What is Meat?

Module Focus

- Meat is an important food commodity which provides nutrients essential for health.
- A variety of different textures, colours and flavours of meat are available for you to choose.
- This module contains an overview of the origin, structure and composition of different types of meat.

Type of Meat

Red meat eaten in Wales and rest of the United Kingdom (UK), comes mainly from:

Cattle | Beef

Sheep | Lamb

Pigs | Pork

The Structure of Meat

Animal flesh consists of muscle tissue or fibres, connective tissue and fatty (adipose) tissue.

Lean meat is the muscle tissue of animals.

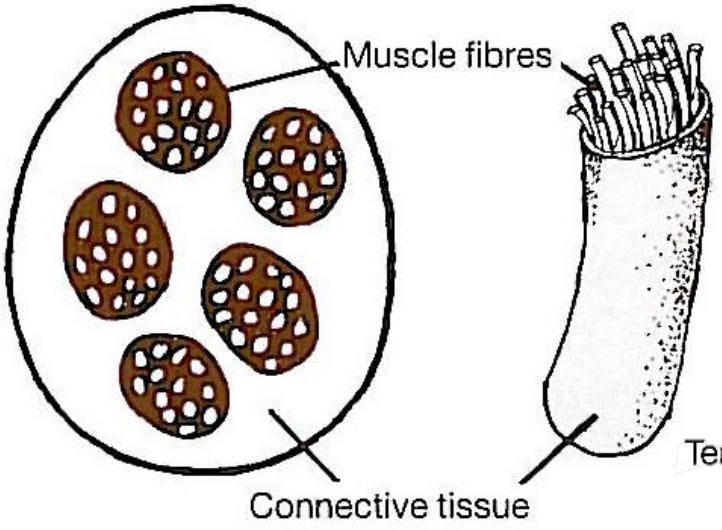
Muscle cells comprise of:

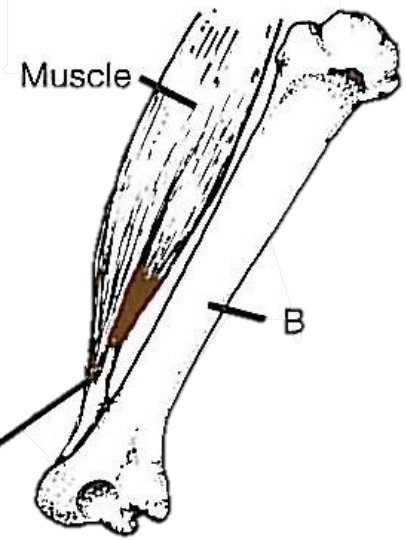
- water
- proteins
- minerals
- vitamins
- the red protein called myoglobin
- (similar to the blood pigment haemoglobin)
- fat

What's the connection?

Meat muscle is made up of bundles of muscle fibres held together by creamy white connective tissue.

Tendons join the muscle (made up of bundles of muscle fibres, surrounded by connective tissue) to the bones of animals.





Muscle Fibres in Action

- Individual muscle fibres are made up of cells which contain the proteins actin and myosin.
- In live animals, actin and myosin work together to make the muscle contract and relax.

Muscle Fibres and Cooking

Connective tissue is made up of two proteins called collagen and elastin.

Collagen

The connective tissue in and around the muscle fibres and tendons is mostly collagen. When meat is cooked, the collagen becomes soft and soluble, and forms gelatine.

Muscle Fibres and Cooking

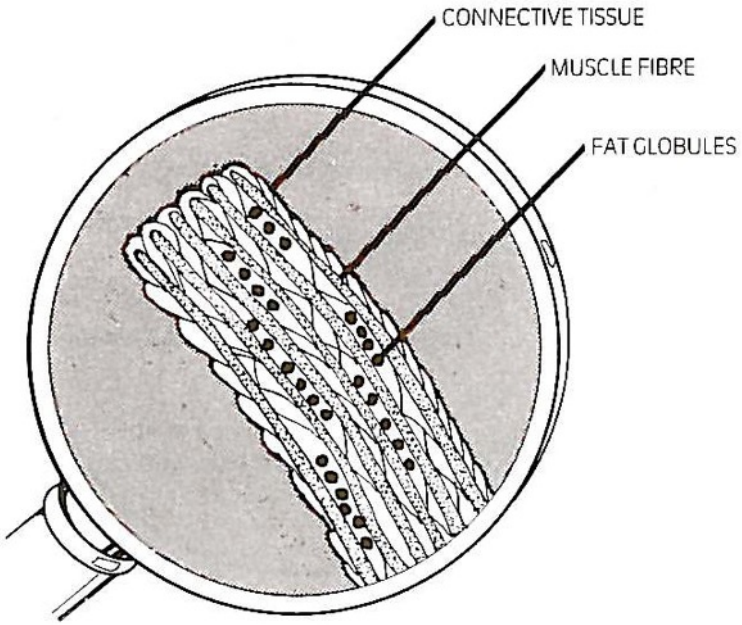
Elastin

This is much more elastic connective tissue.

