



# Nutrition for Athletes

Elite Netball Academy







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- Faint, light-colored line drawings of a banana and a bunch of grapes are visible in the bottom right corner of the page.



# What is Nutrition?

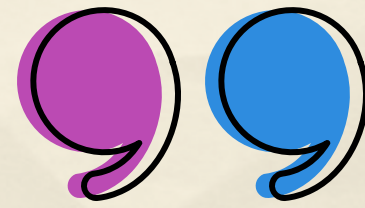
**Sports nutrition plays a key role in optimising the beneficial effects of physical activity,**

**Making informed decisions with your nutrition and hydration can result in improved performance, injury prevention and quicker recovery but it's difficult to know where to start with so much conflicting information readily available.**

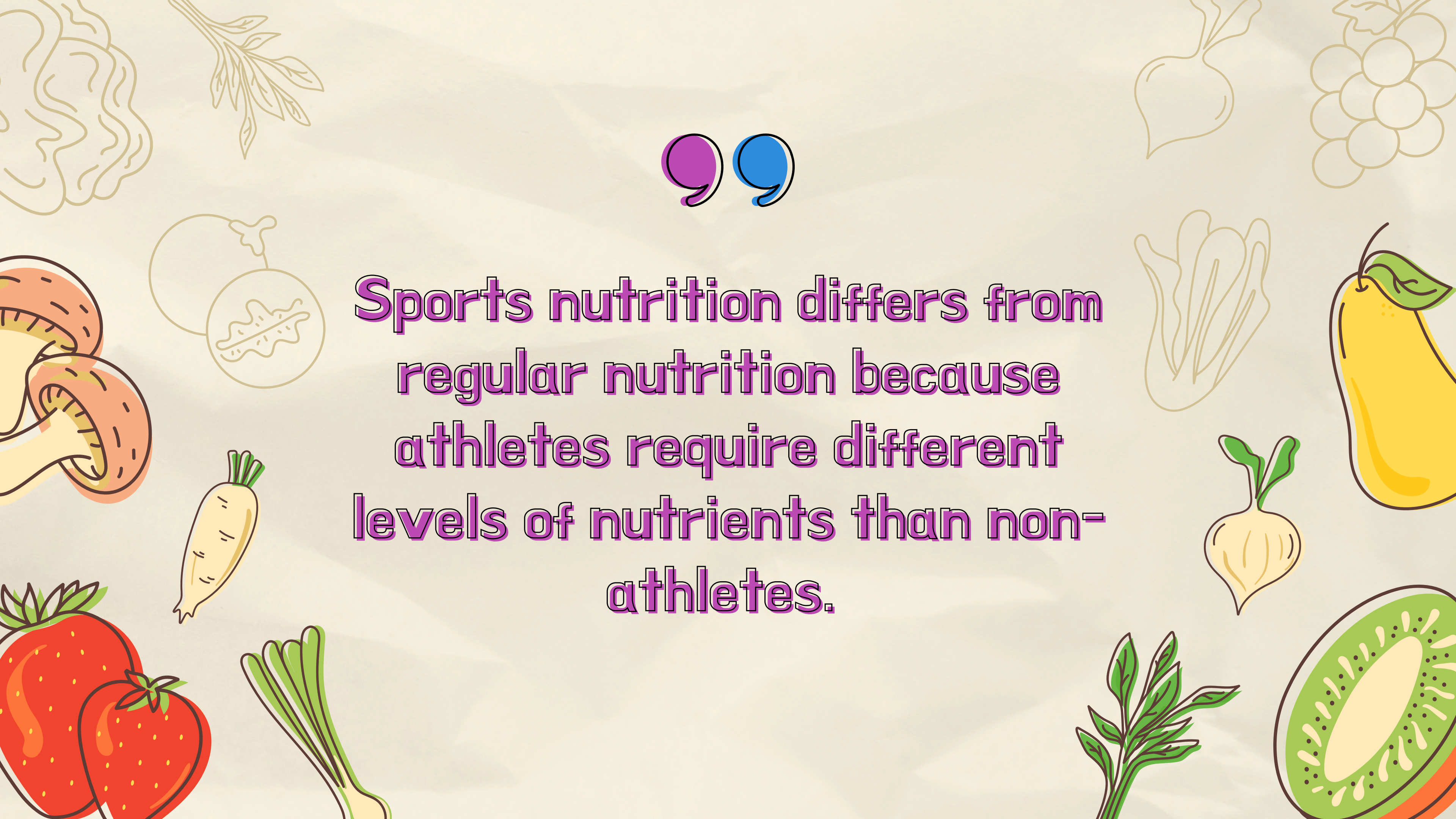
**Best performance is achieved by providing the right amount of food type (protein, carbohydrates, fats, fibre, etc.), fluids and nutrients to maximise energy and aid in sports recovery.**







Sports nutrition differs from regular nutrition because athletes require different levels of nutrients than non-athletes.





