

# Professional Diploma in Nutrition

## Module 1

### Lesson 2: Magical Macro's



**EQF Level 5**  
Professional Diploma



# What is Nutrition?

“Nutrition is the intake of food, considered in relation to the body’s dietary needs” (WHO)





# Who is Nutrition Important for?

- Nutrition affects everyone
- Cornerstone of good health

## Poor nutrition can lead to:

- Reduced immunity
- Increased susceptibility to disease
- Impaired physical and mental development reduced productivity.

# Benefits of Good Nutrition



Refuels energy stores



Helps you to reach your weight loss/gain targets



Boosts immune system



Improves sports performance



Enhances concentration levels



Delays fatigue

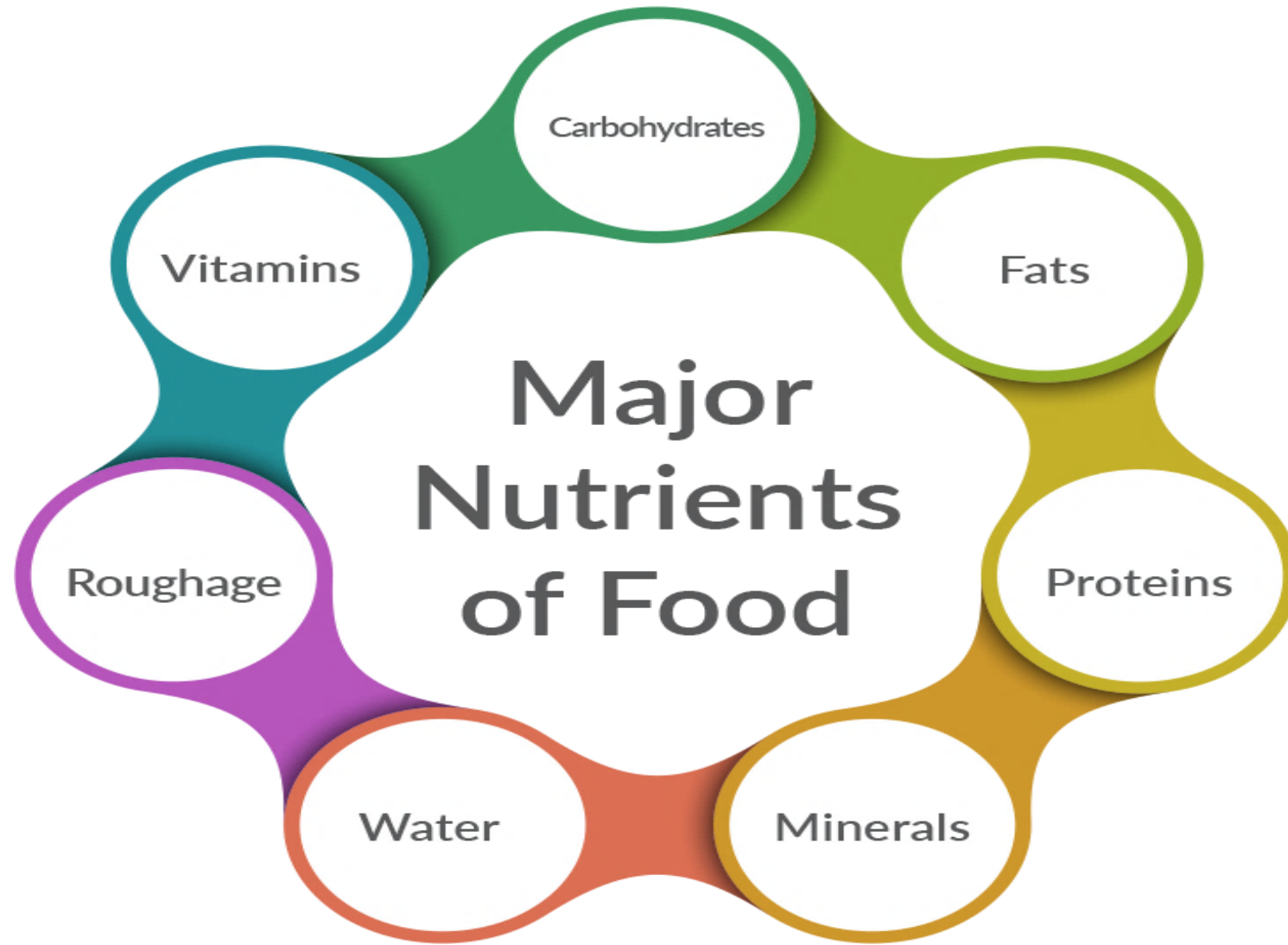


Protects teeth and keeps gums health



Fights and helps to prevent disease

# Essential nutrients for life



# Macronutrients



Protein



Fats



Carbohydrates

# Protein



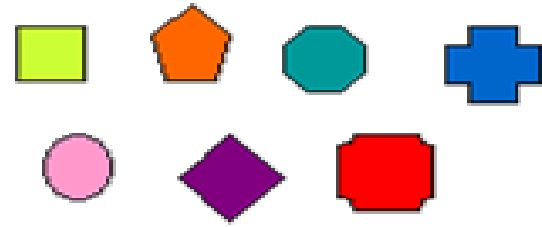
# Functions of Protein



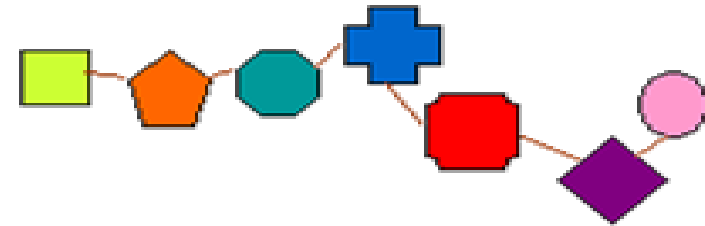
- **GROWTH & REPAIR of tissues and cells**
- **Enzymatic function-** all enzymes are proteins
- **Transport function-** Act as carriers for other nutrients e.g. haemoglobin carries oxygen
- **Hormonal function-** e.g. insulin
- **Immune function-** antibodies fight illness
- **Buffering function-** maintain pH balance of the blood
- **Dietary energy-** 4 kcal/ g (17KJ)

