Human bodies are good at fighting disease, but sometimes things go wrong and then we need medicines. It takes about 15 years to make a new medicine. This is how it’s done.

**Basic research**

Basic research is sometimes called ‘pure’ research. Scientists study how bodies and diseases work and search for ‘targets’ for new treatments. Some basic research involves animals.

**The target**

Medicines need ‘targets’ to act on. A target is something that causes disease, often a protein molecule. It is called a ‘target’ because we can aim new medicines at it. If a protein molecule is causing a disease, scientists can look for another molecule that will attach itself and neutralise it. This is sometimes called the ‘lock and key’ approach.

**Finding treatments**

When you have a target, you can look for an ‘agent’ that will act on it. Many agents have been found in nature, such as digitoxin which comes from the common foxglove. But these days we can also make new compounds in the lab or with computer models, and screen them to see if they attach to the target.

Modern technology makes it possible to screen hundreds of thousands of compounds to find a few hundred that work on the target. The ones that work are called ‘drug leads’.

**Pre-clinical testing**

Screening tells us a lot but chemicals may work differently in living bodies. The most promising new treatments are tested in some simple animals first, before they are tested in any animals to see if they really work. Will they get changed by the digestive system? What are the side effects?

**Clinical trials phase 1**

After a compound has passed safety testing in animals we can begin to test it on people. In the first phase of clinical trials a very small amount of the new treatment is given to a few healthy people to make sure there are no ill effects.

**Clinical trials phase 2**

In phase 2 the treatment is given to a larger group of volunteers who suffer from the target illness.

**Clinical trials phase 3**

In phase 3 thousands of patients are given the new treatment to test its effects and effectiveness. This is sometimes called the ‘phase 4 clinical trial’.

**Approval**

If a treatment is more effective than the placebo in the clinical trials it is possible to apply for a licence from the government. A licence means that doctors can give the new medicine to patients.

**Prescription and monitoring**

When doctors start prescribing the medicine it is still monitored for side effects and effectiveness. This is sometimes called the ‘phase 4 clinical trial’.

**Safety testing**

Only a few compounds make it past the pre-clinical tests. But before we can give them to people, we still need to know how much is safe to take. Nearly everything is poisonous if you take too much. The law requires that compounds are tested for safety on two species of animal.

**Clinical trials are regulated**

Every procedure using an animal in research if there is any doubt as to its effect on human beings, of course.

**FACT**

Eight out of ten animals used in medical research are rats and mice.

**FACT**

If a treatment is more effective than the placebo in the clinical trials it is possible to apply for a licence from the government. A licence means that doctors can give the new medicine to patients.

**FACT**

On average, it costs more than £1 billion to create a new medicine. On average, it costs more than £1 billion to create a new medicine.

**FINISH**

You can find out more about how animals are used in discovering new medicines here . . . www.UnderstandingAnimalResearch.org.uk