Developing a vaccine

The Krebs review into bovine TB in cattle and badgers concluded that in the long run, the best prospect for control of bovine TB is to develop a vaccine for cattle. The review also recommended that the development of a cattle vaccine and an associated diagnostic test to distinguish infected from vaccinated cattle should be a high priority for MAFF's long-term research strategy.

The review recommended that a badger vaccine, although posing greater technical problems in terms of both development and delivery, should be kept as an option.

The Government agrees that developing a TB vaccine for cattle or badgers may be a long-term solution and is spending over £1.4 million a year on this.

**Developing a vaccine**

The Krebs review sets out the three phases of developing a vaccine:

- a number of possible vaccines are being created and tested in the laboratory. These are known as candidate vaccines;
- the correct dose and method of delivering the candidate vaccine will be tested in a controlled environment; and
- finally field trials will be carried out to see how safe and effective the vaccine is when used in the animals natural environment.

**Producing candidate vaccines**

In order to produce a vaccine there are two basic approaches which can be taken, although neither is guaranteed to succeed:

- work out how the immune system protects against TB and design a vaccine to trigger the response you want; and
- develop a possible vaccine by changing the causative agent of the disease in the laboratory so that it no longer produces disease but can bring about immunity.

Recent advances in molecular biology have provided improved ways of following these approaches, and have led to renewed interest in developing new vaccines for preventing tuberculosis in humans and animals.

**MAFF work programme**

Our current work programme uses both approaches to produce a vaccine. Our programme of work is likely to take at least 10 to 15 years to complete. However, there are no guarantees of finding a suitable vaccine so we must explore other approaches to controlling TB.

We are working with:

- the Wellcome Trust carrying out studies into the genetic code of the *M.bovis* organism at the Veterinary Laboratories Agency, the Sanger Centre and the Institut Pasteur;
- the Institute of Animal Health investigating immune responses to *M.bovis* in cattle; and
- the Veterinary Laboratories Agency (with the Centre for Applied Microbiological Research and New Zealand scientists) identifying vaccine candidates for cattle and badgers, and assessing their suitability for further development.

**Vaccinated and infected cattle**

The tuberculin test is used to test whether cattle have suffered from or been in contact with TB. Depending on the nature of the vaccine used, vaccination may interfere with the results of the tuberculin test, by causing uninfected animals to give a positive reaction. The test will probably give the same result for both vaccinated and infected cattle.

So to avoid any restriction on future exports we need to:

- develop a foolproof method of finding out which animals are vaccinated and which are infected with the natural disease;
- have the test accepted, by the European Union, as the basis for allowing the export of vaccinated cattle; and
- confirm that other countries will accept the introduction of TB vaccination.