Protein is the most satisfying nutrient

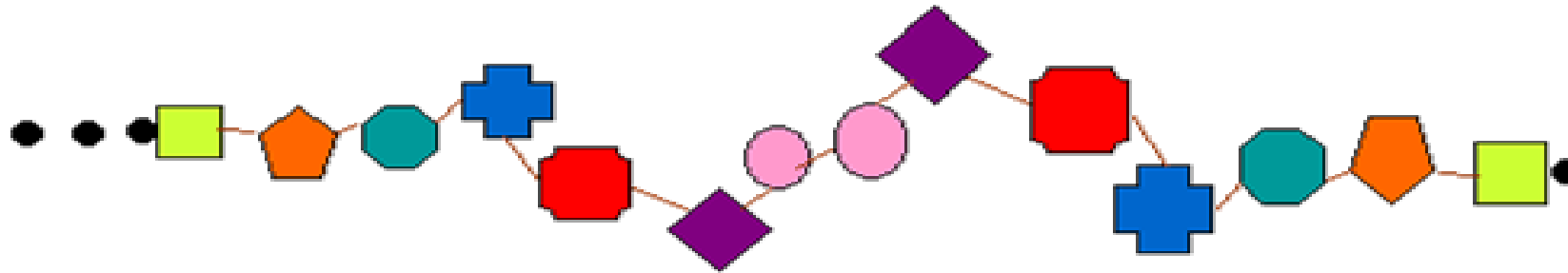
# Structure of Protein



Amino acids



Polypeptide chain -  
a short chain of amino  
acids



A protein - a long chain of amino acids.  
The sequence of amino acids will determine  
the proteins shape & therefore function.

# Structure of Protein

## Amino acids

### Essential

1. Isoleucine
2. Leucine
3. Valine
4. Lysine
5. Methionine
6. Phenylalanine
7. Threonine
8. Tryptophan
9. Histidine
10. Arginine
11. Selenocysteine

### Conditionally Essential

1. Arginine
2. Cysteine
3. Glutamine
4. Glycine
5. Proline
6. Tyrosine

### Non-Essential

1. Alanine
2. Aspartic acid
3. Asparagine
4. Glutamic acid
5. Serine

### Branched-Chain

1. Valine
2. Leucine
3. Isoleucine

# Protein Requirements

WHO: recommends 0.80g/kg  
body weight per day  
Or 0.36g/lb body weight for the  
average adult

## Example:

So if you weigh 70kg you will need:

70 kg x 0.80g protein = 56g/day

70kg = 154 lbs

0.36g x 154 lbs = 55.4 g/day





# Sources of Protein

What is Biological Value?

**High Biological Value:** when a protein contains the essential amino acids in a proportion similar to that required by humans

**Low Biological Value:** when the protein is missing one or more essential amino acids are scarce

When 2 incomplete proteins are eaten together they can compensate each other

Food	Portion size	Amount of Protein (grams)	Food	Portion size	Amount of Protein (grams)
Fillet of beef steak	100g	29	Soy burger	1 burger (60g)	5
Chicken breast	100g	32	Quorn mince	100g	12
Roasted Turkey breast	100g	33	Wholemeal bread	2 slices (76g)	7
Canned Tuna	1 small tin (100g)	24	Pasta (boiled)	100g	7
Grilled salmon	100g	24	Brown rice (boiled)	100g	3
Cottage cheese	Small carton (100g)	13	Almonds	3 ounces	10
Cheddar cheese	30g	8	Banana	1	1.2
Milk (skimmed)	1 glass (200ml)	7	Broccoli	1 cup	10
Egg (boiled)	1 egg	6	Chickpeas	1 cup	5
Natural yoghurt	Small carton (125g)	6	Corn	1 cup	15
Fromage frais	1 small tub (100g)	5	Lentils	1 cup	4.2
Peanut butter	1 tablespoon	4	Peas (frozen)	1 cup	9
Pumpkin seeds	2 tablespoons	7	Spinach (frozen)	1 cup	7
Cashew nuts	Handful (10 nuts)	2	Avocado	1 cup	3
Baked beans	1 small tin (200g)	10	Quinoa	100g	18.4
Hummus	1 small serving (60g)	5	Oats	100g	11g
Tofu	Half packet (125g)	10	Milk (low-fat)	250ml	10g

# Fat



# Functions of Fat

- Supply fuel for cells- **9Kcals/ g (38 KJ)**
- ENERGY DENSE
- Provide essential fatty acids
- Act as a carrier for fat soluble vitamins (A,D,E,K) and antioxidants
- Insulate the body and provide a reserve of energy
- Protective layer for the organs
- Form brain tissues, nerves cell membrane
- Main intake from unsaturated
- Omega 3 fatty acids may be of particular benefit