# The Benefits of Sports Nutrition

Consuming the right balance of food and drink is important for everyone and those actively participating in sports need to be aware that it can also affect performance.

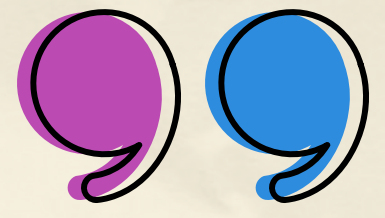
Fuelling your body with the right foods is essential for sports performance, importantly fats, protein and carbohydrates which maintain the body's energy.

- Carbohydrates are the primary fuel used by working muscles, so adequate intake is essential for preventing muscle fatigue.
- While it's important to monitor your fat intake, you shouldn't remove it from your diet completely. Fats provide fatty acids that can be used as a source of energy - especially if your exercise sessions last longer than one hour. Fats also provide the building blocks for hormones and the formation of cell walls.
- Protein can be used as a source of energy and is critical for building new muscle tissue. If you're taking part in resistance training, your body will require additional protein.



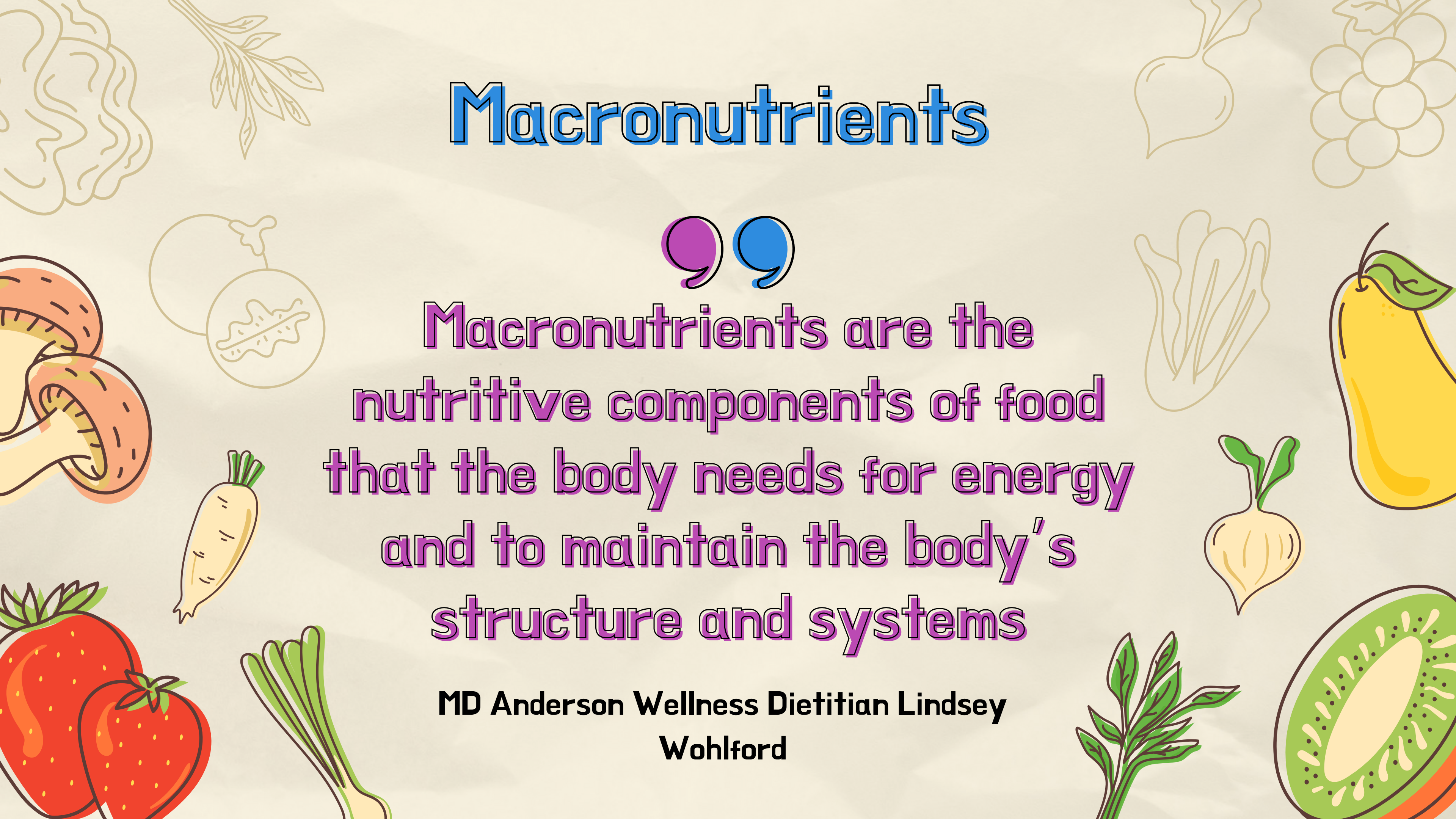


# Macronutrients



Macronutrients are the nutritive components of food that the body needs for energy and to maintain the body's structure and systems

**MD Anderson Wellness Dietitian Lindsey Wohlford**





# Macronutrients



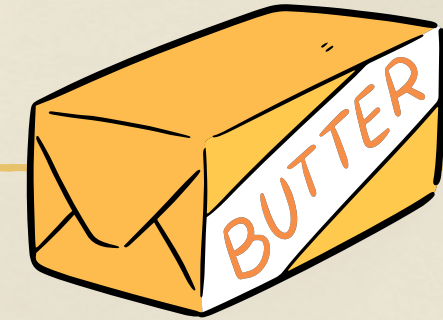
## Carbohydrates

Carbohydrates are plant foods that are made up of sugar molecules called saccharides. Saccharides are found singularly, in pairs and in complicated chains.



