adjust your diet accordingly as you will need to on days when you train.

So back to energy calculations, the equation commonly used is the St Jeor-Mifflin equation, which was developed in the 1990's. This equation found that lean body mass was the best predictor of energy expenditure, which meant that people with a higher muscle mass, tend to have a higher basal metabolic rate. Our metabolism is just one of the three broad ways in which we expend energy.

1.Basal metabolic rate or BMR (~60-70%)

Basal metabolic rate is the energy cost associated with keeping all our life-sustaining processes occurring over a 24-hour period. It is the energy we use to keep all of our cells running, and with over 100 trillion cells in our body, there is a considerable amount of energy used in metabolic processes.

2. All movement (~20-30%)

This includes structured exercise, physical activity, spontaneous activity and non-exercise activity thermogenesis (NEAT), which is essentially things like jiggling our leg, standing, typing on a keyboard etc.

3. Thermic effect of food (~10%)
This is the energy cost associated with the metabolism (break down and absorption) of energy from food.

What's really interesting in all of the this is that physical activity (especially cardio) is not the calorie burner we think it is! However, as I mentioned earlier, the St Jeor-Mifflin study found that lean body mass has a higher correlation to metabolic rate and as our metabolism accounts for such a high proportion of our daily energy expenditure, it makes sense we would eat and train in a way to improve this. Weight training and adequate protein intake significantly improves lean body mass (which influences BMR), hence why they are so strongly encouraged in our programs.

And for those who are interested in calorie counting, this will help with your calculations:

1 Calorie = 4.2kJ
Carbohydrate: 4 cal/g (17kJ/g)
Protein = 4 calories/gram (17kJ/g)
Fat = 9 calories/gram (38kJ/g)
Alcohol = 7 calories/gram (29kJ/g)

So to summarise the section on energy, we digest our food which releases the energy stored in it (calories), which we then use in the process of turning ADP into ATP. Then the third phosphate in ATP is broken away, which releases the stored energy that we then use in all cellular processes. When we count calories, we do so based on an equation that predicts how much food energy we need to stay healthy whilst trying to achieve our weight goals. PHEW!

Now that we have an understanding of energy (I hope) let's move onto the nutrients.

Macronutrients

The macronutrients are the organic, energy yielding nutrients. This simply means they provide energy to our bodies after being broken down during the digestion process. Carbohydrates and protein provide 4 calories per gram whereas fat provide 9 calories per gram. For good health, macronutrients are required to consumed in large enough quantities (hence "macro").

Micronutrients

The micronutrients are the inorganic, non-energy yielding nutrients; or vitamins and minerals. So whilst micronutrients do not directly contribute energy to the body, they are essential for all energy making processes to occur. For good health, we require micronutrients in much smaller volumes than the macronutrients.

Scientifically, carbohydrates are compounds composed of carbon, oxygen and hydrogen arranged as monosaccharides (single sugar) or multiple monosaccharides (disaccharides and polysaccharides). Most carbohydrates have a ratio of one carbon molecule (carbo) to one water molecule (hydrate).

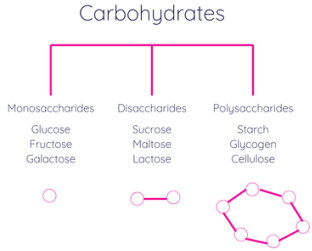
The four major functions of carbohydrates are:
1. Energy production
2. Energy storage
3. Macromolecule building
4. Sparing the burning of protein and fats.

Carbohydrates are mostly used in making energy however, they also play important roles in cell-signalling, immune-function and more.

The media often discuss carbohydrates in terms of simple and complex. What is actually meant by this is:

Simple carbohydrates i.e. sugars: which are monosaccharides (glucose) or disaccharides (sucrose or table sugar)

Complex carbohydrates i.e. starches and fibre: which are polysaccharides (straight or branched chain monosaccharides).



However, keep in mind these are biochemical classifications and foods are composed of both complex and simple carbohydrates. We simply want to eat foods that are higher in complex carbs and lower in simple carbs.

So what do these sorts of foods actually look like?

