



Understanding B-cells in the MS brain

Lead author: David Halfer
Location: Yale University, USA

What was the study about?

B-cells are a type of white blood cell – they are part of our immune system and produce antibodies that defend us against infection. B-cells are also involved in producing antibodies and other proteins that may cause damage to tissues in the brain in people with MS.

Using tissues provided by the Tissue Bank, researchers studied the role of B-cells in the brains of people with MS. They found that B-cells derived from division of a single cell (i.e. they are identical) can be found in different places in the brain and tissues surrounding the brain.

How will it help people with MS?

This study showed that this particular type of B-cell (called antigen-experienced B-cells) are found at a number of locations throughout the MS brain. Removing this specific type of B-cell using drugs that are currently in development may be more beneficial than removing all B-cells.

KIR4.1 potassium channels and MS lesions

Lead Authors: Lucas Schirmer and Bernhard Hemmer
Location: Munich, Germany

What was the study about?

Potassium channels allow potassium ions to flow across the membrane of a cell. Antibodies (proteins produced by the immune system) against a potassium channel called KIR4.1 are found in some people with MS. This suggests that the KIR4.1 potassium channel may be targeted by the immune system in MS.

But researchers know very little about KIR4.1, both in the healthy brain and in MS lesions. So researchers used human brain tissue from the Tissue Bank to look at KIR4.1 in more detail. In areas of the brain without lesions they found KIR4.1 in specific brain cells called oligodendrocytes and astrocytes. But MS lesions contained fewer oligodendrocytes, and astrocytes within lesions contained fewer KIR4.1 channels. This suggests that antibodies against KIR4.1 might be targeting and killing oligodendrocytes and astrocyte cells within MS lesions differently than outside of MS lesions.

How will it help people with MS?

This study suggests that antibodies against KIR4.1 might play an important role in how lesions are formed in MS and will help us design treatments that stop the damaging actions of these antibodies.

How to get in touch

What to do if your details change: If any details, such as your name, address, telephone number or your GP change, please ring our office number on **020 7594 9734** to let us know. Also, please update any change of details for your next-of-kin.

Emergencies: If you need an immediate response from the Tissue Bank or need to report the death of a donor please call our 24-hour Emergency Donor Line on **07 659 132 045**.

Donor registration: If you would like to register onto our donor scheme please call **020 7594 9734** or email ukmstissuebank@imperial.ac.uk for a free registration pack.



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A letter from Richard Reynolds

Welcome to the latest issue of the Bank Statement, the newsletter from the MS Society Tissue Bank at Imperial College in London.

We would like to thank you for your continuing support for this vital part of our fight against MS. We started the Tissue Bank 15 years ago, and with your support we have built it into a major world resource for MS research. Together we can be proud that we are enabling vital MS research in the UK and around the globe. Major advances in our understanding of MS and how to treat it have been made using the brain tissues from the Bank. We are delighted to tell you that the funding of the Tissue Bank has been continued for another 5 years.

In this issue, researchers share their discoveries from some of the latest research projects that have been made possible by donations left to the Tissue Bank. We also speak to Martin Long about why he decided to register as a donor and Dr Pascal Durrenberger about how tissue from the Bank helps his research.

The Bank Statement

We'd also like to take this opportunity to announce an important change at the Tissue Bank that you should be aware of.

Due to changes in the way the NHS operates, our 24 hour Emergency Donor Line is changing. This will mean that from January 2014 all calls received between the hours of 17:00 and 09:00 will be answered by an operator who will record your message and pass it on to the Tissue Bank. Our coordinators will check the messages and answer all calls on the morning of the next day. Please read the accompanying letter in which we have explained in detail how these changes are being implemented.

I hope you enjoy reading this issue of the Bank Statement. Please get in touch with us if you have any questions or comments. Thank you again for making such a vital gift.

Richard

Professor Richard Reynolds is Director of the MS Society Tissue Bank at Imperial College.

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Donor and researcher perspectives

We interview Martin Long, who registered as a donor in 2007, and Dr Pascal Durrenberger, who has worked with tissue from the Tissue Bank, to find out how they feel about the Tissue Bank.



Martin Long was diagnosed with MS in 2007. He discovered the MS Society Tissue Bank through an online search and decided to register as a donor. We talk to him about why he decided to leave his tissue to research and his hopes for MS research.

Why did you decide to donate tissue?

The Tissue Bank supports so much vital work on the causes of, and better treatments for, MS. As soon as I found out about the Tissue Bank I decided to register as a donor because I want to help research in any way that I can.

What have you done since becoming a donor?

I informed my family and next of kin of my wishes to donate to the Tissue Bank. I also told my doctor as well as my friends. It's really important that more people join the scheme, so I have also tried to spread the word – recruiting more donors, both with MS and people without MS who can offer a 'control brain'. There's no expense, so there's nothing to worry about from that point of view. Just remember to keep in touch with the Tissue Bank if you change your contact details.

What do you hope will happen as a result of donating tissue?

I hope they can find out more about the causes of MS, but even more importantly that they can use my tissue to find a cure. It's heartening to think that my tissue may contribute to finding out more about MS and may ultimately help to find a cure.



Dr Pascal Durrenberger is a Research Associate at Imperial College London and is also a former on call coordinator at the MS Society Tissue Bank. He has used tissue from the Tissue Bank for his research and talks to us about why he thinks it's an invaluable resource.

What does your research focus on?

My main interest is inflammation in the brain in MS. I work mostly on human brain cells called microglia, and another type of brain cell called astrocytes. So little is known about astrocytes compared to microglia – they are involved in inflammation and may have a much bigger role in MS than we first thought.

Work in our lab is aimed at understanding inflammation better and developing new treatments to reduce inflammation in the brain of people with MS.



How did you get involved in MS research?

I originally started researching Parkinson's disease but slowly my work got involved with MS – it's sort of evolved. I am particularly interested in the role of grey matter lesions in disability progression and how to target these lesions to prevent or slow disability progression in people with MS.

Why is it important to have human tissue to work on?

Using human tissue in research is essential because it's the best way we can understand the symptoms of MS. Laboratory models of MS don't imitate or replicate the complexity of what's going on in the human brain, so it's really important to study human tissues when you're trying to understand complex conditions like MS.

What would you like to say to people who have signed up to the Tissue Bank? I'm so impressed by people's generosity. I find it quite inspiring. Thank you to all the families who have registered, because that contribution makes such a difference to research and will improve our understanding of MS.

Bank statement highlights

Highlights of recent peer-reviewed research that has used tissue from the Bank

Gene variants and spinal cord damage

Lead Authors: Gabriele De Luca and Margaret Esiri
Location: Oxford, UK

What was the study about?

Understanding the nature of the damage MS causes in the spinal cord is an important determinant of clinical outcome in people with MS. Research suggests that a gene variant called 'HLA-DRB1*15', which is involved in controlling the immune response, may play a role in determining how an individual's MS develops.

Researchers analysed spinal cord tissue from the Tissue Bank and found that 'HLA-DRB1*15' status influences the extent of myelin loss and inflammation in the spinal cord of people with MS. Inflammation in people who tested positive for 'HLA-DRB1*15' was associated with increased loss of nerve fibres that control movement.

How will it help people with MS?

This study highlights how a common genetic variant in MS influences the extent of MS activity in the spinal cord and outcome of a person's condition. This research will help us understand how MS progresses faster in some people and will help us to treat them appropriately.