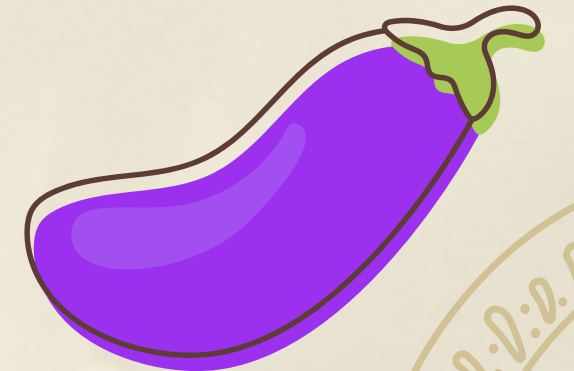
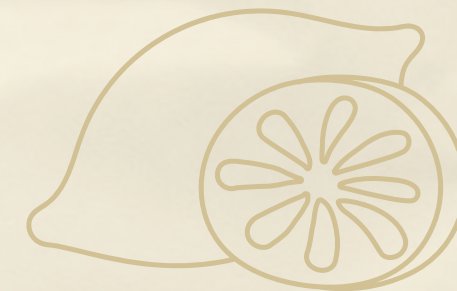
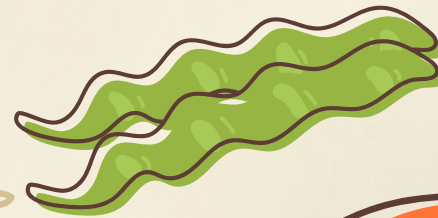
## Proteins

Protein is an organic compound that serves many functions in the body. Protein is a vital nutrient that makes up a large amount of your body's tissues including your hair, skin, nails, and bones and, of course, your muscles.



## Fats

A small amount of fat is an essential part of a healthy, balanced diet. Fat is a source of essential fatty acids, which the body cannot make itself. Fat helps the body absorb vitamin A, vitamin D and vitamin E.





# Carbohydrates

## Carbohydrates

Carbohydrates provide four calories of energy per gram or around 16.8 kilojoules and are the preferred source of energy for your brain and higher intensity activities such as weight lifting and sprinting. On consumption, all digestible carbohydrates are broken down into glucose.

### CARBOHYDRATES ARE FOUND IN THREE BASIC CATEGORIES:

- Simple carbohydrates: also known as sugars.
- Complex carbohydrates: also known as starches.
- Non-Starch polysaccharides (NSP): also known as fibre.

## The benefits of carbohydrates:

- Preferred source of energy for the brain (stored in the liver)
- Fuel for high intensity activity
- Stored as glycogen for fuel
- Muscle glycogen provides energy for contractions

Consuming enough carbohydrates to fuel performance and recovery can be difficult if the athlete is purposefully restricting energy.