Foods that are higher in complex carbohydrates include:

- veggies
- fruits
- rice
- wholegrains (bread, pasta, oats, polenta)
- quinoa (pseudo-grain)

Foods that are higher in simple carbohydrates include:

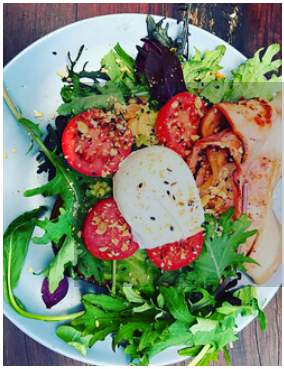
- lollies
- sweetened beverages
- cakes, biscuits, chips etc.

I would recommend that most of our carbohydrates are obtained in the form of fruit and veggies, and to supplement with smaller volumes of other types of complex carbohydrates around our higher intensity training sessions.

There's two reasons for this:

1. The processing method for food, strips much of its fibre and nutrient content. Research has demonstrated that the greater the fibre and micronutrients in food, the greater the impact on satiety (fullness). Therefore, any food that requires a greater degree of processing to make it to your plate (i.e. bread, pasta and most grain-based foods) will have a reduced effect on fullness either immediately or post-prandially (after the meal).
2. Foods like pasta, rice and bread are higher in carbohydrate and calories. So you don't need these sorts of foods if you're fairly sedentary or having a rest day (in fact there's much debate over whether we "need" them at all). So rule of thumb, eat these foods (or starchy veggies like sweet potato and potato) around your heavy, weight training sessions.

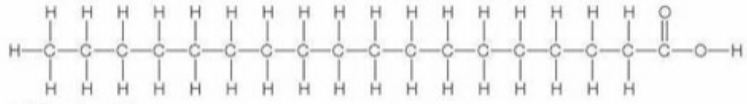
Finally, I have a pretty simple philosophy around carbs; I generally live by the concept of "meat and three veg". The simpler we keep things, the easier it is to stick to.



Fatty acids are organic acids composed of a chain of carbon atoms with hydrogens attached, with an acid group at one end and a methyl group at the other.

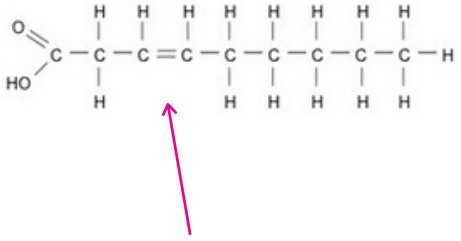
Fatty acids vary in length with saturated fatty acids generally being shorter than their unsaturated counterparts. Saturated fatty acids do not contain any double bonds in their carbon chain, which is completely "saturated" with hydrogen atoms (see over the page). This high degree of saturation makes these types of fats very stable.

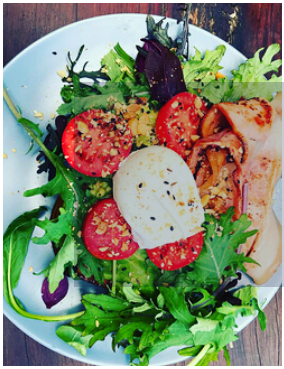
Saturated fatty acid: no double bond and fully saturated with hydrogen



Unsaturated fatty acids are not completely saturated with hydrogen and have one or more double bond/s in their carbon chain. Unsaturated fats are further divided into monounsaturated and polyunsaturated fats. Monounsaturated fats only have a single double bond whereas polyunsaturated fats have two more more double bonds. The greater the double bonds, means the greater the degree of unsaturation and instability.

Monounsaturated fatty acid: 1 double bond and not completely saturated with hydrogen

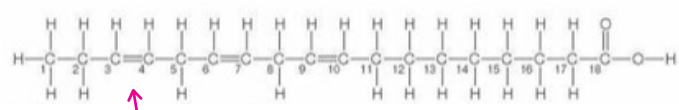




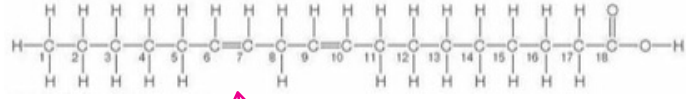
Fat

Polyunsaturated fats are further divided into omega 3 and omega 6 fatty acids. Omega 3 fats have their first double bond at the third carbon in the chain, whereas omega 6 fatty acids have their first double bond at the 6th carbon in the chain.

