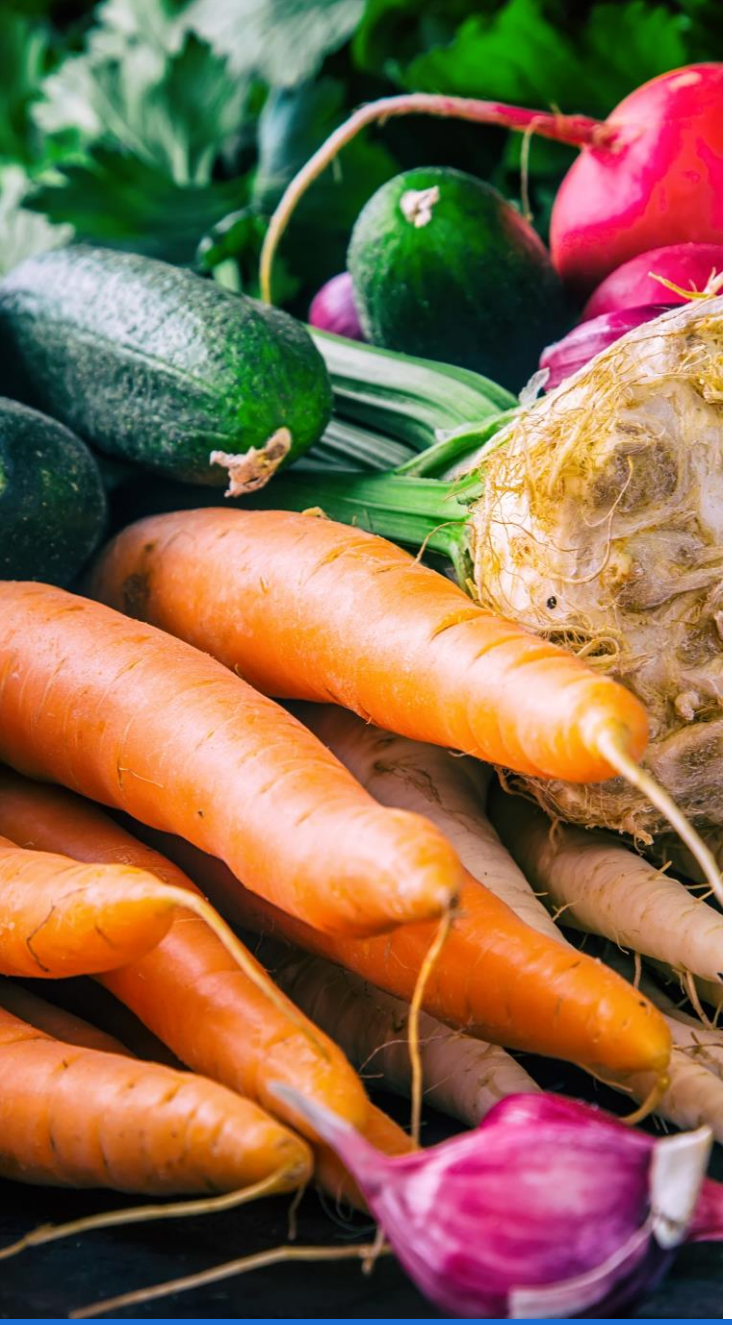
Professional Diploma in Nutrition

Module 1

Lesson 3:
Mighty Micro's

EQF Level 5
Professional Diploma
European Qualifications Framework

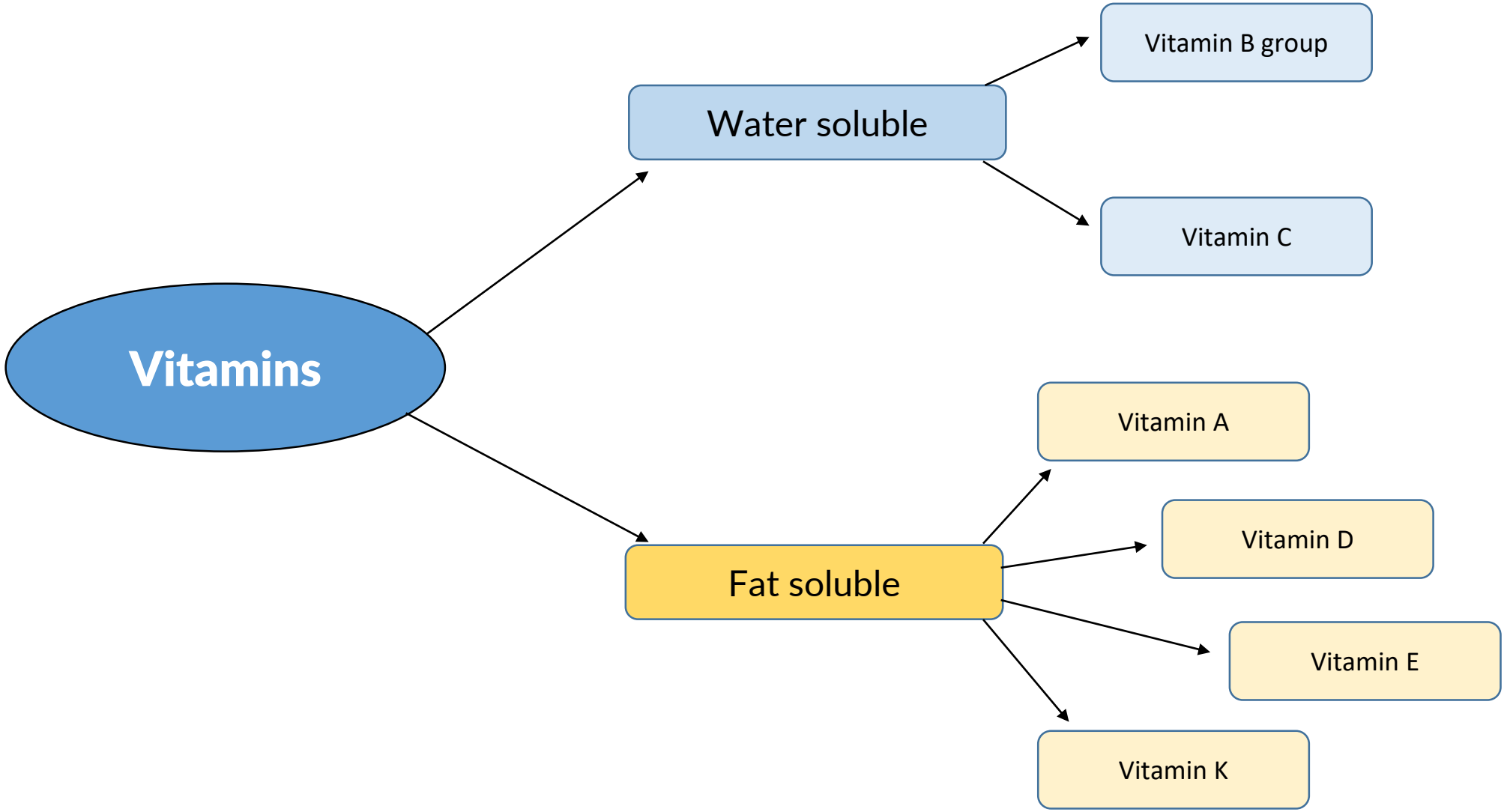
Micronutrients



Vitamins

- Diverse array of chemicals
- Needed in small quantities
- Essential for many processes carried out in the body
- Dietary intake essential
- Deficiency causes disease
- Over consumption via supplements is also harmful. This is called TOXICITY

Classification of Vitamins



Vitamin B1 - Thiamine

Function:

Assists energy production

Food sources:

Wholegrains, enriched grains liver, pork, dried beans, nuts and seeds.

Deficiency:

Beriberi, loss of appetite, aches and pains or tingling sensations.

Vitamin B2 - Riboflavin

Function:

Assist energy production. Helps the body use other B vitamins.

Food sources:

Soybeans, meat, poultry, liver, eggs, milk, cheese, yoghurt, wholegrains and enriched grains.

Deficiency:

Dermatitis, peeling of the skin around the nose, stomatitis.

Vitamin B3 - Niacin

Function:

Helps metabolise macronutrients for energy. Enzyme function.

Food sources:

Mushrooms, peanut butter, meat, fish, poultry, wholegrains and enriched grains.

Deficiency:

Dry, cracked and scaly skin, pellagra.

Vitamin B5 – Pantothenic Acid

Function:

Helps utilise fats and CHO for energy, makes hormones.

