

Tissue donation

Information Sheet I

People with motor neurone disease (MND) and healthy individuals can make a vital contribution towards research by donating their brain and spinal cord tissue after their death. This information sheet explains how donated tissue may be used and how to go about arranging for donation.

If after reading this information you decide that you would like to donate your tissue for use in research, you will need to make the necessary arrangements with a tissue bank. Please ensure that you make your wishes known to your family and everybody who is involved in your care. You should also pass on to them the contact details of the tissue bank you have chosen.

The content is split into the following sections:

- 1: What is tissue donation and why is it important to MND research?**
- 2: What will I need to do to donate my tissue?**
- 3: What will happen to my body?**
- 4: FAQs about tissue donation**
- 5: Studies that used tissue donation samples**
- 6: How do I choose which centre to contact?**
- 7: MND tissue bank contact details**
- 8: How do I find out more?**

Disclaimer: Please note that information provided in this information sheet is based on a review of the currently available literature. This information sheet was written by MND Association staff who are not clinicians, so any information provided in this sheet should not be considered clinical advice. You should always discuss potential treatments with your clinician.



This symbol is used to highlight **our other publications**. To find out how to access these, see *Further information* at the end of this sheet.

1: What is tissue donation and why is it important to MND research?

Tissue is the word used for a collection of specialised cells within the human body that perform a specific job. All organs are made up of tissues. Researchers investigating MND are particularly interested in the whole of the brain and spinal cord tissue, collectively called the central nervous system (CNS).

Why is tissue donation important to MND research?

Tissue donation plays a pivotal role in MND research. Many areas of research require careful examination of parts of the body which are often affected by MND (e.g., the CNS). Researchers believe that changes found in the CNS can help explain the causes of MND and may provide vital clues about how to combat the disease. Examination of the CNS also sheds light on the effects of MND-targeted medication and can therefore help to improve treatments.

I do not have MND, is my tissue useful?

Yes, it is just as important for research into MND to examine the brain and spinal cord tissue from people who do not have a neurodegenerative disease. By comparing tissue from both groups of people, researchers are able to study the damage specifically caused by MND. Donating tissue, whether you have MND or not, means that you can make a lasting gift in the fight against MND.

2: What will I need to do to donate my tissue?

If you are considering tissue donation, it is better if you can make arrangements well in advance. This allows you time to discuss your wishes with family, your next of kin and healthcare professionals. Tissue obtained soon after death is of greatest value to the researcher and it can make a difficult time easier if arrangements have been made beforehand. It is also not guaranteed that tissue donation can be arranged after death due to time constraints of hospitals.

Step 1: Contact a tissue bank

In the first instance, you should contact one of the tissue banks (also known as brain banks) listed at the end of this information sheet. There are many centres in the UK that have the facilities to store and preserve brain and spinal cord tissue donations for MND research - these are known as tissue banks.

Tissue banks are usually on hospital premises with strong links to academic medical research laboratories. The tissue donation process will be explained to you fully when you contact the tissue bank.

Step 2: Consent to tissue donation

For legal purposes, your next of kin or legal representative will be asked to sign a consent form; you may also be asked to sign a form to state that you want to donate your tissue for research. This is to ensure that you have given your informed consent for your body to be used in this way.

These forms will then be witnessed by your doctor or a healthcare professional. This will also give you the chance to discuss donation with people involved in your care and ensures that they are aware of your decision. If you are under the care of a hospice or hospital the forms can be signed and witnessed there.

Once these forms have been sent off to your chosen tissue bank, you may find it useful to contact them again to ensure that they have received everything that you have sent.

In relation to any tissue donation it is important to have the fullest possible medical and clinical history; permission to access your medical records will therefore be required (your personal details will remain confidential to the tissue bank).