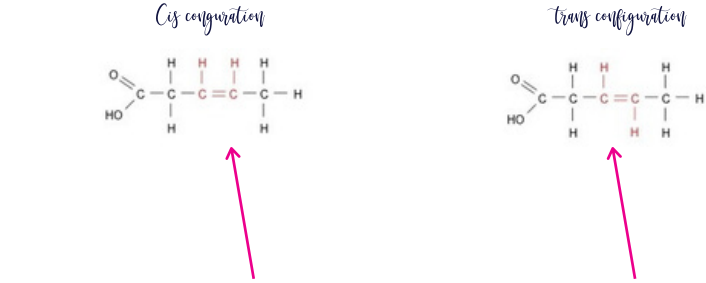
Omega 3 fatty acid: 2 double bonds with the firs occurring at the 3rd carbon and not completely saturated by hydrogen



Omega 6 fatty acid: 2 double bonds with the firs occurring at the 6th carbon and not completely saturated by hydrogen



And finally there are a group of fats called trans fats which are a form of monounsaturated fat. Naturally occurring trans fats are actually good for us (go nature) but it is the man-made trans fats that create all sorts of issues. These fats have been banned from use in most foods due to the overwhelming evidence that they contribute to disease and illness.



Each of these fatty acids are used in different ways in the body and are essential to good health (except for artificial trans fats). We should enjoy a mix of saturated and monounsaturated fats and try and have a closer ratio of omega 6 to omega 3 fats (ideally less than 4:1). Of concern is the high omega 6 content in the Western diet, which can be as high as 50:1 (omega 6: omega3). This is due to the increased usage of seed and vegetable oils in processed food and home cooking.

The concern over the amount of omega 6 in the diet is because of the propensity for omega 6 to promote inflammation (omega 3 are anti-inflammatory). When unchecked, inflammation can create pain and exacerbates symptoms of disease. Furthermore, due to the ease for omega 6 fats to oxidise, it is likely that having such a high volume of omega 6 in the diet is not ideal. This is why I don't eat margarine or cook in vegetable or seed oils (which are naturally high in omega 6).

My preference for fats/oils include:

- coconut oil
- olive oil
- avocado oil
- macadamia nut oil
- butter
- lard

However, there are many whole food sources that provide excellent sources of fats including:

- meat
- seafood
- fatty fish
- poultry
- eggs
- nuts/seeds

Similarly to carbohydrates, these foods are all mixes of both saturated and unsaturated fatty acids. Animal products tend to be higher in saturated fats whereas plant-based foods tend to be higher in monounsaturated. Plant-based and animal-based fats are both good for us in the right ratios.

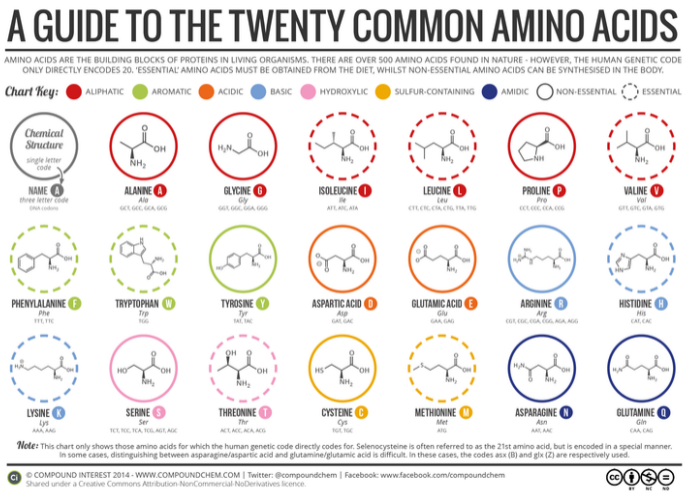
It's also important to point out that the idea that fat makes us fat or that saturated fat causes heart disease, has been disproven. So we can enjoy a mix of all of these foods without concern.

Finally, fats are an essential component to our diet and are needed for many functions including:

- hormone production
- hormone signalling
- vitamin absorption
- nerve conduction
- brain health
- nutrient transportation
- thermoregulation
- protection
- energy production
- production of eicosanoids (compounds used to promote and dampen the inflammatory response, control blood pressure and more)
- slows movement of food from the stomach into the small intestine (keeping us fuller for longer)
- and more!

Clearly getting enough fat in our diet is importance for both health and for helping keeping us fuller, for longer!

Proteins contain the same atoms as carbohydrates and lipids but also contain nitrogen atoms. These nitrogen atoms give the name amino (nitrogen containing) to the amino acids.
All amino acids have the same basic structure but what differs one from another is a distinctive side group or side chain (see below).