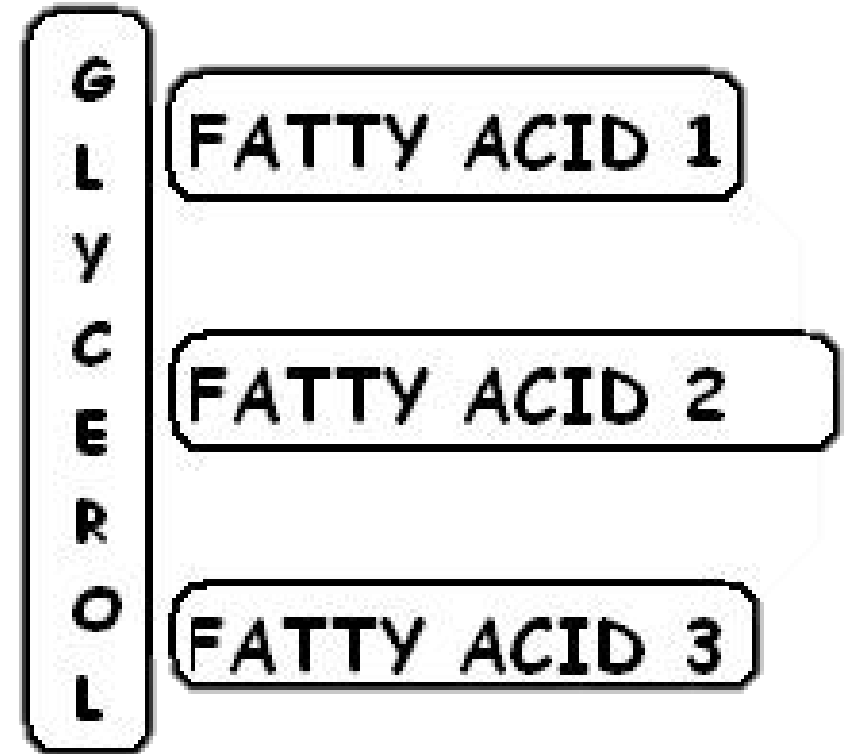
# Structure of Fat

Belong to a group of compounds known as lipids

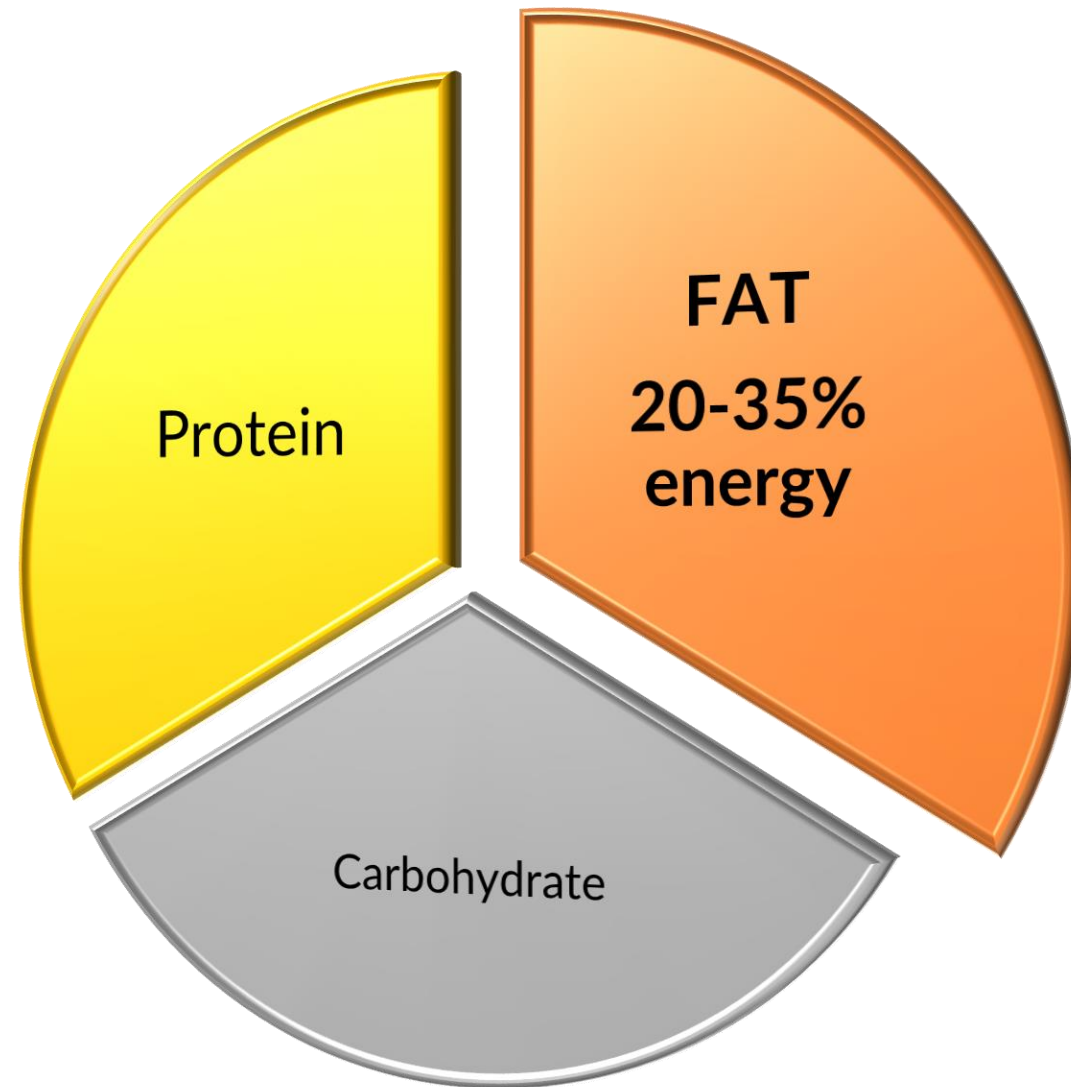
Found in both plant and animal sources

3 main types of lipids:

- ✓ Triglycerides (Glycerolipids)
- ✓ Phospholipids
- ✓ Sterols (Cholesterol)



# How Much Fat?



	<b>Trans Fat</b>	<b>Saturated Fat</b>	<b>Unsaturated Fats</b>
Composition	Chemically modified via hydrogenation to be solid at room temperature.	Solid at room temperature.	Liquid at room temperature.
Benefits/Detriments	Increased inflammation in the body, potential for red blood-vessel abnormalities. May cause insulin resistance, thus promoting diabetes, increased risk of cardiovascular disease	Consumed in moderation, saturated fats can have benefits for the liver and lungs. Consumed in excess, saturated fats can be harmful to cholesterol and the heart.	Source of energy, essential fatty acids essential to growth and development, healthy cells, improved brain function, beneficial for skin and other tissues, absorption of vitamins.
Effects on cholesterol	Raise LDL (bad cholesterol) and lower HDL (good cholesterol) in the body.	Diets high in saturated fat increase LDL levels.	Increase HDL levels and lower LDL levels in the body.
Recommendation	None at all.	Moderate.	Majority of you fat intake.
Typical source	Processed foods	Animal products	Vegetarian sources.
Examples	Donuts, fried foods, chips, some margarine and dressings.	Butter, cheese, chicken, beef, turkey.	Olive oils, nuts, seeds, fish, avocados.



# Monounsaturated fat (MUFAs)

- Improves blood cholesterol levels by lowering LDL levels in your blood, which can decrease your risk of heart disease
- Oils that contain monounsaturated fats are typically liquid at room temperature
- Provide us with essential nutrients - Oils rich in MUFAs contribute vitamin E to the diet

## Foods:

- olive oil, canola oil, peanut oil, safflower oil, sesame oil
- avocados
- peanut butter
- nuts and seeds



# Polyunsaturated fat (PUFAs)

- Oils that contain polyunsaturated fats are typically liquid at room temperature.
- Improves blood cholesterol levels, which can decrease your risk of heart disease.
- Provide us with essential nutrients - Oils rich in PUFAs contribute vitamin E to the diet.