Food sources:

Organ meats, milk, fish, poultry, wholegrains, legumes, sweet potatoes, broccoli, cauliflower, oranges and strawberries.

Deficiency:

Numbness and shooting or burning pains in the feet and/or chronic fatigue.

Vitamin B6 - Pyridoxine

Function:

Helps utilise Protein and Glycogen, helps form haemoglobin.

Food sources:

Potatoes, bananas, meat, fish, poultry, liver, soybeans, chickpeas, lentils, nuts and sunflower seeds.

Deficiency:

Eczema/dermatitis, stomatitis. Leg cramps/numbness of hands/feet, mood abnormalities, migraine headaches, nausea/dizziness, anaemia.

Vitamin B7 - Biotin

Function:

Allows your body to use protein, fat and carbohydrates from food.

Food sources:

Sweet potatoes, yoghurt, peanuts, almonds, eggs, liver, soy protein.

Biotin content in food can vary greatly

Vitamin B9 – Folate

Function:

Helps to produce DNA, cells, red blood cells. Prevent anaemia.

Taking folic acid lowers the risk of having a baby with NTD's.

Food sources:

Asparagus, cooked spinach, romaine lettuce, Brussel sprouts, beets, broccoli, corn, green peas, oranges, orange juice, bread, enriched pasta, wheat germ, liver, dried beans, soybeans, flaxseeds, sunflower seeds and lentils.

Vitamin B12 - Cobalamin

Function:

Works with Folate to make DNA, makes blood cells, nerve health.

Food sources:

Milk, cheese, yoghurt, fortified soy products, meat fish, poultry, liver and eggs.

Deficiency:

May lead to pernicious anaemia

Vitamin C

Function:

Prevent cells damage, helps heal cuts and wounds and keeps gums healthy. Keeps the immune system healthy. Increases iron absorption.

Food sources:

Citrus fruits, peppers, broccoli, tomatoes, dark leafy green vegetables and Brussel sprouts.

Deficiency:

Bruising, slow healing wounds and fractures, nosebleeds, bleeding gums and loose teeth, scurvy

Vitamin A	**Function:** Healthy eyes, protects from infections, promotes normal growth and development.	**Food sources:** Liver, some fish, milk and cheese.	**Deficiency:** Slow bone formation, night blindness, rough dry scaly skin, increased susceptibility to colds and infections.
Vitamin D	**Function:** Increases calcium and phosphorus absorption, bone and teeth health.	**Food sources:** Milk, fortified foods, some fish, eggs and organ meats.	**Deficiency:** Rickets, Osteomalacia.

Vitamin E	**Function:** Healthy immune system, antioxidant and protects cells from damage.	**Food sources:** Vegetable oils, avocados, green veg, wheat germ, sunflower seeds,	**Deficiency:** Loss of appetite, nausea, anaemia, weak immune system or eye problems..
Vitamin K	**Function:** Clots blood. Makes body proteins for your blood, bones and kidneys.	**Food sources:** Broccoli, soybeans, dark green leafy vegetables and turnip/ beet greens.	**Deficiency:** Bruise or bleed easily, blood taking longer to clot than normal.

Special Consideration

Vitamin D:
If you are over 50 years old, you have higher needs for vitamin D. This amount may be difficult to meet with food alone. Recommendations are that men and women over the age of 50 should take a daily supplement.

Folate:
All women who could become pregnant, are pregnant or breastfeeding are recommended to take a daily folic acid vitamin to help prevent NTD's.

Vitamin C:
Smokers are advised to increase their Vitamins C each day. This can be met easily by eating a variety of fruits and vegetables each day. NIH recommend 35mg more for smokers every day.

Vitamin K:
People who use Warfarin (Coumadin) should take the same amount of Vitamin K each day. A sudden increase or drop in Vitamin K foods can affect how the medication works.