Long chains of amino acids link together in a specific configuration to form specific proteins. If any single amino acid is absent, the protein will not form. The body is able to synthesise (make) some amino acids (AA), however, some must be obtained in the diet. AA that can be made are called non-essential whereas the AA that must be obtained in the diet are called essential.

Essential

Histidine
Isoleucine
Leucine
Lysine
Methionine
Phenylalanine
Threonine
Tryptophan
Valine

Non-Essential

Alanine
Arginine
Asparginine
Aspartic acid
Cysteine
Glutamic acid
Glutamine
Glycine
Proline
Serine
Tyrosine

The word protein comes from the Greek word "proteos", meaning "number one" or "most important" and it is absolutely correct. Ensuring we are eating adequate protein is one of the most best things we can do for our overall good health as protein is needed for:

- muscle growth
- tissue repair and healing
- making enzymes
- making hormones
- a strong immune system
- beautiful skin and hair
- healthy DNA
- and so much more!

We literally need protein for every single process/system in our body, so making sure we eat enough should be our priority.

So what are some good sources of protein? Below are listed some popular protein choices with their approximate protein content per 100g.

- chicken (~30g/100g)
- steak (~25g/100g)
- fish (~20-30g/100g)
- turkey (~18g/100g)
- eggs (~6g per egg)
- edamame (~10g/100g)
- soy (~30g/100g)
- cottage cheese (~10g/100g)
- Greek yogurt (~10g/100g)

Other good sources of protein include:

- nuts
- beans/lentils
- dairy
- other seafood

Remember that these higher protein foods are all MIXES of carbohydrate, protein and fats and each one has a different micronutrient (vitamin and mineral) profile. As an example, turkey has a good protein content, is slighter lower in calories than chicken breast and is high in an important mineral called selenium. Selenium plays an important role in many systems of the body but in particular, thyroid function. It is also possible that many people are deficient in selenium due to low levels in our soil which makes the inclusion of turkey meat, an attractive choice.

Furthermore, to maximise muscle protein synthesis (MPS), which is an important consideration for those trying to build muscle and lose fat, a minimum of 2.5g of leucine (amino acid) needs to be present in the meal. Animal products are easily able to meet this requirement, but those following plant-based diets, need to be more calculated in their choices.

Therefore, when choosing a protein source, it's not just a matter of how much protein is in it but also what vitamins and minerals, how many calories and is there enough leucine to kick off recovery and muscle building!

In the early 1900s. scientists first discovered that there were substances in food that were "vital to life". Since this time, much has been learned about vitamins. Vitamins are stand alone structures and are not linked together (like amino acids and glucose molecules). Vitamins do not yield energy but are crucial in the breakdown of fats, proteins and carbohydrates. They also play other roles in producing DNA, protecting the body from stress and damaging substances through to controlling blood clotting factors. Vitamins are so important in our diets, that if we are deficient in any of them, we become unwell and produce signs and symptoms of disease. Examples of this include iron-deficiency anaemia, rickets which is produced by a lack of vitamin D or scurvy, a lack of vitamin C.

Vitamins are categorised into two groups; water soluble and fat soluble. Water soluble vitamins are absorbed into the body fluids and excreted via urine easily. Fat soluble vitamins require fat to be absorbed into our body. For this reason, care must be taken when supplementing with fat soluble vitamins as they are absorbed into fat tissue and can reach toxicity as they are not excreted so easily..

Over the next few pages, I have summarised the main functions and significant food sources of each vitamin and major minerals. This is intended to show you just how important the micronutrient content of our food is and why, it is such a mistake, to not focus on micronutrients like we do macronutrients.

Please note, I have only briefly covered each micronutrient; this section is not exhaustive in terms of functions and food sources. I have also covered each micronutrient as simply as possible to aid learning and encourage people to actually read the document ☺

The next section has been developed from the text "Understanding Nutrition" (1st edition, 2010) with one of the authors, Associate Professor Tim Crowe, being my favourite nutrition lecturer from Deakin Uni. I thank Professor Crowe and the other authors for their hard work and simple explanations of some difficult nutrition topics. This has made my life so much easier in sharing this information with my clients.