It is yellow in colour and remains tough, even when cooked. The ligaments which join two bones together are mostly made up of elastin.

Muscle Fibres

Muscle fibres are very small – and can only be seen under a microscope. The length of muscle fibres varies.



Fine Muscle Fibres

These tend to come from the muscles of young animals, or in older animals from the muscles which do least work.

They contain little collagen and are tender even when cooking times short, e.g. grilling.

Muscle Fibres

Thick muscle fibres

These tend to be from older animals and also muscles which do the most ‘work’ – such as neck and shin.

They have more connective tissue to prevent muscle damage.

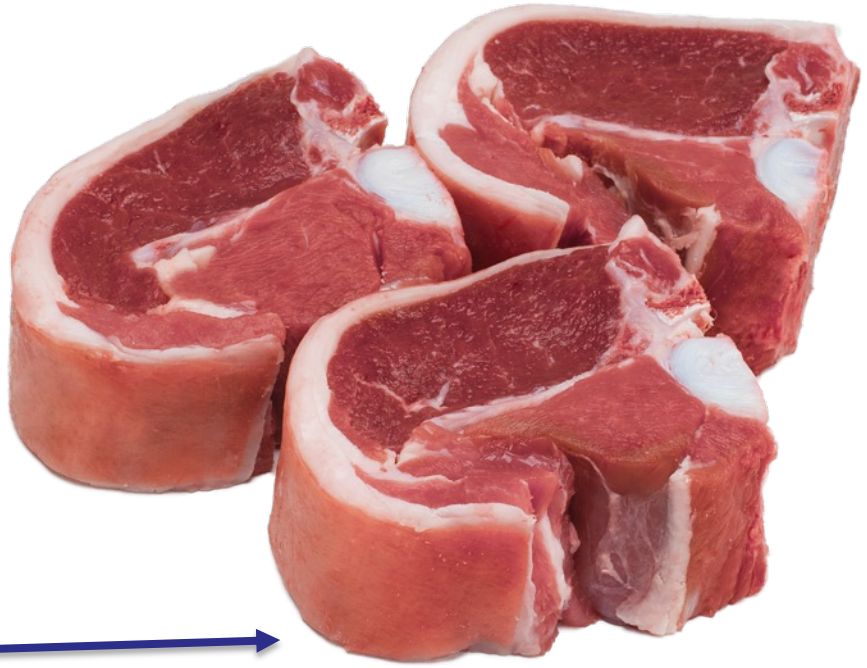
This type of meat is tougher and needs long, slow cooking with moisture to make it tender, e.g. casserole.

Fat – Visible Fat

Fat is found in meat underneath the skin (subcutaneous fat) and between the muscles (intermuscular fat) and is a creamy-white colour.

This type of fat is called visible fat.

Visible fat (called suet) is also found around the animal's organs, such as the kidneys.