Vitamin Toxicity

- Overloading on vitamins can be harmful
- Toxicity can occur when upper limit for intake is exceeded
- Hyper-vitaminosis
- Usually occurs from self treating

Vitamin Toxicity

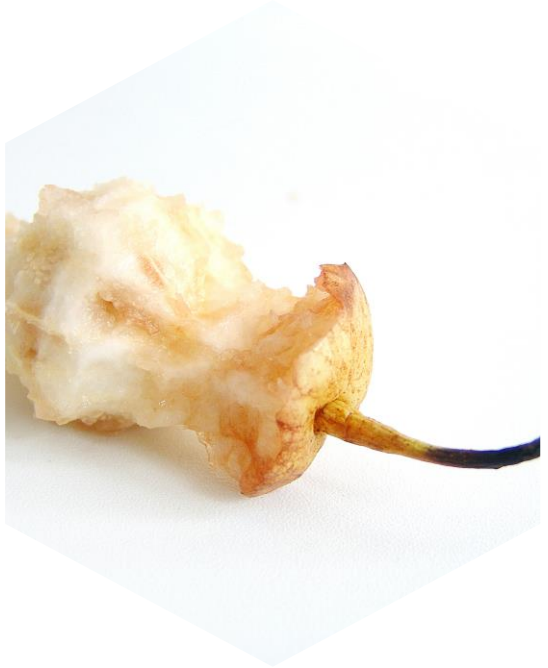
Vitamin	Toxicity Symptoms
A	Red blood cell breakage, nosebleeds, bone pain, headaches, nausea, vomiting, diarrhoea, weight loss, blurred vision, muscle weakness, fatigue, loss of appetite, dry skin, rashes, loss of hair, hair loss, brittle nails
D	Raised blood calcium, thinning of tooth enamel, excessive thirst, headaches, weakness, nausea, loss of appetite, calcification of soft tooth tissues
E	Augments the effects of anti-clotting medication, nausea, GI discomfort, blurred vision, fatigue
K	Interference with anti-clotting medication

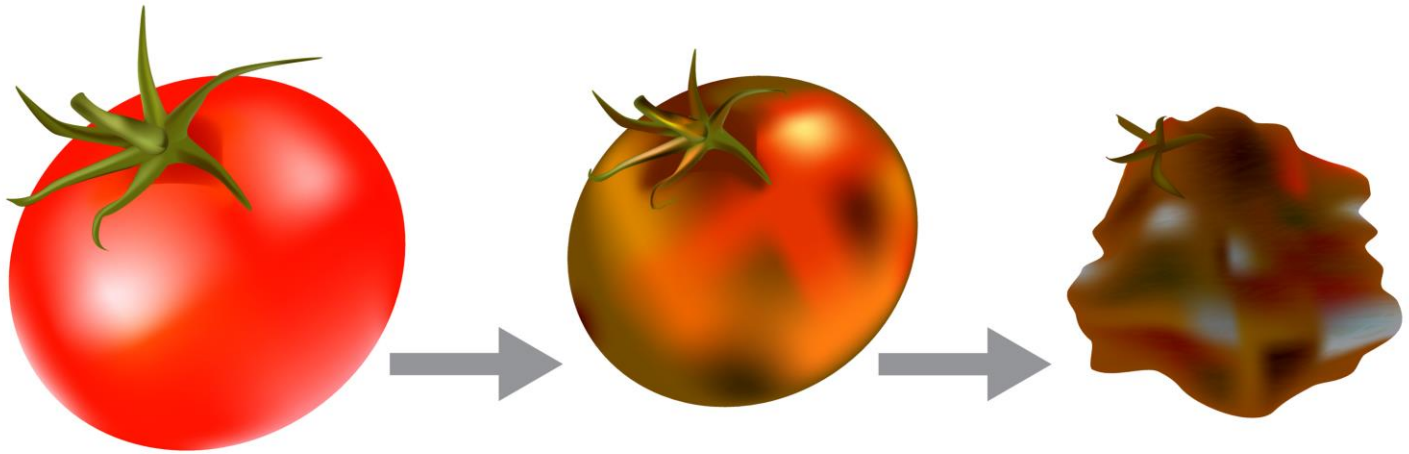
Vitamin Toxicity

Vitamin	Toxicity Symptoms
C	Nausea, abdominal cramps, diarrhoea, excessive urination, headache, fatigue, rashes, aggravation of gout
B1 (Thiamin)	No toxicity symptoms reported
B2 (Riboflavin)	No toxicity symptoms reported
B3 (Niacin)	Nausea, vomiting, painful flush, rash, sweating
B5 (Pantothenic Acid)	Infrequent water retention
B6 (Pyridoxine)	Bloating, fatigue, impaired memory, irritability, headaches, numbness, restlessness
B7 (Biotin)	No toxicity symptoms reported
B9 (Folate)	Masks B12 deficiency
B12 (Cobalamin)	No toxicity symptoms reported