Fat Soluble Vitamins

vitamin A

The different forms of vitamin A are collectively known as **retinoids**. Retinoids are involved in **sight, protein synthesis and cell differentiation, healthy skin and supporting reproduction and growth**. Retinoids are found abundantly in **liver, fish, milk, bytter and eggs**.

vitamin D

The body is able to synthesis vitamin D in the skin from a precursor made from cholesterol with the help of sunlight (which is why it is often called the sunlight vitamin). Given adequate exposure to sunlight, people do not need to obtain vitamin D from food however, fatty fish is the only food with a substantial amount. **Vitamin D is essential for healthy bone growth and plays vital roles in brain, immune and whole body health.**

vitamin E

Also known as **tocopherols**, **vitamin E is an important antioxidant**. Antioxidants protect the body against the damaging effects of free radicals by stopping the production of more free radicals. This protects our vulnerable cell membranes (we have ~100 billion cells in our body each with a membrane) in addition to preventing polyunsaturated fats and other lipids from oxidising (becoming rancid). **Vegetable oils, particularly wheat germ oil** are high in vitamin E, as are **egg yolks, liver nuts and seeds**.

vitamin K

Vitamin K can be synthesised in the gut by bacteria and its primary role is in **blood clotting**. More recently has vitamin K been found to play important roles in **bone health** by "encouraging" calcium into bones, decreasing bone turnover and playing a role in bone formation. There are two types of vitamin K: K1 and K2. **K1** is obtained from plant sources such as **leafy green vegetables** and vitamin **K2** is obtained from animal sources such as **dairy products**.

Water Soluble Vitamins

Thiamin

Thiamin plays an important role in **energy metabolism and nerve conduction**. It is found in **whole grains, pork and most nutritious foods**.

Riboflavin

Riboflavin is involved in the process that releases **energy from nutrients in all cells**. It is found in **milk and milk products, liver and enriched grain products**.

Niacin

Describes two chemical structures; nicotonic acid and nicotinamide. Niacin is responsible for **energy-transfer reactions and metabolism of fats, glucose and alcohol**. Niacin is found in **milk, eggs, meat, poultry, fish, wholegrains, nuts and all protein-containing foods**.

Biotin

Biotin plays an important role in **metabolism, gluconeogenesis, fatty acid synthesis and the breakdown of certain fatty acids and amino acids**. Biotin is widespread in foods but particularly in **liver, egg yolks, soybeans, fish and grains**.

Pantothenic Acid

Pantothenic acid forms part of the chemical structure of an important molecule known as **coenzyme A**, which is crucial to **energy production**. This means that pantothenic acid is involved in more than **100 different steps in the synthesis of lipids, neuotransmitters, steroid hormones and haemoglobin**. Pantothenic acid is also widespread in foods but particularly in **chicken, beef, potatoes, oats, tomatoes, liver, egg yolk, broccoli and whole grains**.

Vitamin B6

Vitamin B6 is crucial to **amino acid metabolism and influences cognitive performance, immune function and steroid hormone activity**. Unlike other water soluble vitamins, B6 is stored extensively muscle tissue. B6 is found in **meats, fish. poultry, potatoes, vegetables, legumes, non-citrus fruits and soy products.**

Folate

Folate, also known as folacin or folic acid, plays an important role in **DNA synthesis in rapidly growing cells** (hence why women who are pregnant supplement with folate). Significant sources of folate can be found in **leafy green vegetables, legumes, seeds and liver.**

Vitamin B12

Folate, and B12 are closely related; they depend on each other for activation. **DNA synthesis requires both folate and B12 and B12 is needed in the production and protection of the nerve sheath, bone activity and metabolic processes**. It's important to note that very little dietary B12 is actually needed as it is reabsorbed and when deficiency occurs it is often due to a lack of hydrochloric acid or a lack of intrinsic factor (intrinsic factor is secreted by the stomach and binds with B12, which enables it to be taken to the end of the small intestine and be used by the body). Significant food sources of B12 are any **animal-based foods.**

Vitamin C

Vitamin C plays different roles depending on the setting, **either acting as a cofactor to specific enzymes or as an antioxidant.** Vitamin C is also needed in **collagen production, thyroxine synthesis and iron absorption.** Interestingly, the adrenals contain more vitamin C than any other organ and will secrete vitamin C in periods of stress (likely to help offset the damage caused by stress-induced oxidative stress). Vitamin C is found in foods like **citrus fruits, dark green vegetables, strawberries and capsicum.**

Minerals are inorganic substances that, like minerals, do not directly contribute energy to the body, but rather assist in all the life-sustaining processes. Minerals also differ from vitamins in that they are not susceptible to heat and their chemical identity is always retained. This means food processing methods have very little bearing on food mineral content. Note: mineral content can be lost from food only when they leech into cooking water that is not used in the cooking process.

