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## **Of mice, men and medicine**

No mice on Earth have more human DNA than the animals kept by Kymab, an antibody engineering company in Cambridge. Genetic manipulation has given the mice a substantial part of the human immune system – all in the cause of making better medicines.



Allan Bradley, Kymab’s founder and chief scientist, says the mice have about 2.7 million base-pairs (chemical units) of human DNA – roughly 0.1 per cent of the whole genome. As a result, researchers can make a wide repertoire of antibodies by immunising them with the appropriate antigen.

Antibodies are protein molecules made by the immune system to bind to harmful substances – antigens – which may be viruses, bacteria, toxins, abnormal proteins or cancer cells. Sales of antibody-based drugs have boomed over the past 15 years, and are now worth more than \$50bn a year globally.

Inoculating live mice is traditionally the best way of making antibodies. In the past these murine antibodies had to be “humanised” in the laboratory, but genetic engineering has made it possible to avoid this step by giving mice a human immune system.

A couple of months after immunisation, when tests show that a mouse is making the desired antibody, its spleen is removed and the antibody-producing B-cells extracted. These are then “immortalised” by fusion with cancer cells and expanded many times in culture.

Kymab is the first spin-out company from the Wellcome Trust’s Sanger Institute, the leading UK centre for genomic expertise, where Bradley used to be director. Wellcome, Britain’s biggest medical research charity, is also the lead investor in Kymab. Although the company will licence its Kymouse technology to drug companies, real success would come from developing its own antibody treatments.

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