## Foods:

- Corn oil, soybean oil, sunflower oil
- Fatty fish such as salmon, mackerel, herring and trout
- Some nuts and seeds such as walnuts and sunflower seeds, tofu and soybeans

# Omega-3 Fatty Acids

- Type of polyunsaturated fatty acids
- Contain EPA & DHA, essential for heart health
- Decrease the risk of arrhythmias (abnormal heartbeats), decrease triglyceride levels, slow the growth rate of atherosclerotic plaque and lower blood pressure

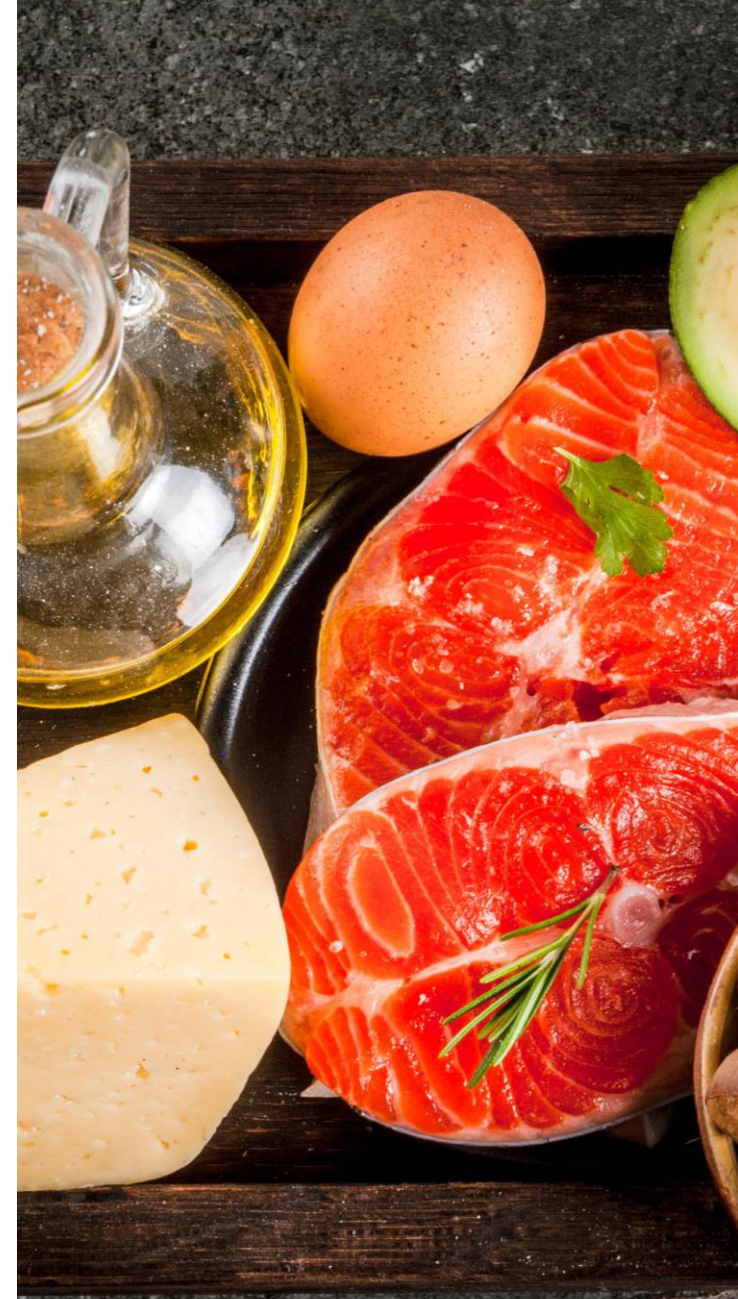
## Foods:

- Salmon, tuna, sardines, mackerel or shellfish
- Walnuts, flaxseed, and canola and soybean oils
- Tofu and other forms of soybeans, canola, walnut and flaxseed, and their oils contain alpha-linolenic acid (ALA), another type of omega-3 fatty acid.



# Essential Fatty Acids

- Slow digestion by slowing down the rate of which the stomachs empties
- Slows carbohydrate digestion and therefore blood sugar spikes
- Decreases insulin resistance
- Boosts metabolism
- Increases fat and cholesterol metabolism
- Reduces inflammation
- May help with low mood



# Essential Fatty Acid Deficiencies

- Difficulty losing weight
- Cracked/dry skin
- Hair loss
- Depressed
- Anxious
- Poor wound healing
- Irritability
- Soft or brittle nails
- Allergies
- Spotty skin back of arms and legs
- Fatigue
- High blood pressure
- Arthritis
- Painful breasts



# Omega-3 Consumption

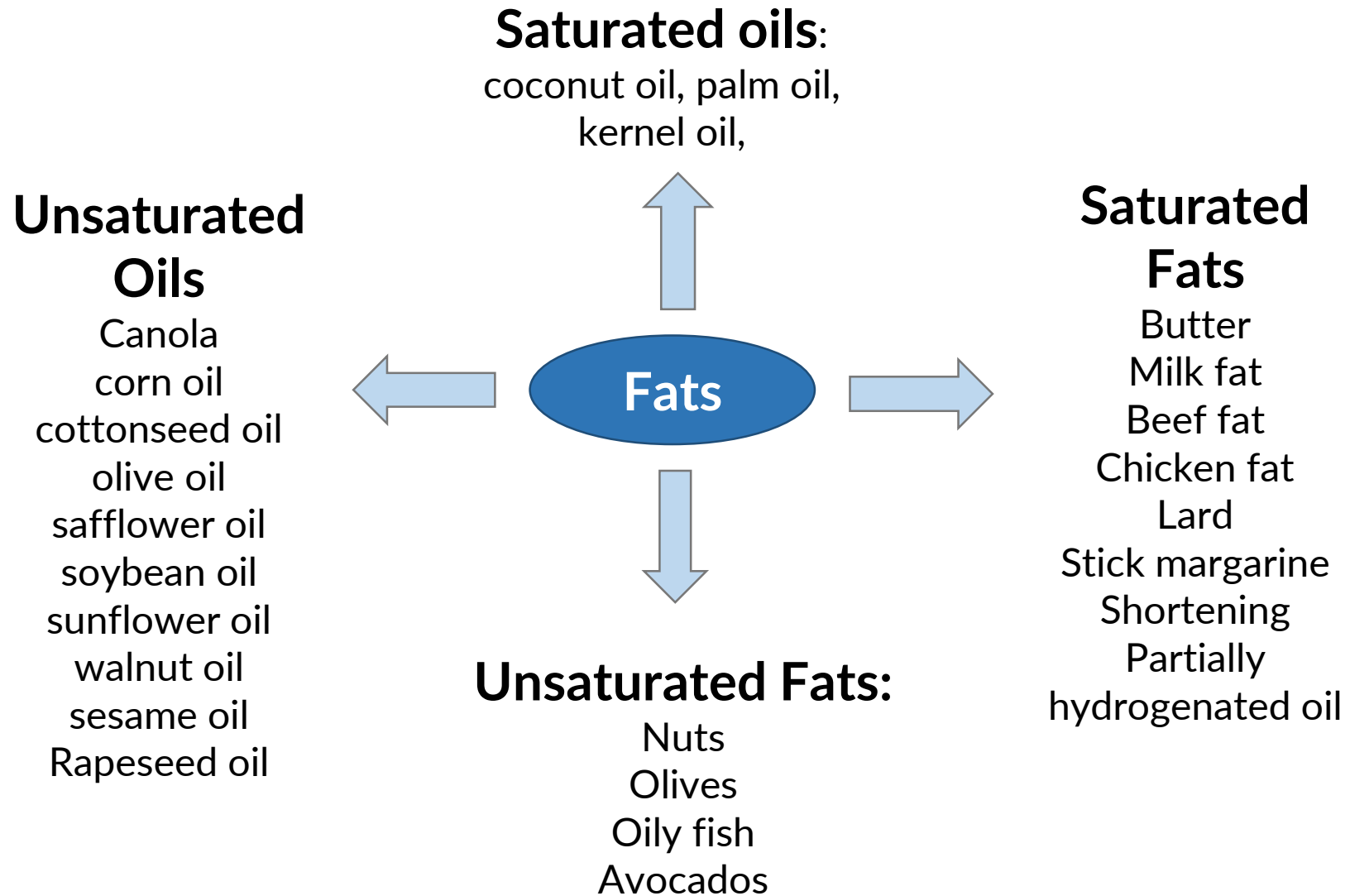
- Guidelines 2011 recommend 8 ounces or 227g a week
- 250mg EPA & DHA