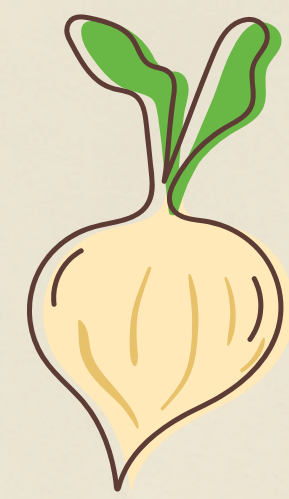
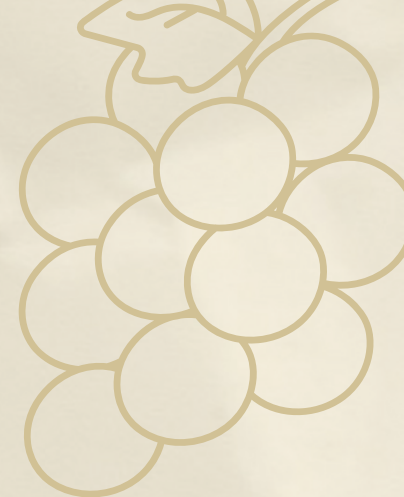




# Carbohydrates

Type	Description	Example
Simple Carbohydrates	Simple carbohydrates can be found in two forms – monosaccharides or disaccharides.	Fruits, sweets, chocolate, milk, and milk products.
Complex Carbohydrates	Complex carbohydrates are made from multiple chains of saccharide molecules called polysaccharides – poly meaning many. Polysaccharides are also called starches.	Bread, rice, pasta, vegetables and grain-based foods.
Non-Starch polysaccharides (NSP)	Fibre can be classified as soluble or insoluble. This refers to its interaction with water.	Grains, fruits, vegetables, pulses, legumes and nuts.





Whole Sources of Carbohydrates	Amount per 100g	Additional Information
Carrots (Baby)	6g	N/A
Carrots (Tinned)	4.4g	Tinned in water
Banana	20.3g	N/A
Strawberries (Fresh)	6g	N/A
Strawberries (Frozen)	6g	N/A
Mango (Fresh)	13.6g	N/A
Mango (Dried)	74.7g	N/A
Flour (Plain)	73.5g	N/A
Flour (Wholemeal)	59.4g	N/A
Bread (White)	46.4g	Warburtons 'Toastie'
Bread (Wholemeal)	37.8g	Hovis 'Wholemeal'
Potatoes (Maris Piper)	17.5g	N/A
Potatoes (New/Baby)	14.9g	N/A
Rice (Basmati)	32.3g	N/A
Rice (Brown)	36.9g	N/A
Pasta (White)	35.7g	Fusili
Pasta (Brown)	32.9g	Fusili
Baked Beans	12.5g	Heinz
Lentils	9.4g	Red Split
Milk **	4.8g per 100ml	Semi-Skimmed/2%/Green
Natural Yoghurt (Plain) **	6.8g	N/A
Digestive Biscuit	63.6g	N/A



# Proteins

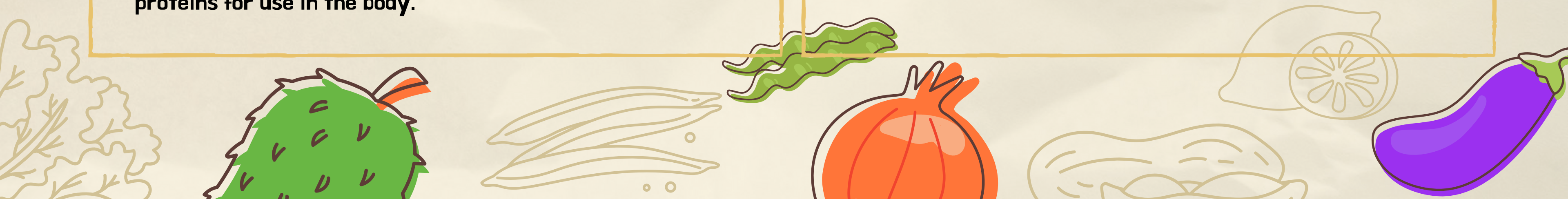
## Proteins

Protein is an organic compound that serves many functions in the body. Protein contains four- calories or 16.8 kilojoules of energy per gram, protein is a vital nutrient that makes up a large amount of your body's tissues including your hair, skin, nails, and bones and, of course, your muscles. It is also an important factor in controlling homeostasis and can, under certain circumstances, be used for fuel.

When digested, protein is broken down into these amino acids which are then re-ordered and re-built back into usable proteins for use in the body.

## The benefits of protein:

- **Growth and maintenance of tissue:** Muscles, bones, hair, nails, skin
- **Energy Source:** Protein provides just under 4 kilocalories per gram.
- **Hormone production:** Hormones control many important chemical activities in the body and consist of protein.
- **Fluid Balance:** Proteins help to balance the body to balance its fluid balance (blood and surrounding tissues).