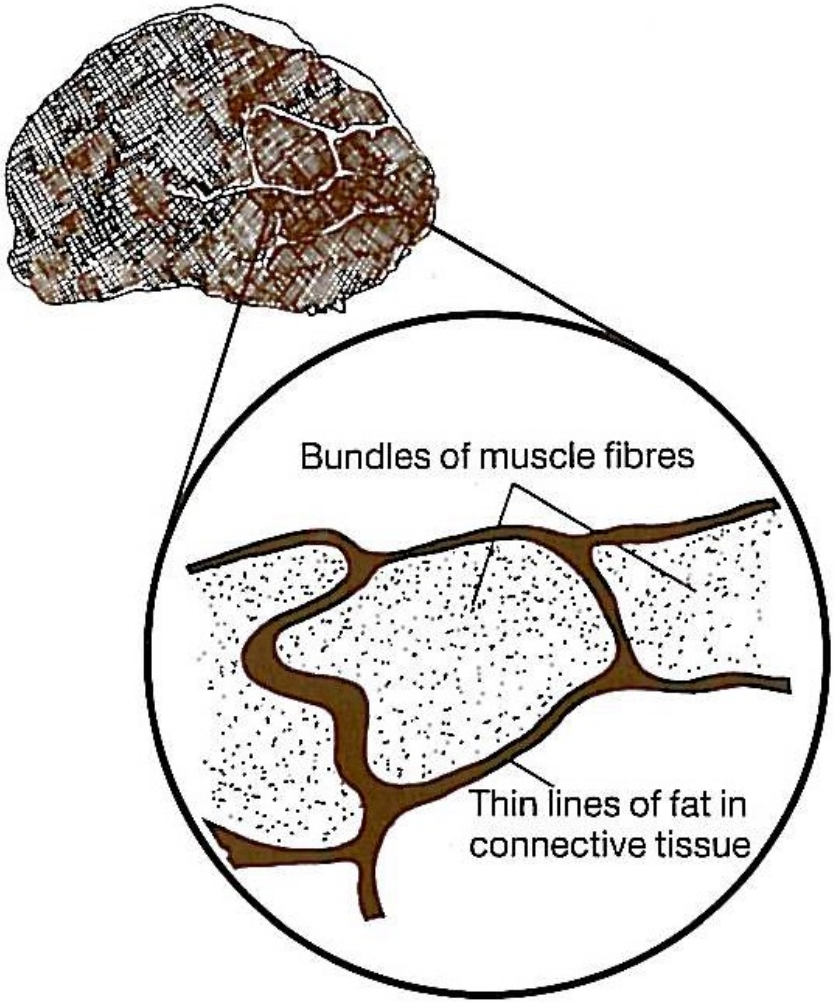


Fat – Invisible Fat

A small amount of fat is also found in connective tissue surrounding the bundles of muscle fibres.

This is usually not obvious to the eye, so it is known as invisible fat. Sometimes these lines of fat can be seen and give meat a ‘marbled’ look.

Many butchers trim off most or all of the visible fat. Farmers are now breeding animals which have a greater proportion of lean meat and less fat.



The Colour of Meat

The colour of meat is largely due to the red protein called myoglobin and some haemoglobin (blood) left in the muscle. Some muscles contain more of these red pigments than others.

Colour differences can be due to age and exercise, but are mainly due to the metabolism of the species and the function of the particular muscle.

Meat from muscles which have been used a lot and are from older animals is usually a darker colour.

The Colour of Meat

- During the time meat is stored the colour changes to a darker brown-red because of the formation of metmyoglobin.
- When meat is cut and exposed to oxygen in the air, it takes about twenty minutes for myoglobin to change to oxymyoglobin, which is brighter red in colour.
- After some time, the meat becomes a browner colour again as metmyoglobin is formed.
- These colour changes do not make any difference to the taste or texture.

The Composition of Lean Meat

Lean raw meat is made up of water, proteins, fats and minerals.

The exact amounts of each of these vary in any particular cut of lean meat. The variation could depend on:

- the species – beef, lamb or pork
- the breed of animal
- the age of the animal
- how the animal was fed
- the particular muscle from which the cut of meat was taken

Group Activities

Ask groups within the class to research different cuts of meat. Challenge the students to identify which cuts of meat contain the most of each of the following:

- bone
- connective tissue
- marbling
- lean muscle

Students could also identify the types of cooking techniques which may be suitable for these different cuts of meat.

(Use the cuts posters to help with this task)

Let's look at Red Meat?

Complete the survey below selecting different cuts of beef, pork, and lamb. Use the cuts posters to help you.

Name of the cut	Draw the cut	Cooking techniques	Does the cut contain...			
			Bone?	Connective Tissue?	Fat?	Lean Muscle?
1.						
2.						
3.						
4.						
5.						

Summary

- Red meat eaten in Wales and the rest of the United Kingdom (UK), comes mainly from: cattle (beef), pigs (pork) and sheep (lamb).
- Lean meat is the muscle tissue of animals which is made up of bundles of muscle fibres held together by creamy white connective tissue.
- Connective tissue is made up of two proteins called collagen and elastin.
- Two different types of fat can be found in meat, visible and invisible.
- The colour of meat varies due to the red protein called myoglobin and some haemoglobin remaining in the muscles. Exposure to oxygen increases the red colour of meat.
- Lean meat consists of water, protein, fats, vitamins and minerals.

For further information and support, go to:

www.hybucig.cymru
www.eatwelshlambandwelshbeef.com
www.porcblasus.cymru
www.hcctrade.co.uk