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Making a modern anti-MAP vaccine to assist in the treatment of Crohn's disease

MAP is short for a bug called *Mycobacterium avium* subspecies *paratuberculosis*. It is a very difficult to detect. It may not grow in cultures, it may not be visible down a microscope, it hides inside cells, and it minimises recognition by the immune system. Now, new research from several laboratories including our own shows conclusively that when the tests are done correctly, most people with chronic inflammation of the intestine of the Crohn's disease type are found to be infected with MAP. MAP causes chronic inflammation of the intestine in many species of animals including primates. It is almost certainly doing the same thing in people.

MAP is resistant to treatment with most common antibiotics. Treatment of active Crohn's disease with combinations of special antibiotics which are more active against MAP can heal Crohn's disease. However, the infection is difficult to eradicate completely and more anti-MAP treatments are needed. Modern vaccines stimulate the production of 'hunter-killer' cells armed up to detect bugs like MAP. These hunter-killer cells patrol the body looking for MAP and can eliminate them

We have made a modern gene-based vaccine against MAP. We used computer programs to search the DNA inside MAP and pick what are likely to be the best genes to use in the vaccine. We resynthesised these in human 'DNA-speak' and joined them together in a single cassette. We put this cassette into a harmless carrier virus called MVA and found that it did indeed function as an efficient vaccine. We are doing the same thing with another harmless carrier virus called Ad5. In the vaccination procedure Ad5 is used first as the priming shot and MVA second as the booster.

With NACC support we will now find out whether the combined anti-MAP vaccination can help as a treatment for MAP infection in animals and protect them from disease. The results of the work should enable us to scale up the production of super pure vaccine suitable for human use and apply for permission to test the anti-MAP vaccination treatment in MAP-infected Crohn's disease sufferers.