# Proteins

Type	Description	Example
Complete	Foods that contain adequate amounts of all the essential amino acids are classed as complete. A diet rich in these foods means that you have all the amino acids necessary to synthesise the non-essential amino acids.	Eggs, meat, fish, dairy produce, poultry, soy and quinoa.
Incomplete	Many plants contain a variety of amino acids but are often deficient in some of the essentials and are therefore classed as incomplete proteins. Because they are lacking one or more of the essential amino acids most plant foods are considered to be carbohydrates rather than proteins.	Vegetables, seeds, nuts, beans and grains.



# Fats

## Fats

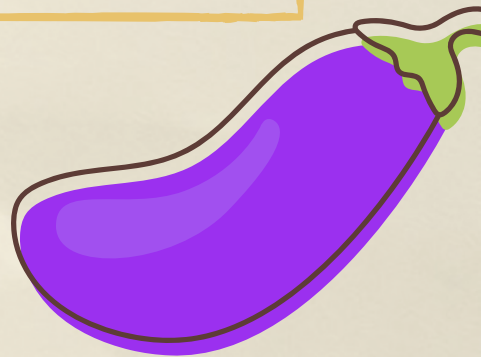
A small amount of fat is an essential part of a healthy, balanced diet. Fat is a source of essential fatty acids, which the body cannot make itself.

Fat helps the body absorb vitamin A, vitamin D and vitamin E. These vitamins are fat-soluble, which means they can only be absorbed with the help of fats.

Any fat that's not used by your body's cells or turned into energy is converted into body fat. Likewise, unused carbohydrates and proteins are also converted into body fat.

## The benefits of fats:

- **Energy Source:** With just under 9 kilocalories per gram, fat is the primary source of energy for lower levels of intensity
- **Energy storage without limit:** Fats can be stored energy-efficiently and in large quantities. These can be used during an energy deficit and prevents your body from starving.
- **Nutrient supplier:** Fat enables the absorption of fat-soluble vitamins (A, E, D & K)
- **Cell Health:** All cells have a layer of fat called the cell membrane. This membrane is made of fatty acids and it controls the permeability of the cell to nutrients.
- **Provides insulation and protects internal organs**



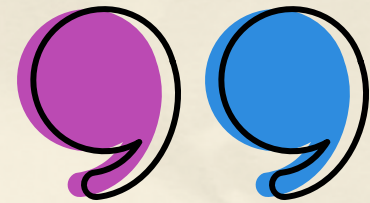


# Fats

Type	Description	Example
Saturated	Comprised of chains of carbon atoms that are packed or saturated with hydrogen. Your body likes to use saturated fats for energy during aerobic activity, as stored energy for later use within your adipose tissue.	Butter, animal produce, eggs and dairy
Unsaturated	Are usually liquid and from plant sources. They differ from saturated fats in that their chemical structure contains one or more double bonds.	Nuts, plant oils, fish containing omega-3 unsaturated fatty acids (salmon, tuna, anchovies), olives and avocados



# Micronutrients



Micronutrients are vitamins and minerals needed by the body in very small amounts. They perform a range of functions, including enabling the body to produce enzymes, hormones and other substances needed for normal growth and development.