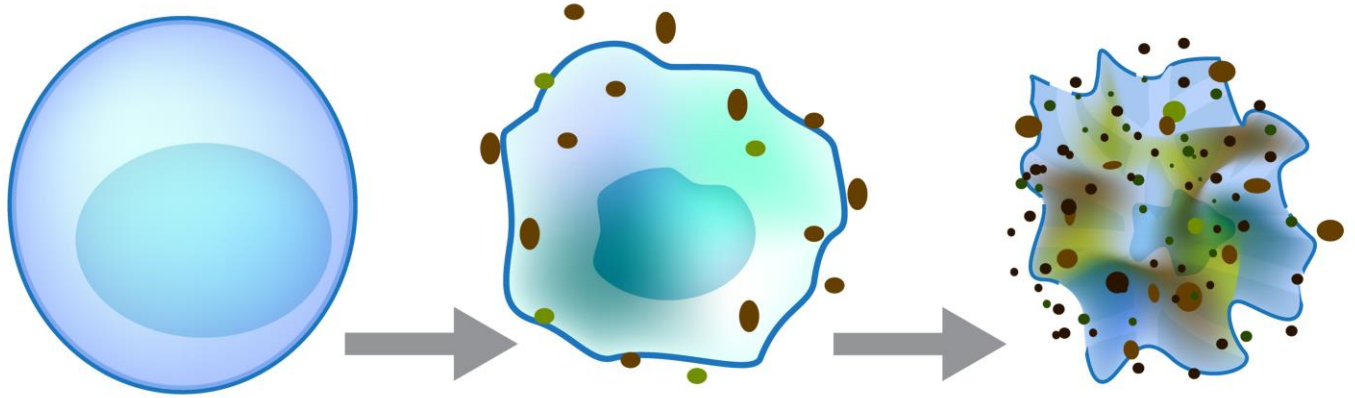
Antioxidants

Antioxidants





OXIDATIVE STRESS



Normal cell

Cell attacked by free radicals

Cell with oxidative stress

Main Antioxidants

- Vitamin C
- Vitamin E
- Vitamin A
- Carotenoids
  - These are not classed as vitamins but some can turn into Vitamin A in the body.
  - Food sources: Cantaloupe, pink grapefruit, tomatoes, broccoli, dark orange vegetable and sweet potatoes.

- Flavonoids/ Phytonutrients
  - Plant chemicals with anti-inflammatory and immune system benefits.
  - Onions, strawberries, kale, grapes, citrus fruit and many spices.
- Selenium

Minerals and Trace Elements

➢Required in small amounts

➢Essential for normal body function

Major Minerals

- Ca — Calcium
- P — Phosphorous
- Mg — Magnesium
- Na — Sodium
- K — Potassium
- Fe — Iron
- Zn — Zinc
- Cu — Copper
- Cr — Chromium
- Mn — Manganese
- Se — Selenium
- F- — Fluoride
- I — Iodine

Mineral	Function	Sources	Deficiency
Calcium	Strengthens bones and teeth. Regulates heartbeat and helps with muscle and nerve function	Milk, dairy products, dark green leafy vegetables, salmon, sardines, turnips, tofu, almonds, broccoli. Absorption increased with vitamin D.	Can affect bone and teeth formation
Iodine	Keeps the thyroid gland working, which helps regulate the rate at which our body carries out necessary physiological functions	Seafood, seaweed, dairy products, iodised salts	Enlargement of the thyroid gland
Iron	Helps the blood and muscles carry oxygen to the body	Liver, red meat, egg yolk, legumes, whole grains, dark green vegetables. Absorption increased with vitamin C	Anaemia-, insomnia, palpitations