## Omega-3 Sources:

- Salmon (Atlantic, Chinook, Coho): 1,200-2,400 mg.
- Anchovies: 2,300-2,400 mg.
- Yellowfin tuna: 150-350; canned: 150-300 mg.
- Sardines: 1,100-1,600 mg.
- Trout: 1,000-1,100 mg.
- Crab: 200-550 mg.
- Cod: 200 mg.
- Scallops: 200 mg.
- Lobsters: 200 mg.
- Tilapia: 150 mg.
- Shrimp: 100 mg.



# Sources of Fat



# Which Oil do I use?

- Oils have different Flash point temperatures
  - Heating oil above its smoke point causes it to oxidise, react with oxygen to form free radicles
  - Monounsaturated and saturated oils quite resistant to heat
  - Polyunsaturated oils should be avoided as the double bonds are chemically reactive and sensitive to heat
- 
- Coconut Oil – (90% Saturated fat)
  - Butter – (90% Saturated fat)
  - Palm Oil – Mostly saturated & monounsaturated very good for cooking
  - Olive oil – Extra virgin or cold pressed



# Tips for Cooking

## High smoke point

- Coconut oil
- Palm oil
- Avocado oil
- Almond oil
- Corn oil
- Soybean oil
- Peanut oil
- Sesame oil
- Safflower

## Moderately high smoke point

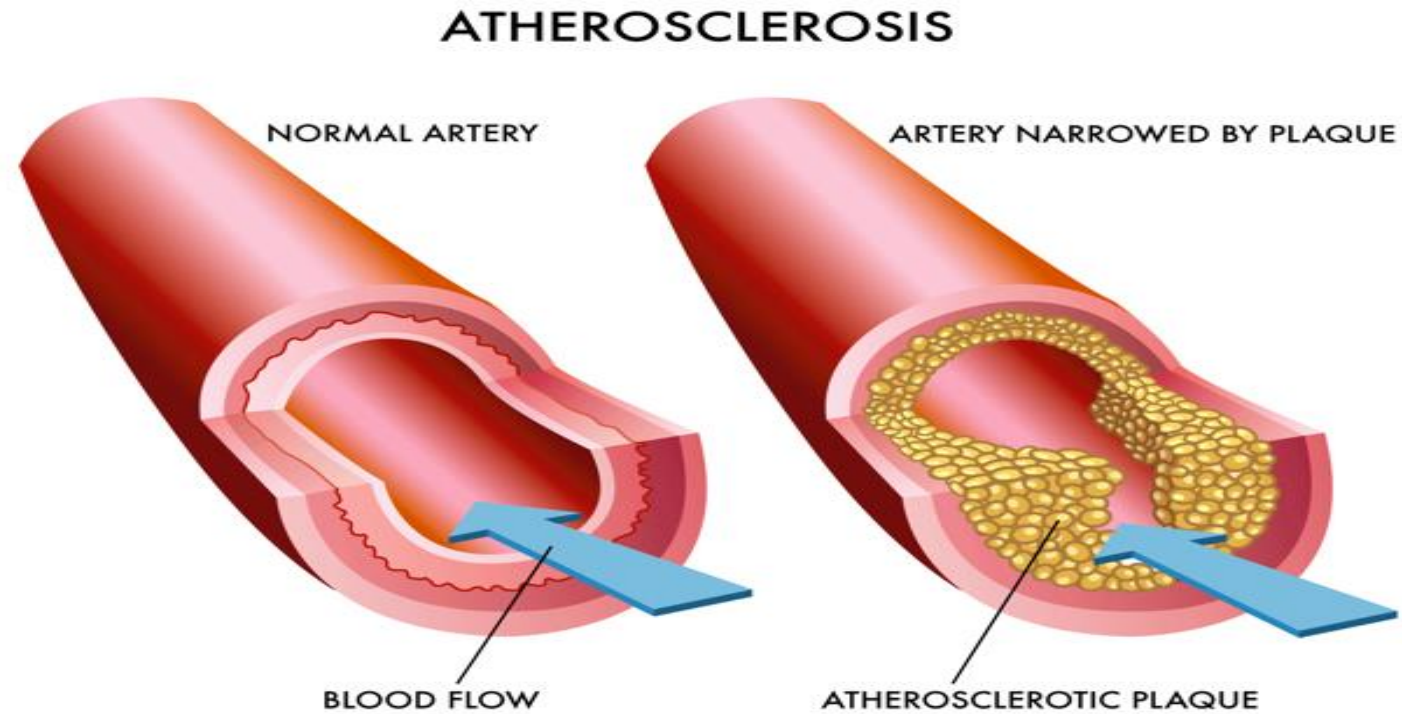
- Extra virgin olive oil
- Canola oil
- Grapeseed oil

