



Nutrition

# Exploring Nutrients

## Lesson 2

Understand the effects that  
macronutrients and  
micronutrients have on the body.





**Vitamins cannot be produced by the body so must come from the diet apart from vitamin D which can come from sunlight and small amounts of niacin which can be made from an amino acid.**



The body needs the right amount of vitamins to carry out functions such as contributing to enzyme activity or being used as an antioxidant which helps to prevent cellular damage.





**The body can have deficiency diseases if there is a lack of vitamins this may be due to a metabolism error or malabsorption disease.**





There are 2 groups of vitamins:



1. Fat soluble vitamins: A, D, E and K



2. Water soluble vitamins: B, C and folate



# Vitamin A

**Comes in two forms:**

- **Retinol from animal based foods**
- **Carotenoids mainly from plants, which are then converted to retinol by the body**





# Vitamin A

Function – it is needed for the structure of the skin and mucous membranes of the body. It helps to keep the eyes, lungs and immune system functioning correctly.





# Vitamin A

Deficiency – can lead to eye problems such as night blindness, xerophthalmia and complete blindness.

Toxicity – too much during pregnancy can lead to birth defects. It can also cause liver and bone damage.





# Vitamin A

Food containing vitamin A:

- Liver
- Cheese
- Whole milk
- Butter
- Carrots
- Dark green leafy vegetables
- Mango
- Sweet potato





# Vitamin D

1. Vitamin D<sub>2</sub> also known as ergocalciferol
2. Vitamin D<sub>3</sub> also known as cholecalciferol





# Vitamin D

Vitamin D comes from the diet and vitamin D<sub>3</sub> comes from sunlight exposure.



# Vitamin D

Function – helps the body absorb calcium maintaining bone strength. It also helps the muscles and immune system to function correctly.



# Vitamin D

**Deficiency – leads to poor calcification of bones, rickets and osteomalacia (aching weak bones and muscles).**

**Toxicity – cannot occur through too much sunlight but can occur through diet intake. This can cause hypercalcaemia where calcium is deposited in soft tissues, bones demineralise, kidney and heart damage.**





# Vitamin D

## Sources of vitamin D:

- Sunlight
- Oily fish
- Eggs
- Fortified breakfast cereals
- Fat spreads







# Vitamin E

Function – it is known as an antioxidant as it helps to protect the bodies cells from oxidative damage by free radicals.





# Vitamin E

Deficiency – this is rare and only occurs in people with rare genetic disorders.

Toxicity – is also rare as the body can tolerate very high levels of vitamin E. In extreme cases it may affect other fat-soluble vitamins.



# Vitamin E

**Foods containing vitamin E are:**

- **Vegetable and seed oils e.g. sunflower oil**
- **Seeds e.g. sunflower seeds**
- **Nuts e.g. almonds**
- **Avocado**







# Vitamin K

**Function -  
needed for blood  
to clot normally  
and for bone  
structure.**





# Vitamin K

Deficiency – this is rare and only occurs with conditions such as malabsorption. Low levels of vitamin K are found in babies up to 6 weeks old so they are given it to prevent haemorrhage disease which can be fatal.

Toxicity – this is very rare.



# Vitamin K

**Foods containing vitamin K are:**

- **Green vegetables e.g. broccoli and peas**
- **Some oils e.g. olive, soya and rapeseed oil**
- **Dairy products**
- **Meat**







# Vitamin B

There are several types of vitamin B:

- Vitamin B<sub>1</sub> also known as Thiamine
- Vitamin B<sub>2</sub> also known as Riboflavin
- Vitamin B<sub>3</sub> also known as Niacin
- Vitamin B<sub>6</sub> also known as Pyridoxine
- Vitamin B<sub>12</sub> also known as Cyanocobalamin





# Vitamin B<sub>1</sub>

**Function – it is used to release energy from carbohydrates. It helps the heart and nervous system to function normally.**