Mineral	Function	Sources	Deficiency
Magnesium	Relaxes muscles, aids metabolism, aids in bone growth.	Wholegrains, nuts, legumes, apricots, bananas, soy, beans, green leafy vegetables.	Fatigue, numbness, poor memory, muscle twitching, irritability, tingling, rapid heartbeat.
Potassium	Essential for nerve function, muscle contraction and maintenance of fluid in the body. Maintenance of blood pressure.	Oranges, bananas, peanuts, beans, potatoes, spinach.	Fatigue, hypertension, decreased heart rate.
Selenium	Helps to prevent damage to cells and aids in functioning the thyroid gland.	Tuna, brazil nuts, eggs, grains, chicken, shellfish, fish.	Poor heart function, osteoarthropathy, mental retardation.
Zinc	Helps wounds to heal. Aids taste and smell senses.	Whole-wheat, peanut, poultry, eggs, legumes, beef, shellfish	Growth retardation, hair loss, diarrhea, delayed sexual maturation and impotence, eye and skin lesions, and loss of appetite.

Absorption of Minerals

- For minerals to be absorbed properly, the digestive system needs to be in good working order
- Good stomach acid levels are needed to help separate the mineral from food or supplement
- The body controls mineral absorption via the intestinal wall depending on the needs and requirements
- Over-loading the body can result in toxicity
- Foods rich in Phytates can block absorption (fibre-containing whole grain products – beans, seeds, nuts and soy foods)
- Foods rich in Oxalates can hinder absorption also (rhubarb, beets, spinach, sweet potatoes, tea, chocolate and soy products)
- Some Vitamins and Minerals improve absorption

Superfoods

Superfoods

- There is no definition of “Superfoods”
- The EU has banned health claims on packaging unless it is supported by scientific evidence. But this hasn’t stopped many food brands from funding academics to research the health benefits of their product
- The superfood trend exploits the fact that healthy lifestyle choices including diet, can reduce our risk of chronic diseases like heart disease, stroke and cancer
- Most research on superfoods tests chemicals and extracts in concentrations which are not found in the food in its natural state

Blueberries

- Great source of Vitamin K, C, Fibre, Manganese and other antioxidants.

Goji berries

- Great source of Vitamin C, B2, A, iron, selenium and other antioxidants.

Chocolate

- Chocolate is the processed and sweetened food produced from cocoa.
- Cocoa is a good source of iron, magnesium, manganese, phosphorous and zinc.

Wheatgrass

- Wheatgrass contains chlorophyll, Vitamin A, C, E, Iron, Calcium and Magnesium.

Beetroot

- Good course of iron and folate, nitrates, betaine, magnesium and other antioxidants.

Green Tea

- Contains B vitamins, folate, Manganese, Potassium Magnesium, Caffeine and other antioxidants.

Oily fish

- Good source of Vitamin D, Protein some B vitamins and selenium. It is also a rich course of omega-3 fatty acids.

Broccoli

- Good source of Vitamin C and folate, Vitamin A, K, calcium and fibre, beta-carotene and other antioxidants.

Garlic

- Contains Vitamin C and B6, Manganese, Selenium and other antioxidants.

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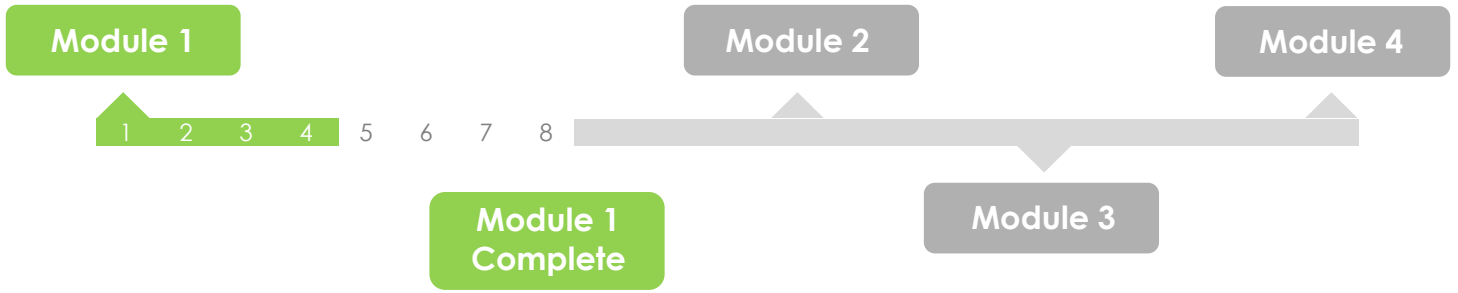
Q&A | See You For Lesson 4



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