## Low smoke point

- Flaxseed oil
- Walnut oil

Best used for salad dressings

# Cholesterol



# Cholesterol

	Total Cholesterol	LDL (Bad) cholesterol	HDL (good) cholesterol	Triglycerides
USA	<200mg/dl	Keep less than  <70mg/dl (people at high risk of heart disease)  100-129mg/dl (healthy people)	>40mg/dl (men- good)  >50mg/dl (women- good)	<150mg/dL desirable  150-199mg/dL Borderline high
Ireland	≤5 mmol/l  No more than 4.5 for people with heart disease or diabetes	Keep less than  3 mmol/l (healthy people)  2.5 mmol/l (for people with heart disease or diabetes)	More than 1 mmol/l	No more than 2 mmol/l

# Carbohydrates

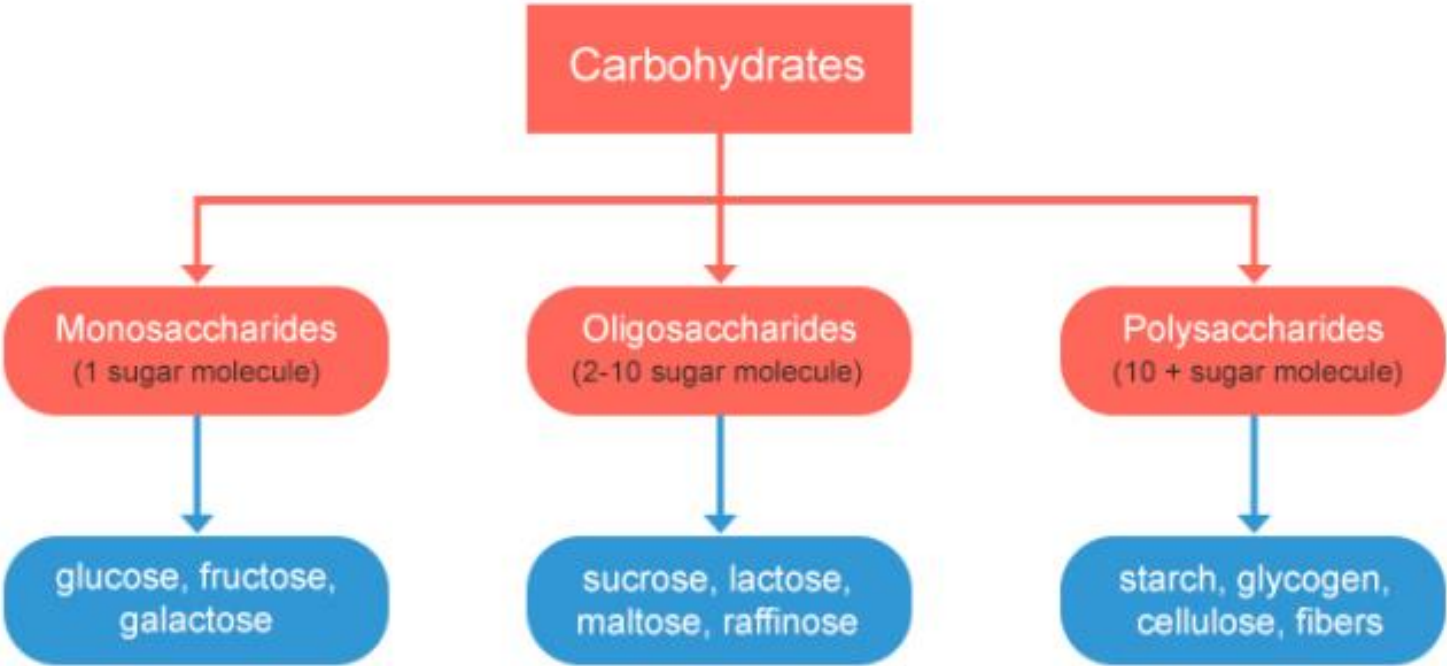


# Functions of Carbohydrates

- **ENERGY**
- Carbohydrates are the principal source of energy in most human diets
- Most important fuel for exercise
- Stored as glycogen in liver and muscles
- Maintain blood glucose levels
- **Dietary energy- 4 kcal/ g (17KJ)**