**World Health Organisation**



# Micronutrients



## Vitamins

- Vitamin A
- Vitamin D
- Vitamin E
- Vitamin K
- Vitamin B
- Vitamin C



## Minerals

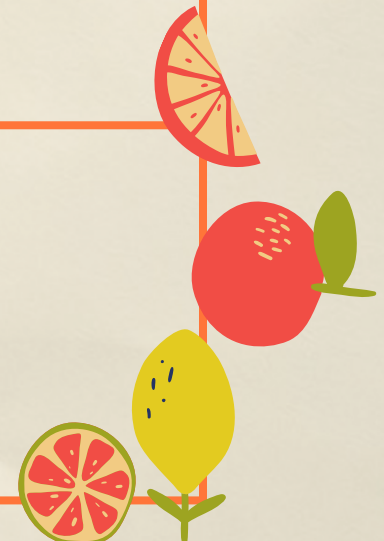
- Calcium
- Iron
- Sodium





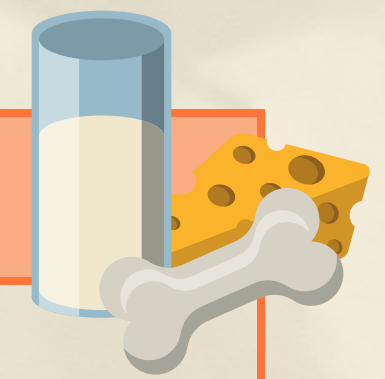
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Type	Purpose	Source
<b>A</b>	<ul style="list-style-type: none"> <li>• Stimulates gastric juices for protein digestion</li> <li>• Plays a vital role in bone building</li> <li>• Promotes blood cell health</li> <li>• Protects against pollution and degenerative damage</li> </ul>	Butter from grass-fed cows, liver, seafood, pasteurised whole eggs
<b>D</b>	<ul style="list-style-type: none"> <li>• Needed for calcium and phosphorus absorption</li> <li>• Helps form strong bones and teeth</li> <li>• Helps protect against cancer and multiple sclerosis</li> </ul>	Butter from grass-fed cows, liver, pasteurised whole eggs
<b>E</b>	<ul style="list-style-type: none"> <li>• Acid blood circulation</li> <li>• Helps with tissue repair and healing</li> <li>• Slows the aging process</li> <li>• Powerful antioxidant</li> </ul>	Unrefined vegetable oils, butter, organ meats and raw nuts & seeds
<b>K</b>	<ul style="list-style-type: none"> <li>• Important for blood clotting</li> <li>• Aids in bone formation</li> </ul>	Liver, pasteurised whole eggs, whole grains and dark leafy green vegetables
<b>B</b>	<ul style="list-style-type: none"> <li>• Promotes healthy nerves, skin, eyes, hair, liver and muscle tone</li> <li>• Prevents fatigue</li> <li>• Vital for carbohydrate metabolism</li> <li>• Helps produce cholesterol</li> <li>• Helps maintain iron levels in blood</li> </ul>	Whole refined grains, fresh fruit, fresh vegetables, raw nuts and legumes
<b>C</b>	<ul style="list-style-type: none"> <li>• Aids tissue growth and repair</li> <li>• Strengthens capillary walls</li> <li>• Supports lactation</li> <li>• Supports adrenal gland function</li> <li>• Vital for collagen formation</li> </ul>	Fresh fruit/vegetables and some organ meats





# Minerals



Type	Purpose	Source
<b>Calcium</b>	<ul style="list-style-type: none"> <li>• Bone growth</li> <li>• Muscle contractions</li> <li>• Regulates acid/alkali balance</li> </ul> <p>Individuals, especially females who consume diets low in calcium-rich foods have on average, lower bone mass, and are at greater risk of stress fractures</p>	<p>Dairy products, fish with soft bones and green leafy veg</p>
<b>Iron</b>	<ul style="list-style-type: none"> <li>• Functional component for transporting oxygen and energy production</li> </ul> <p>A major component of hemoglobin, a type of protein in red blood cells that carries oxygen from your lungs to all parts of the body. Without enough iron, there aren't enough red blood cells to transport oxygen, which leads to fatigue. Iron is also part of myoglobin, a protein that carries and stores oxygen specifically in muscle tissues. Iron is important for healthy brain development and growth in children, and for the normal production and function of various cells and hormones.</p>	<p><b>Two types:</b></p> <ul style="list-style-type: none"> <li>• Heme - animal flesh like meat, poultry, and seafood.</li> <li>• Non-heme iron - plant foods; whole grains, nuts, seeds, legumes, and leafy greens.</li> </ul> <p>Non-heme iron is also found in animal flesh (as animals consume plant foods with non-heme iron) and fortified foods.</p>
<b>Sodium</b>	<ul style="list-style-type: none"> <li>• Water balance</li> <li>• Cellular fluid distribution</li> <li>• Nerve stimulation</li> </ul> <p>Sodium is one of the body's <u>electrolytes</u>, which are <u>minerals</u> that the body needs in relatively large amounts. Electrolytes carry an electric charge when dissolved in body fluids such as blood. Most of the body's sodium is located in blood and in the fluid around cells. Sodium helps the body keep fluids in a normal balance.</p>	<p>Unrefined vegetable oils, butter, organ meats and raw nuts &amp; seeds</p>



# Eatwell Guide

Check the label on packaged foods

Each serving (150g) contains

Energy 1540kJ 360kcal	Fat 3.0g LOW	Saturated 1.3g LOW	Sugars 34g HIGH	Salt 0.9g MED
13%	4%	7%	38%	15%

of an adult's reference intake  
Typical values (as sold) per 100g: 667kJ/167kcal