Once a mineral enters the body, it remains there until it is excreted as minerals are also unable to change into anything else. Sometimes a mineral may bond with another substance to allow a reaction to occur, but it always remains the same mineral. As an example, iron can bond with other charged salts but it is always iron.

Some minerals (such as potassium) are excreted via the kidneys and behave in similar manner to water soluble vitamins, whereas other minerals, such as calcium, behave more like a fat-soluble vitamin and require carriers to be transported and absorbed into the body.

Minerals also vary in bioavailability. Some foods contain binders that combine chemically with minerals, preventing their absorption and carrying them from the body with other waste. Examples of binders include phytates (legumes and grains) and oxalates (spinach).

Finally, the presence or absence of vitamins and minerals can affect the absorption, metabolism or excretion of another mineral or vitamin. Some examples include:

- when sodium intakes are too high, both sodium and calcium are excreted
- phosphorous binds with magnesium in the small intestine which means that magnesium absorption will be affected when phosphorous is high
- magnesium is for the absorption of both calcium and vitamin D
- iron will inhibit the absorption of calcium

It can be easy to start worrying about our diet when we read these interactions but I promise I have some very simple advice coming on how to make sure we meet our vitamin and mineral requirements.

Major Minerals

Sodium

Sodium is the major extracellular electrolyte and plays an important role in blood pressure regulation and water balance. Sodium also helps maintain the acid-base balance and is essential to nerve impulse transmission and muscle contraction. Significant sources of sodium include table salt (duh?!), soy sauce moderate amounts are in meats and vegetables, large amounts are found in processed foods.

Chloride

Chloride is another major extracellular electrolyte and usually occurs in association with sodium. Chloride, like sodium and potassium, maintains fluid and electrolyte balance. Chloride is found abundantly in table salt, soy sauce moderate amounts are in meats, milk. eggs, large amounts are found in processed foods.

Potassium

Potassium is the body's major intracellular electrolyte and plays a major role maintaining fluid, electrolyte balance, nerve conduction and cell integrity. Potassium is found in all whole foods but particularly in meat, milk, fruits, vegetables, grains and legumes.

Calcium

Calcium is the most abundant mineral in the body. 99% of all calcium is stored in the bones and teeth where it plays two roles: providing an integral component to the structure of bones and acting as a calcium reserve should blood calcium levels drop. Calcium also plays crucial roles in muscle contraction and relaxation, nerve function and blood pressure. Calcium is found in foods such as dairy, canned fish with bones, greens vegetables, legumes, almonds and sesame seeds.

Major Minerals

Phosphorous

Phosphorous is the second most abundant mineral in the body. Approximately 85% is found combined with calcium in the hydroxyapatite crystals of bones and teeth. Phosphorous plays important roles in every cell of the body including being used as a part of the acid-base buffering system and forming phospholipids. Phosphorous is found in all **animal tissue (meat, fish, poultry, eggs, milk)**.

Magnesium

Over half the body's magnesium is **stored in bones** with most of the remaining magnesium being found in **muscles and soft tissues**. Magnesium is required for **bone health, energy metabolism and plays a major role in** ATP (energy currency of the body) synthesis. Magnesium participates in **hundreds of enzyme systems and is also required for muscle contraction and nerve signalling**. Significant sources of magnesium include **nuts, legumes, whole grains, dark green vegetables, seafood and cocoa.**.

Sulfate

Sulfate is the oxidised form of the mineral sulfur and is used to **stabilise and help form the shape of proteins**. Sulfate is also found in part of the **vitamins biotin and thiamin and the hormone insulin**. Sulfate is found in all **protein-containing foods (meats, fish, poultry, eggs, milk, legumes and nuts)**.