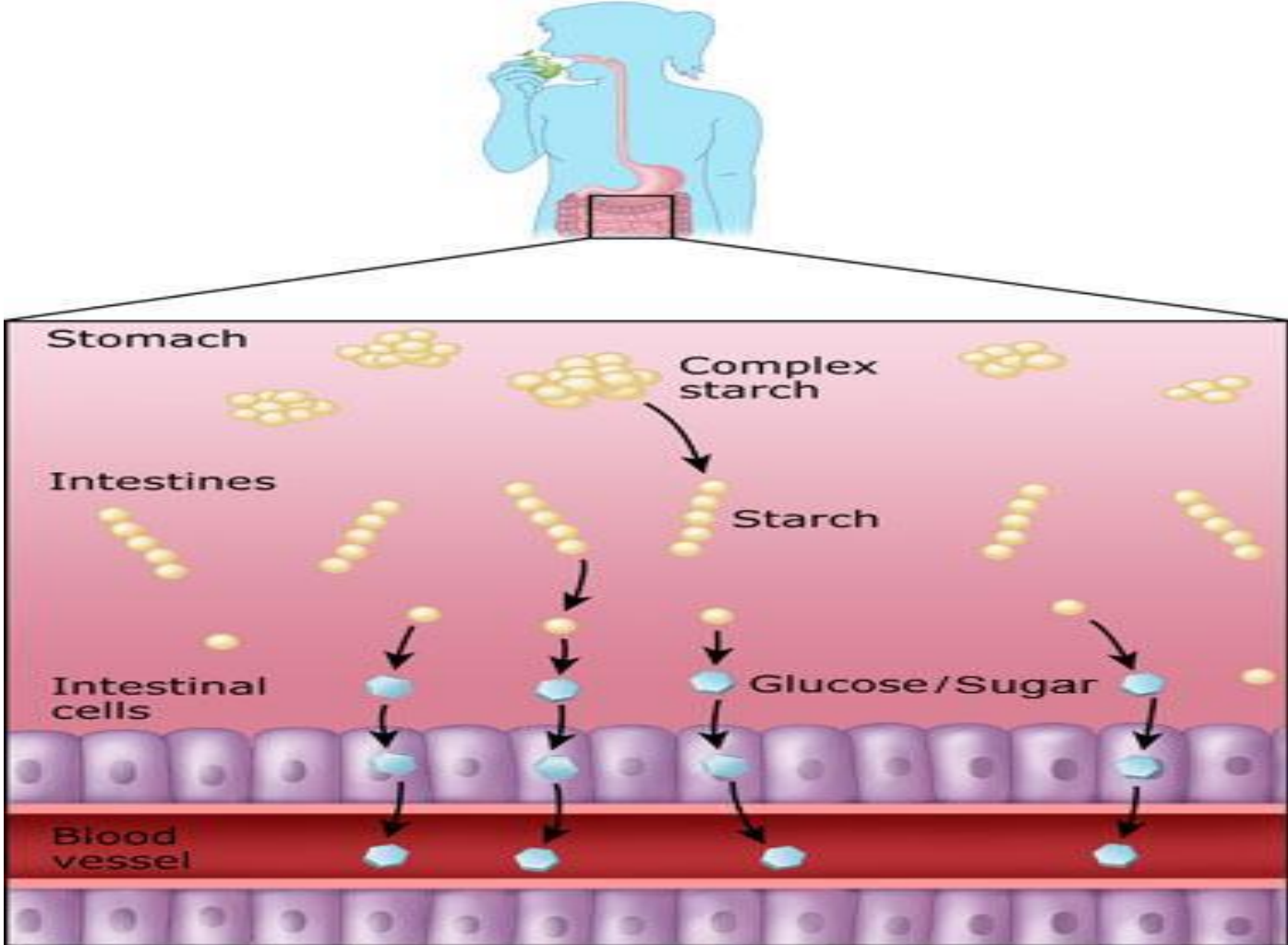


# Structure



# Digestion

## How Starch Enters the Bloodstream



# Carbohydrates

## Simple *Sugar*

## Complex

### *Starch*

### *Cellulose (fibre)*

Milk	Wholegrain breads and cereals	Wheat bran
Fruit	Brown Rice	Edible skins
Jam	Wholegrain Pasta	Whole bread
Cakes	Potatoes	Cereals
Sweets & confectionery	Root vegetables & unripened fruit	Lentils
Honey	Pulses, nuts, seeds	Green leafy veg
Syrup	Dairy products	Oats

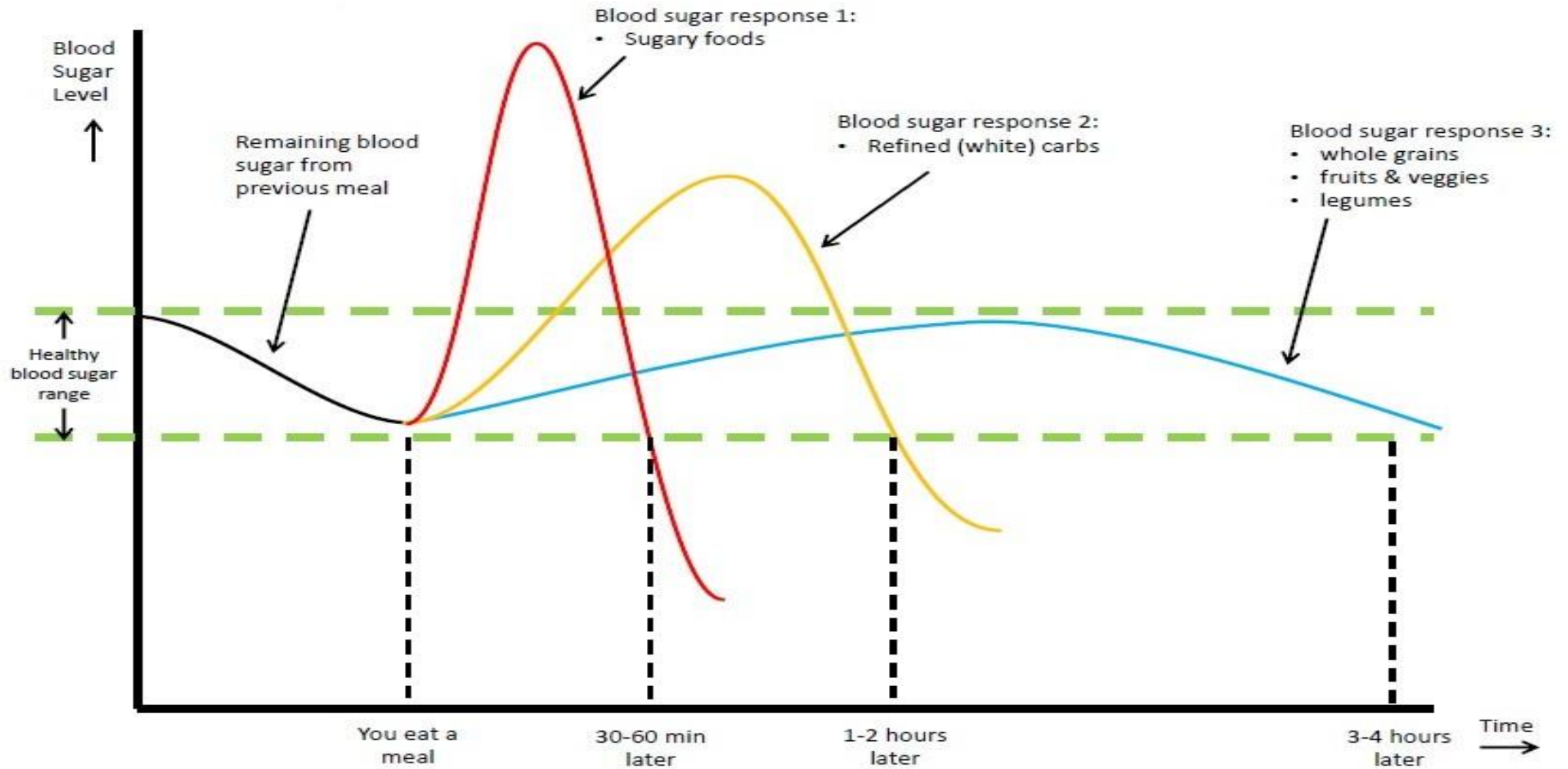


# Glycaemic Index (GI)

- All carbohydrates are digested and absorbed at different rates
- Simple carbohydrates are digested and absorbed quicker than complex carbohydrates
- Carbohydrate foods all have an effect on blood glucose levels
- The effect is called the glycaemic index and measures how a carbohydrate affects our blood glucose levels
- GI should not be used in isolation as it has its limitations

