

Current Research Projects

Here are some examples of Meningitis UK studies:

Development of a novel multivalent Group B meningococcal vaccine based on adenovirus vectors

This project proposes, for the first time, to link expertise in the development of meningitis B vaccines with a new type of vaccine based on the harmless adenovirus - which has been developed to fight infections such as malaria and HIV, but not yet investigated for meningitis B.

Experts in meningitis B research have identified bacterial proteins that cause the body to produce antibodies able to stop infection. Dr. Christine Rollier, working alongside Professors Martin Maiden, Ian Feavers, Adrian Hill and Andrew Pollard, has developed new ways of delivering these proteins to the immune system: by inserting them into a genetically modified adenovirus. Recent clinical trials have shown that this virus induces production of higher quality antibodies but can't cause infection. This is very effective at triggering an immune response as the immune system is tricked into thinking it is fighting a real infection when it is actually facing a harmless vaccine.

The study will investigate the immune responses induced by these new vaccines and compare their effectiveness used alone or mixed with other types of Meningitis B vaccines to identify the best potential vaccine. This innovative approach to vaccine design could have a far-reaching impact and, ultimately, lead to the creation of a lifesaving vaccine for meningitis B.



Dr Christine Rollier

Identification of meningococcal antigens linked with cross-immunity following colonisation and disease

Professor John Heckels and his team at the University of Southampton are looking for proteins that are the same between all the common disease-causing strains of Meningitis B. They are searching for the Achilles heel of the bacteria, the weak point in their armour that can be exploited by designing a vaccine against it. They are doing this by looking at the antibodies found in the blood of people that are colonised by the meningococcus, and comparing them with people that are not. These initial screens are now complete and the team are identifying which of the proteins will be the most useful for designing a vaccine against. At present, all the possible vaccines against Meningitis B only protect against a small group of strains - as yet no single common protein has been found. By screening a large group of people they hope to be able to design a vaccine that will protect against a wide range of Meningitis B strains.



Research Assistant Jenny Williams, Prof. John Heckels and Dr Myron Christodoulides

The vaccine potential of meningococcal secreted proteins

A group led by Dr Karl Wooldridge at the University of Nottingham are looking at the proteins produced by the meningococcus that are secreted and anchored to the outside of the bacterium. They hope to find a protein that will produce a better vaccine than the capsule or the current Meningitis B vaccine candidates, which have a limited range. We know that many proteins on the bacterial surface affect the immune response during disease. By looking closely at different aspects of the immune response, Wooldridge's team have identified a few proteins that seem to be very promising vaccine candidates. This exciting project has progressed to purifying these proteins and they will now be used to immunise animals to test their potential protective effects as the basis of a vaccine.



Dr Karl Wooldridge in the laboratory

Determining *N. lactamica*-induced cross-immunity

A team at the University of Oxford led by Dr Nigel Saunders is developing a highly sensitive assay for detecting very low levels of antibodies in blood. They plan to use it to screen the blood of people who have been colonised with the commensal, *N. lactamica*, to identify any antibodies that help protect against subsequent infection with *N. meningitidis*. Preliminary work on this project is now underway, optimising the techniques used to store and analyse antibodies to maximise their results. Work will now progress to initial analyses of real samples. The team hope that their super-sensitive assay will also be used to test efficacy during vaccine trials in the future.



Dr Richard Capper working with one of the two highly-sensitive protein array printers in Dr Saunders' laboratories

Investigating development of mucosal immunity to immunisation with a new Meningitis B vaccine

Professor Rob Heydermann at the University of Bristol is working alongside the Novartis Vaccine Group in Italy to predict the precise effects of immunisation with a brand new vaccine against Meningitis B called MenZB. His group have developed ways to analyse the immune response following immunisation by looking at the effects of certain meningococcal proteins in the immune response in adults. These analytical tools been thoroughly tested and are now being put into use analysing the immune response to a trial vaccination programme of MenZB that started in Spring 2008. This work is important as vaccines can be used not only to protect the vaccinated individual, but also to prevent carriage of the bacteria, thus reducing transmission rates. By understanding the link between immunity and vaccination, the team also hopes to provide novel insights into the development of immunity to Meningitis B and to help improve design of vaccine strategies.



Professor Robert Heydermann (back left) with his co-researcher Professor Neil Williams (back right), along with other staff at the laboratories

Bacterial meningitis in babies less than 90 days of age: the current burden of disease

Newborn babies run a higher risk of contracting meningitis than any other age group. Although the use of antibiotics has improved the chances of survival this remains a very serious illness and, with no vaccine available to protect against the main causes of neonatal meningitis, it is even more important to find ways of improving treatment.

Meningitis UK is currently working in collaboration with Dr Heath and Dr Okike from St. George's, London, who are leading an investigation to determine the best treatment options for all forms of neonatal bacterial meningitis, the most common being Streptococcal Group B Meningitis. Between July 2010 and August 2011, they are seeking to answer questions relating to the number and nature of cases, as well as establishing what treatment was given and whether or not it was successful. This information will provide an excellent basis for evaluating and improving existing 'treatment' options for neonatal meningitis.



Dr Heath and Dr Okike

Despite all the excellent research being carried out on meningitis and septicaemia, the disease continues to destroy lives and devastate families each year. At Meningitis UK we are still contacted every week by families who have lost a loved one to this terrible disease. Our mission is to raise funds for research that is working towards wiping out the disease altogether.

Meningitis UK receives no government funding, and therefore we rely entirely on fundraising and on the generosity of the general public to help our cause. The more money we can raise, the more life-saving research we can fund.

To find out how you can help, please visit www.meningitisUK.org or phone **0117 373 73 73**