

Understanding copper metabolism in sheep

Harper Adams University

Current Postgraduate Research Briefing



Why copper?

Copper is one of the most important trace elements required for normal body functioning in animals and humans.

Having **too little** or **too much** copper in the diet can cause serious health problems in humans and in ruminant animals, such as cattle and sheep. The nerves and brain can be affected if too little copper is available and liver damage can result from copper poisoning.

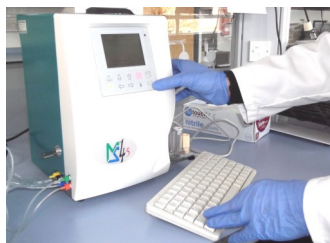
In the UK, the diet of ruminants may contain adequate levels of copper but other minerals can interact with copper and prevent it being used by the body. The interactions of **molybdenum, sulphur** and **copper** have been well-documented but less is known about the ways that **iron** alters copper in the liver.

Study aim

This study aims to find out how iron and sulphur in sheep diets can affect copper metabolism, including the ways copper is excreted.

Use of The Princess Margaret Laboratories

Sheep on the farm were fed diets containing different amounts of iron. Various samples are being analysed using equipment in **the Princess Margaret Laboratories** including:



- **mass spectrometry (ICP-MS)** for minerals;
- **the RT-qPCR** (see panel);
- **Cobas Mira Plus** for **enzymes** in blood;
- **haematology apparatus** to examine **red and white blood cells**.



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So far.....

So far, the results have indicated that by increasing the iron in the diet, there is a reduction in the storage of copper in the liver without affecting sheep health, weight gain or any of the blood components.

The next step is to find out why. Is this reduction in the storage of copper in the liver because it is not being absorbed or is there an increase in copper being excreted from the liver?

PhD programme

This briefing outlines the second-year work of a three-year PhD research programme by **Sherwan Sefdeen**, Postgraduate Researcher.

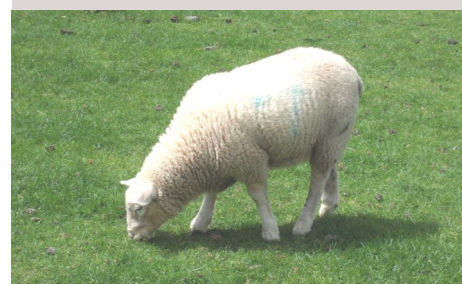
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RT-qPCR equipment

The reverse transcription quantitative polymerase chain reaction (RT-qPCR) equipment is used for **gene expression** and **copper transportation** in and out of liver and intestinal cells.



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