Choose foods lower in fat, salt and sugars

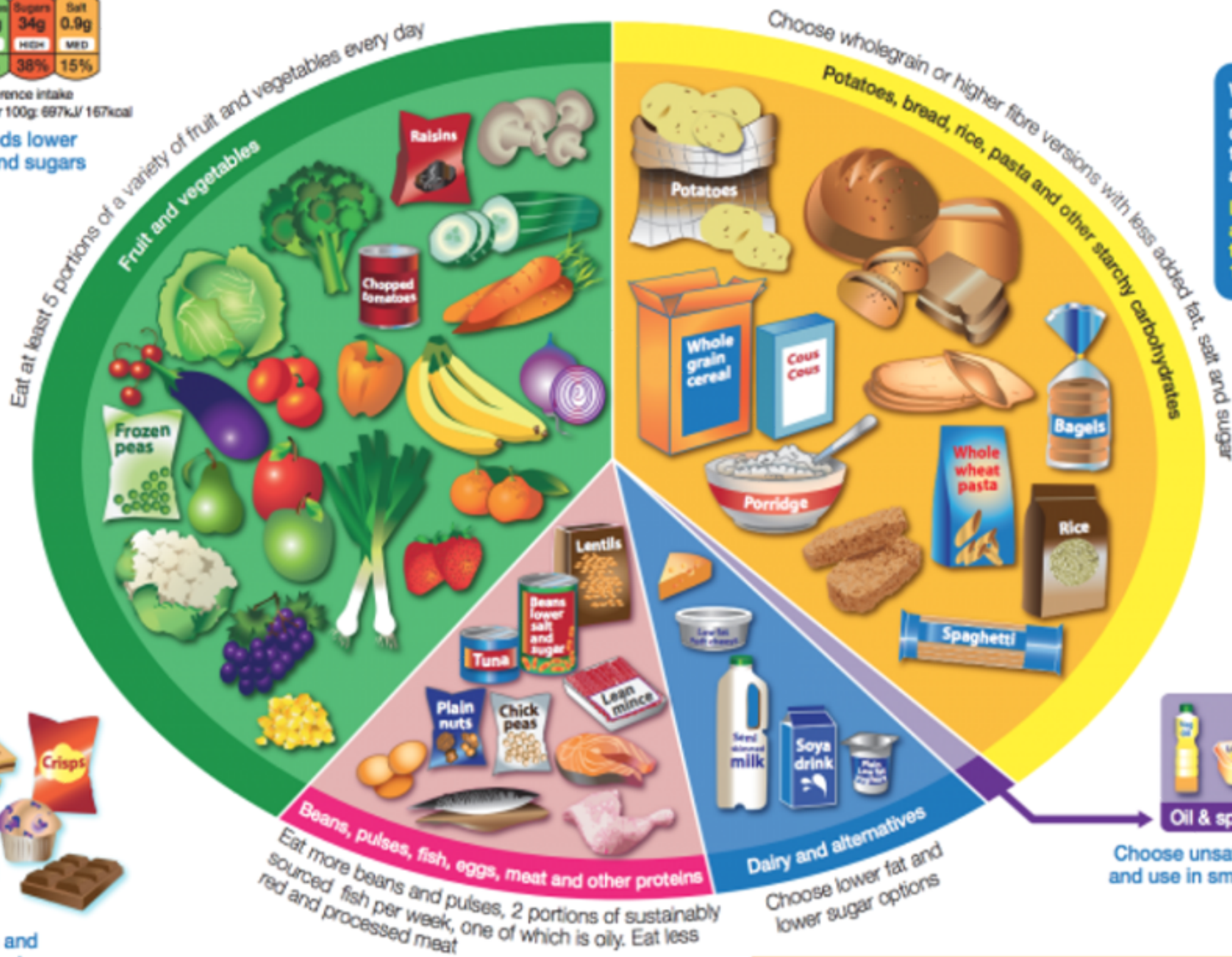
Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.



6-8 a day

Water, lower fat milk, sugar-free drinks including tea and coffee all count.

Limit fruit juice and/or smoothies to a total of 150ml a day.



Eat less often and in small amounts

Per day  2000kcal  2500kcal = ALL FOOD + ALL DRINKS



# Hydration

**Studies have shown that dehydration can negatively impact performance, specifically shooting accuracy, speed, agility concentration and co-ordination.**

**In order to stay hydrated, players should drink fluids should before, during and after training and matches. However, body fluid needs will depend on individual fluid losses, which vary depending on individual sweat rate.**

**The aim is to start any exercise session or competition well hydrated. This requires drinking regularly throughout the day leading up to training or competition. Having a drink with all meals and snacks is a good start.**





# Hydration

## Sports Safety 101: Hydration

1.



Drink water  
before,  
during and  
after play.

2.



Know the  
signs and  
symptoms of  
dehydration.

3.



Hydration  
is essential  
for staying  
in the game.

