## **How Scientists Work**

Scientists ask questions about the world around them and carry out research to learn more about the problems they are trying to solve. Scientists try to predict what will happen in different situations. These predictions are called hypotheses.

Scientists carry out experiments to see if their hypothesis is correct.. During the experiment data is collected by recording measurements and observations. Variables that are intentionally changed in an experiment are known as independent variables. Other variables that change as a result of the deliberate change are known as dependent variables.

Experiments are often repeated to be certain the data collected is reliable. When the experiment is finished scientists must analyse the data and decide whether their hypothesis was right or wrong. This can lead to the scientist changing the hypothesis and designing a new experiment .

Dr. Lydia Lynch is a scientist working at TCD who studies the immune system. She investigates the role that certain white blood cells play in obesity.



She developed a hypothesis that adipose tissue contains special white blood cells that were important in controlling the storage of fat.

## Glossary

White blood cells protect the body against infection and disorders. Obesity is a disease involving an excessive amount of body fat. Adipose tissue , often found underneath the skin, contains specialised cells that store fat.

She designed an experiment to measure the weight gain of a group of mice that were lacking in these particular white blood cells. As a control or comparison she monitored the weight gain of mice that had a normal level of these white blood cells. Strict guidelines were in place to control when animals such as mice can be used in laboratory investigations. They must be housed in suitable conditions to avoid any discomfort and pain. Both groups of mice were kept under identical conditions and given the same food.

The average mass of each for mice in each group was recorded over 8 weeks and the data was displayed on the graph shown. Analysis of the graph shows that the mice lacking in the specific white blood cell gained more weight. From this data the scientist can conclude that her hypothesis was correct: that there was a link between a certain white blood cell in the immune system and weight gain

More information about Dr Lynch's research can be found here..



Review Exercises.
What is a hypothesis?
What is meant by the term data?
What was Dr Lynch's Hypothesis?
What was the control group in Dr Lynch's experiment?
Identify the dependent variable in her experiment.
Which group of mice gained the most weight?
What do you think there were a number of mice in each group?
Why do you think both groups of mice were a different weight on day 0 of the experiment?
What is the purpose of white blood cells?
Why are fat storing cells in the body important?
Research a health effect of obesity.
Suggest the next step that Dr Lynch might take based on the knowledge she obtained here.