Step 3: Tell everybody

It is extremely important that you discuss your decision with your family, carers and healthcare professionals, so that all the arrangements can take place as quickly as possible after death. For this reason, it may be a good idea to write down the name, telephone number and out of hours contact details of your chosen tissue bank. You may also like to consider choosing a funeral director in advance to ensure that the tissue bank is aware of these arrangements after your death.

3: What will happen to my body?

After the tissue bank has been contacted and a death certificate has been issued, the funeral director will usually transport your body to the chosen tissue bank or, in some cases, the nearest regional hospital.

A post-mortem examination will be carried out and the donated brain and spinal cord tissue will be removed and prepared for storage. After the tissue has been removed, your body will be transported to the chapel of rest until your funeral. If the post-mortem was performed at a local hospital, the tissue will be sent on to the tissue bank you have chosen.

How will the tissue I donate be used?

Upon removal, the whole brain and spinal cord tissue samples will be stored securely at the tissue bank. In all cases, the samples are coded so the identity of each donor remains strictly confidential to the tissue bank.

The tissue will first be studied to determine the specific diagnosis; for example, the

particular type of MND may be confirmed. These 'neuropathological findings' can often be communicated to the family (see information on individual tissue banks given at the end of this sheet). The tissue bank will then usually retain the tissue permanently in its collection for use in research and education.

It is important to know that it will not be possible for the bank to provide families with information on how individual samples are used in research, or what was learned from studying them.

Who will do research on donated tissue?

Primarily, researchers based at the tissue bank where the tissue was collected will carry out the research. However, tissue banks may also be participating in collaborative studies with other universities, hospitals and private companies.

4: FAQs about tissue donation

Making the decision to donate your brain and spinal cord tissue for MND research is not an easy one. There are many questions that may concern you and your relatives that need careful consideration.

How much does it cost?

For most tissue banks listed on this information sheet, there are no costs involved in tissue donation. Unfortunately, for other tissue banks no funding is available for the transport of the donor to the tissue bank where the donation occurs. At these tissue banks, the family of the donor is asked to pay the transport costs, although there may be local charities that can provide some financial assistance. The costs involved can vary according to the distance to the centre, and the funeral director transporting the body. Typical figures may range from £40 - £300+.

The role of NICE in drug approval

No. The post-mortem examination and removal of tissue is carried out in such a way that it will not prevent an open casket or other traditional funeral arrangements. The examination and removal of tissue usually takes place on the day following death and therefore should not cause a delay to the funeral.

In some cases, it may not be possible for the tissue bank to arrange the post-mortem immediately. This sometimes happens when a tissue donor dies at the weekend, even if the tissue bank concerned has an out-of-hours service (see information on individual tissue banks at end of sheet). However, the post-mortem and removal of tissue can usually be arranged for the following Monday. This may still be soon enough for the

tissue to be used by researchers but will vary between tissue banks.

Will the tissue bank cover the cost of my funeral?

No, tissue banks cannot provide any monetary awards to assist with the cost of your funeral.

Will donation still be possible if I have not arranged it beforehand?

Yes, your next of kin can arrange the donation of your tissue after your death. To do this they need to contact one of the tissue banks listed at the end of this sheet as soon as possible. We would however strongly recommend registering beforehand to help the donation proceed smoothly when the time comes and to reduce the need for your next of kin to deal with administrative issues at a distressing time.

Can I change my mind?

Yes, you are free to change your mind, without giving a reason, at any time, but it is important that you tell everyone involved, especially your next of kin or legal representative.

Are there any circumstances which may prevent donation?

There is a small possibility that the tissue bank with which you have registered is unable to accept your donation when the time comes. The most likely reason for this is that too much time elapses between your death and the removal of your tissue; this shouldn't be more than 72 hours, but preferably within 24 hours. We would recommend discussing this issue with your family to prepare them for the slight possibility that your wishes will not be carried out. The co-ordinators at each tissue bank will be happy to answer any questions you have about this.

I carry a donor card; will this prevent donation of tissue for research purposes?