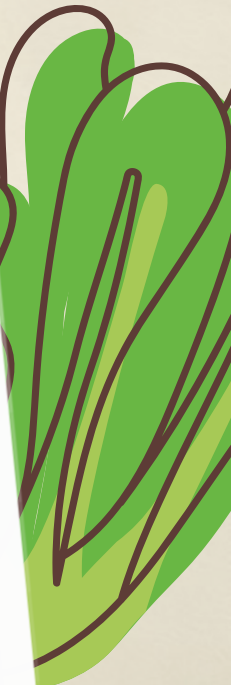
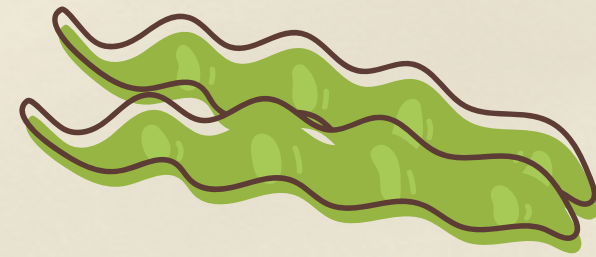


# Eating before competition (3-4 hrs)

It's important to start games well-fuelled. Each athlete is different, but players will often eat a pre game meal around 3 to 4 hours before the start of the match. This meal should contain some carbohydrate for fuel as well as some fluids for hydration. A small amount of protein in the pre game meal is also useful, as it can help to prevent hunger during the game.

Some suitable pre-game meal ideas can include:

- Wrap or sandwich with chicken and salad
- Bowl of muesli with yoghurt and berries
- Pasta with chicken in tomato-based sauce
- Soup served with bread rolls
- Stir-fry with noodles or rice



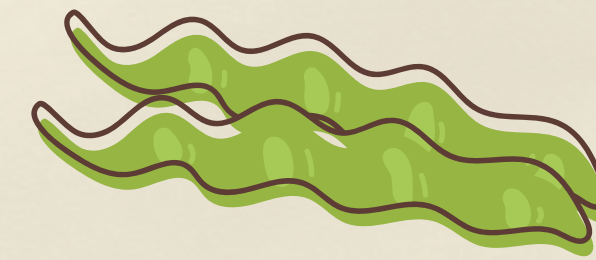


# Eating before competition (1-2 hrs)

Many players will also have an additional small snack 1-2 hours prior to the game. This is often something light that is rich in carbohydrate but relatively low in fat and fibre so it is easy to digest.

- Some suitable pre-game snack ideas include:
- Yoghurt with fruit salad
- Banana and a handful of almonds
- Peanut butter on rice cakes
- Toast with peanut butter

If solids don't sit well before a game, or players are very nervous, a liquid source of protein and carbohydrate such as a fruit smoothie can be a good option.





# Eating & drinking during competition

Quarter and half-time breaks give you the opportunity to rehydrate with water and refuel with a light snack.

Some players with higher energy demands may benefit from a sports drink to improve fluid absorption, boost electrolyte levels and provide an easily digestible source of carbohydrate to fuel active muscles, but as this is not always necessary so seek your coach for advice. Usually sports drinks are reserved only for particularly high-intensity efforts or exercise of more than an hour duration. Sports drinks with no added sugars are preferred.

For players able to tolerate solid food, fruit with a high-water content can double up in providing both energy and boosting hydration.

Mid-match snack ideas:

- Slice of hydrating, low-fibre fruit like watermelon, oranges or grapes
- Sports drink (if recommended by your coach)
- Homemade protein bar/balls, muesli bar or seed-based bar





# Recovery after competition

Recovery nutrition has three important aspects:

- Refuel muscle glycogen (carbohydrate stores)
- Repair muscle (for function & development)
- Rehydrate (replace fluids lost through sweat)

Recovery meals and snacks should therefore contain carbohydrate (fuel), some protein (for muscle repair and development) and plenty of fluids and electrolytes to replace sweat losses.

A recovery meal or snack should be consumed soon after exercise period, remembering that recovery nutrition extends well beyond the initial hours post-game, particularly when the next training session or game is the next day. Fluids (mainly water) should also be consumed, based on estimated losses.

Some recovery food suggestions include:

- Egg and salad sandwich
- Flavoured milk tetra packs or smoothies
- Chicken and vegetable risotto
- Homemade beef burgers with cheese and salad





# To Wrap Up...

**A healthy lifestyle is key to athletes of all levels to achieve their fitness goals and fuel for success. How and when you fuel your body can greatly improve or impair your performance – not to mention influence how you feel both physically and mentally when the competition heats up.**

**In preparing for a match or competition, it is important to stick to familiar meals that you know work well with your body to avoid any digestive upset during activity. Generally speaking, the closer to the match, the smaller the meal.**





**Thank you!**

**Do You Have Any Question?**