Iodine

Iodine is an integral part of **thyroid hormones** that **regulate body temperature, metabolic rate, reproduction, growth, blood cell production, nerve function and more**. Significant sources of iodine include **iodised salt, seafood, bread, dairy and plants grown in iodised rich soil.**

Trace Minerals

Iron

Iron is one of the most well-known trace minerals. It has an ability to be reduced (ferrous iron) and oxidised (ferric iron) which enables it to participate in **oxidation-reduction reactions**, which are so widespread in metabolism that **they occur in every cell**. Iron is needed to make **amino acids, collagen, hormones and neurotransmitters**. Most of our iron is stored in **haemoglobin and necessary for transporting oxygen around the body**. Iron deficiency is the most prolific deficiency world-wide and leads to iron-deficiency anaemia if not corrected. Iron is found **abundantly in red meat and less so in fish poultry, eggs, legumes and dried fruits.**

Zinc

The rate of absorption of zinc depends on a person's zinc status; if more is needed, more is absorbed. Zinc is also affected by dietary factors such as the presence of phytates which bind zinc and limit absorption. Zinc plays a role in **many enzymes, it is associated with the hormone insulin, it is involved in immune reactions, wound healing, taste sensation. sperm production and the normal development of the unborn baby. Zinc is found in protein-containing foods.**

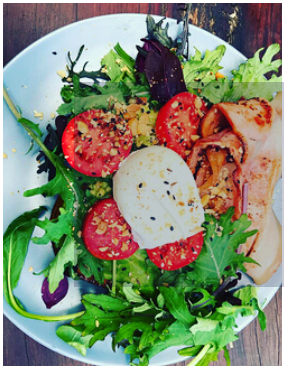
Selenium

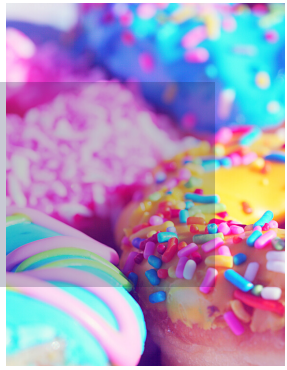
Selenium is one of the body's **antioxidant nutrients** working primarily as part of proteins, most notably the enzyme glutathione peroxidase. Selenium defends against **oxidation and plays a role in the conversion of the thyroid hormone to its active form**. Selenium is found in **seafood, meat, whole grains, fruits and vegetables**

Water makes up approximately 60% of an adult's body weight and an even higher percentage of a child's. Water makes up about 3/4 of the weight of lean mass and less than 1/4 of the weight of fat mass meaning that our body composition greatly influences how much water we have in our body.

Water is the fluid in which all life processes occur. The water in body fluids:

- carries nutrients and waste products throughout the body
- maintains the structure of large molecules such as proteins and glycogen
- participates in metabolic reactions
- serves as the solvent for mineral, vitamins, amino acids, glucose and many other small molecules so that they can participate in metabolic activities
- acts as a lubricant and cushion around joints and inside the eyes, the spinal cord and, in pregnancy, the amniotic sac surrounding the baby
- aids in the regulation of normal body temperature
- maintains blood volume





Thirst is the body's mechanism to warn us about being dehydrated, so if you are currently thirsty, you need to drink more water.

We can obtain water in many ways such as:

- fruits and vegetables
- soups
- juice, softdrink, milk etc.
- coffee and tea
- sports drinks

If you are drinking liquid with calories in it, you need to ensure that you're not exceeding your daily energy requirements. It's also worth mentioning that tea and coffee may have a diuretic effect and you may need to offset some water losses with additional fluid.

The fluid recommendation for most people is 0.24 mL/kJ of energy expended and the best way to obtain this is through water and your fruits and veggies.

Despite what you may think (based on what you've just read) food does not need to be complicated.

Research has shown us that there are a few key attributes to the ideal meal in terms of healthfulness and keeping us full. The ideal meal contains:

- adequate protein
- healthy fats
- it is micronutrient dense
- and high in fibre

The great news is that I can simplify this even further for you. My personal philosophy around food is that we should be aiming for the concept of meat and three veg for most of our meals.

Each meal, I figure out what my protein is, then make sure I have some fat and some high fibre carbs. As an example I will have a banana smoothie for my first meal, then I have left over dinner for lunch (steak and veg) and then something similar for dinner (salmon, steak, chicken etc, with veggies).

I try to limit my intake of low-protein, processed foods as I find they are high in energy and generally low in satiety (keeping me full). I also try to avoid eating a lot of sugar and when a craving hits, I'll eat fruit instead (which generally deals with the craving).

If you want to know more about my food philosophies, have a read of the PDF, which gives a more detailed explanation about how I include things like alcohol and junk food without massive changes in weight.