A donor card lets people know that you want your body to be used for transplant purposes. It is not usually possible to donate your body for transplant purposes and also for medical research because of the complexity of the arrangements that would be necessary. If you wish to donate your brain and spinal cord to MND research and you carry a donor card, there may be some confusion at the time of your death about your wishes and this may cause your family distress at a difficult time. It is important to make your wishes clear to everyone.

With the exception of corneas, the organs of people with MND can be accepted for life-saving transplants if their death is caused by something other than MND (e.g. in an accident). As with all organ donations, the transplant clinicians will take into account any medical history, assess the condition of the donor organ and use it if it is suitable. However, organ donation for transplant is not usually possible after somebody dies from MND, particularly if they die at home or in a hospice. This is mainly due to the concern that, in some rare cases (specifically in people with the SOD1 genetic mutation), toxic protein inclusions that are normally seen only in motor neurones, were observed in the patients' liver and kidney. While MND is not an infectious disease, these observations might make clinicians wary of transplanting potentially affected organs to healthy patients.

If you wish to register as an organ donor, the NHS Organ Donor Register can be contacted on www.organdonation.nhs.uk or **0300 123 2323**.

5: Studies that used tissue donation samples

The positive impact of tissue donation can be best shown by explaining the research studies where they have been used. Below are brief summaries of selected studies that used tissue from tissue banks.

ALS-FUS pathology revisited: singleton FUS mutations and an unusual case with both a FUS and TARDBP mutation

King, A., Troakes, C., Smith, B., et al. (2015) *Acta Neuropathologica Communications*

One of the genes that causes MND has been found to be the 'FUS gene'. Disruptions in this gene result in creation of toxic 'clumps' in motor neurones, eventually leading to degeneration and death. Researchers in this study aimed to look at the detailed composition and location of these clumps when their formation is caused by the faulty FUS gene. The study used the brains and spinal cords of seven patients with a diagnosis of MND due to mutations in the FUS gene.

The tissue was subjected to a number of analyses: genetics, where the tissue is screened for various genes known to cause MND; immunochemistry, in which thin slices of the brain are stained with special chemicals to show the presence of clumps; and neuropathological analysis, in which the number of clumps within the brain and the amount of neuronal loss in the spinal cord is observed. These analyses revealed that the FUS-related clumps are located mostly in the lower motor neurones (in the spinal cord rather than the brain). The researchers also found that the composition and number of clumps was different in each patient. Further studies looking at possible subtypes of the FUS-specific MND might therefore be required in the future.

Genetic compendium of 1511 human brains available through the UK Medical Research Council Brain Banks Network Resource

Keogh, M. J., Wei, W., Wilson, I., et al. (2016) Genome Research

In order to analyse the possible genetic causes of any neurodegenerative disorder, researchers organise extensive studies in which they look at tens to hundreds of brains taken from patients as well as healthy individuals. The purpose of this study was to create a detailed overview of the most common neurodegenerative diseases and describe the genetic mutations that are likely to contribute to their development. The researchers looked at 252 brains of patients with MND and FTD, alongside of over 1,200 brains of patients with other neurological disorders (e.g., Alzheimer's disease, Parkinson's disease).

All brains underwent a neuropathological examination, in which a diagnosis was confirmed by a pathologist. In the first stage, slices of brains were sent out for a DNA extraction; this includes an extraction of cells from the brain tissue using a special DNA extraction robot and application of various chemicals and mechanic processes to obtain the purest form of DNA. Further stages involved more detailed analyses of chunks of DNA to reveal the genes that are present in that specific DNA sample. Finally, the presence of genes was tracked back to each tissue sample and associated with their specific disease. Using this approach, the researchers were able to confirm that 149 genetic mutations that were previously thought to be adverse do not in fact lead to a development of neurodegenerative diseases. Such findings will make it easier for researchers to only focus on the relevant genes in the future.

6: How do I choose which centre to contact?