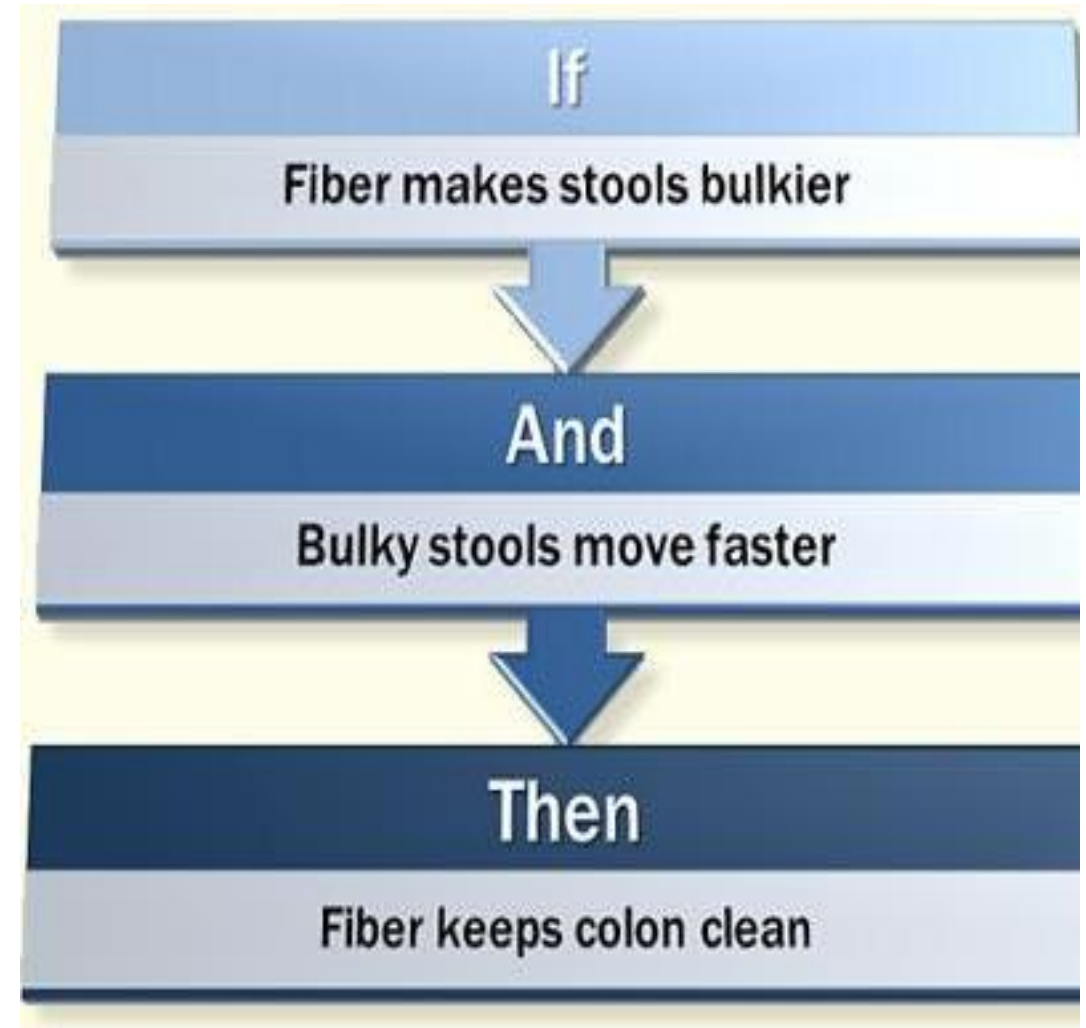
	Low GI	Medium GI	High GI
<b>Cereals</b>	Wholegrain, Barley, Oatmeal, Oat bran, Bulgur, Brown rice, Pearled barley	Whole wheat, Rye, Couscous, Quinoa, Wild rice, Basmati rice	Puffed rice, Rice pasta, Packet pastas e.g. macaroni and cheese, White rice
	Wholemeal Pasta, Noodles, Fettuccini, Wholegrain spaghetti, Mixed grain breads, Wheat tortilla, Corn chips,	White spaghetti, Rye crisps, Shortbread, Pitta bread white, Muffin, Crumpet, Croissant, 50% cracked wheat kernel bread, Corn tortilla, Pumpernickel bread	Rice cakes, White bread, White baguette, Bagel
	All-bran cereal	Special K cereal, Raisin bran cereal, Instant oatmeal, Muesli	Puffed wheat cereal, Cornflakes cereal, Coco pops cereal
<b>Fruit</b>	Grapefruit, Apple, Banana, Prunes, Pear, Peach, Oranges, Dates	Strawberries, Plum, Grapes, Pineapple	Melon, Watermelon, Banana, Figs, Mango, Apricot, Kiwi
<b>Vegetables</b>	Green and salad vegetables, Legumes, Yam, Corn, Peas, Parsnip, Carrots, Sweet potato	Beetroot	Pumpkin, Russet potato, Instant mashed potato, Baked sweet potato
<b>Milk &amp; milk products</b>	Cows Milk, Natural yoghurt, Soy milk	Ice-cream plain	Flavoured yoghurt

# GI and Blood Glucose Levels



# Dietary Fibre

- Found in the indigestible parts of plants
- Substances which escape digestion
- Helps to keep the digestive system healthy
- Aids weight control
- 2 types: Soluble and Insoluble
- Soluble fibre slows digestion of CHO – results in slower blood glucose rise
- Insoluble fibre prevents constipation



## Insoluble Fibre



- Passes through the body undigested
- Prevents constipation

**Sources:** wheat bran, edible skins & seeds of fruit and vegetables, nuts, seeds, dried beans

## Soluble Fibre



- Helps to lower bad cholesterol
- Weight maintenance
- Keeps you feeling fuller for longer

**Sources:** oats, fruit, vegetables, barley, beans, linseed, lentils, seed husks, flaxseed

# How much fibre is in food?

Bowl of porridge	3g
2 Weetabix	3g
Bowl of cornflakes	0.5g
1 slice of wholegrain bread	2g
1 piece of fruit	2g
1 serving of vegetables (3 dessertspoons)	2g
1 dessertspoon milled seeds	3-4g
1 tablespoon sunflower seeds	3g
1 baked potato (eaten with the skin)	3g
1 bowl of All-Bran Original	11g
½ tin of chickpeas	10g
½ tin baked beans	7.5g
½ tin kidney beans	10g
1 tablespoon dried lentils	1.5g
1 serving of brown rice	2g
1 serving of white rice	0.5g
1 serving of brown pasta	2g
1 tablespoon nuts	1.5g
3 dried prunes	1.5g

Aim for:  
Women 24g  
Men 38g per day  
  
(Dept. of Health)

# Professional Diploma in Nutrition

## Module 1

# Q&A

## See You Back For Lesson 3