# Vitamin B<sub>1</sub>

**Deficiency – can cause beri-beri which is a disease of the nervous system. Alcoholics and people with HIV can develop Wernicke-Korsakoff syndrome due to vitamin B<sub>1</sub> deficiency.**

**Toxicity – this does not occur because the body excretes any excess vitamin B<sub>1</sub>.**







# Vitamin B<sub>1</sub>

Foods containing vitamin B<sub>1</sub>:

- Fortified breakfast cereals
- Bread
- Meat
- Nuts
- Seeds
- Beans
- Peas





## Vitamin B<sub>2</sub>

Function – helps to release energy from fat, carbohydrates and protein. It helps in maintaining normal skin structure. Plays a role in the transport and metabolism of iron, reducing tiredness.



# Vitamin B<sub>2</sub>

**Deficiency – shows symptoms of dry cracked skin around the nose and mouth with a painful tongue.**

**Toxicity – this does not occur as the body excretes any excess vitamin B<sub>2</sub>.**







# Vitamin B<sub>2</sub>

Foods containing vitamin B2:

- Milk
- Fortified breakfast cereal
- eggs
- Some oily fish
- Offal
- Mushrooms
- Almonds
- Green vegetables





# Vitamin B<sub>3</sub>

Function – helps to release energy from carbohydrates, maintains normal skin, nervous system and reduces tiredness.



# Vitamin B<sub>3</sub>

**Deficiency – is rare but can cause a disease called pellagra.**

**Toxicity – can occur during hyperlipidaemia treatment and severe toxicity symptoms are itchy, flushed skin, nausea and gastrointestinal problems.**





# Vitamin B<sub>3</sub>

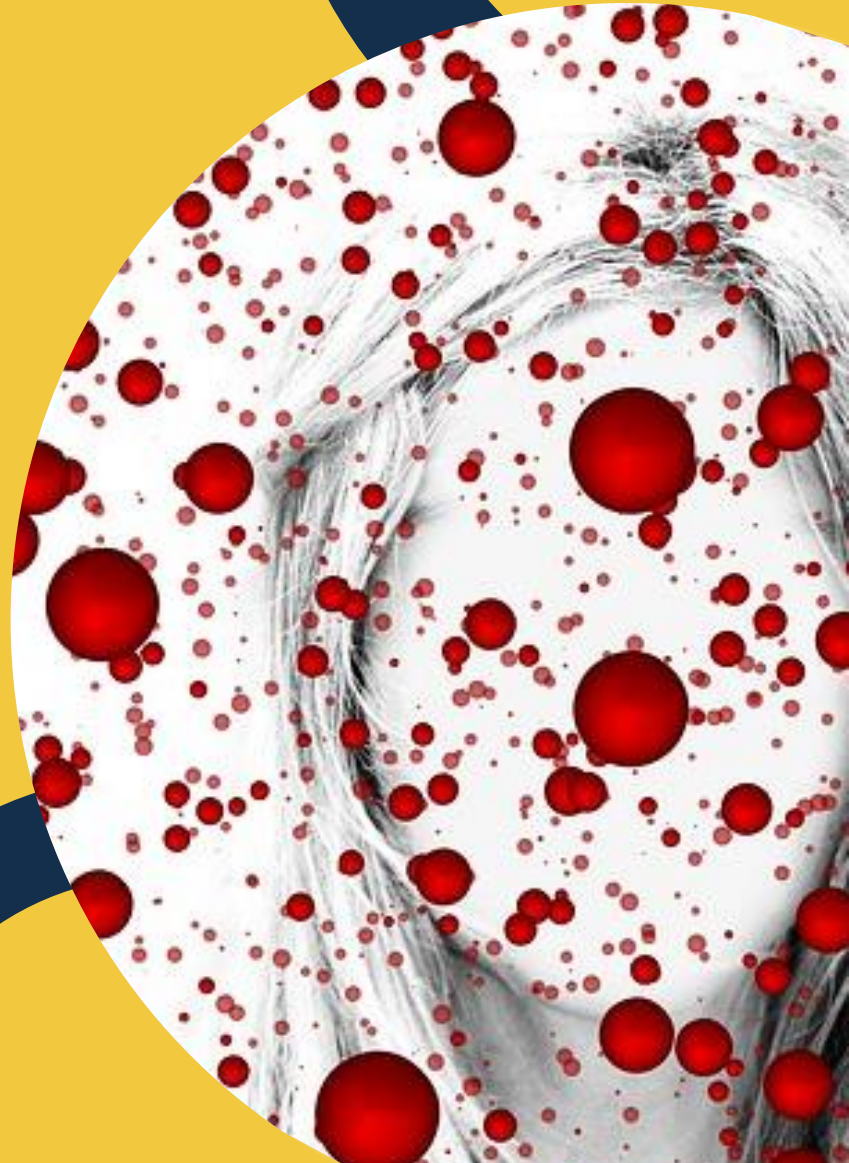
Foods containing B<sub>3</sub> are:

- Eggs
- Meat
- Poultry
- Fish
- Wholegrains
- Bread
- Wheat
- Dairy products



# Vitamin B<sub>6</sub>

**Function – it helps to make red blood cells, transport and metabolise iron in the body. It enables the immune system to work, helps in hormone regulation and reduces tiredness.**





# Vitamin B<sub>6</sub>

**Deficiency – this is rare as vitamin B<sub>6</sub> is found easily in foods and the bodies gut flora.**

**Toxicity – can cause sensory nerve damage.**





# Vitamin B<sub>6</sub>

Foods containing vitamin B<sub>6</sub> are:

- Meat
- Poultry
- Milk
- Eggs (yolk)
- Fish
- Soya beans
- Some fruit e.g. bananas
- Some vegetables e.g. green pepper





# Vitamin B<sub>12</sub>

**Function – helps the normal function of the nervous system, makes red blood cells and the metabolism of folate. It helps to keep the immune system functioning correctly and reduces tiredness.**





# Vitamin B<sub>12</sub>

**Deficiency – occurs in strict vegans and older people with absorption problems. It causes pernicious anaemia when red blood cells become enlarged and damage to the nervous system can occur.**

**Toxicity – this is very rare.**





# Vitamin B<sub>12</sub>

Foods containing vitamin B<sub>12</sub> are:

- Meat
- Fish
- Milk
- Cheese
- Eggs
- Fortified breakfast cereals







# Folate

**Function – it is used to make red blood cells, maintain a healthy immune system and reduce tiredness. In unborn babies it is essential for the nervous system development.**





# Folate

**Deficiency – this causes megaloblastic anaemia and shows symptoms such as insomnia, irritability, depression and forgetfulness.**

**Toxicity – this is not thought to cause any serious effects.**





# Folate

Foods containing folate are:

- Green leafy vegetables
- Offal
- Beans
- Oranges
- Fortified breakfast cereals
- Bananas
- Brown rice
- Peas







# Vitamin C

Function – it is known as an antioxidant, it protects the bodies cells from oxidative damage from free radicals. It is also used when making collagen in the body. This is very important for connective tissues such as gums, bones, skin and teeth and the healing process. Vitamin C helps the immune system and the nervous system function correctly. It plays a role in helping the body to absorb non-haem iron (iron from plants e.g. broccoli) in the gut.







# Vitamin C

**Deficiency – severe deficiency can lead to scurvy which can cause damage to bone and other tissue. Mild deficiency can cause fatigue, aching muscles and joints.**

**Toxicity – this can cause diarrhoea and intestinal pain.**



# Vitamin C

**Foods containing vitamin C are:**

- **Fruit e.g. especially citrus fruit and berries**
- **Green vegetables e.g. broccoli**
- **Tomatoes**
- **Peppers**





# Revision Activity 2

**What are the fat soluble vitamins?**