Although tissue donation is easier to arrange in areas local to the tissue bank, some of them can accept donations from a wider area (see the guide below for details).

If you have any specific questions, we suggest you discuss them directly with the tissue bank involved. To ensure that you completely understand the principles of tissue donation, it may help to go through the issues raised on this information sheet with the tissue bank that you have chosen.

Some tissue banks are not contactable out of hours. If you choose such a bank, it may be a good idea to discuss with them what would happen if you were to die during a weekend or bank holiday.

7: MND tissue bank contact details

See below for information on the tissue banks across the UK and Ireland that receive tissue donations from people with MND. Please note that not all tissue banks will be able to accept tissue from anywhere in the country, however, there are some that are able to do so (please check details for each specific institution). Please note that out of hours services are not for registering your interest.

Cambridge

Cambridge Brain Bank, Department of Histopathology, Box 235, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Hills Road, CB2 0QQ

Maggie Luff

Telephone: **01223 217336**; out of hours service not currently available. After 5.30pm please leave a message with the Brain Bank who will respond on the next working day.

Email: add-tr.cambridgebrainbank@nhs.net

Coverage: East Anglia only (Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk, Suffolk and Northants).

Feedback: Information on neuropathological findings (diagnosis) will be provided to the patient's next of kin or clinician if requested.

Funding: Transport costs to and from the patient's local hospital will be met by Cambridge Brain Bank.

Dublin

Dublin Brain Bank, Department of Neuropathology, Beaumont Hospital, Dublin 9, Ireland

Jennifer Lorigan

Telephone: **01 8092706; 01 7974757** (24-hour messaging service number)

Email: brainbank@rcsi.ie

Coverage: The Brain Bank works in conjunction with hospitals around the country so that tissue can be recovered and transferred within 24-72hrs.

Feedback: Information on neuropathological findings (diagnosis) will be provided to the patient's family.

Funding: All costs relating to the transport for donation will be borne by the study.

London

London MRC Neurodegenerative Diseases Brain Bank, PO Box 65, Institute of Psychiatry, Psychology and Neuroscience, King's College London, De Crespigny Park, London, SE5 8AF

Dr Claire Troakes

Telephone: **0207 848 0290** (office hours 9am-5pm, Monday-Friday, please leave an answerphone message outside these times).

Email: brain.bank@kcl.ac.uk

Coverage: Mainly London and South East of England but can be accepted from throughout UK.

Feedback: A copy of the final neuropathology report can be sent to the family. A copy of the report is sent to the clinician in charge of the patient's care.

Funding: The costs of tissue donation are met by the Brain Bank.

Newcastle

Newcastle Brain Tissue Resource, MND Care Centre, Department of Neurology, Royal Victoria Infirmary, Queen Victoria Road, Newcastle upon Tyne, NE1 4LP

Debbie Lett

Telephone: **0191 208 1231**; out of hours service possible via 0191 248 1345 (answer machine - checked daily including weekends and holidays)

Email: nbtr@ncl.ac.uk

Coverage: Northumberland, North Cumbria and Tyneside.

Feedback: Will give feedback on request in terms of tissues stored and any additional findings at post-mortem.

Funding: The costs of tissue donation are met by the Newcastle Brain Tissue Resource

Nottingham

Nottingham Brain Research Archive, Department of Histopathology, Queen's Medical Centre, Derby Road, Nottingham, NG7 2UH

Dr Simon Paine

Telephone: **0115 924 9924** (ext. 81271); out of hours service not available.

Email: simon.paine@nuh.nhs.uk

Coverage: Donors need to have been under the care of a clinician from the Nottingham University Hospital Trust. Donation for research is one of the options for dealing with the tissues once diagnosis is complete.

Feedback: Information on neuropathological findings (diagnosis) will be provided to the donor's next of kin or clinician if requested.

Funding: The family would need to meet the costs of transport to and from Queen's Medical Centre.

Oxford

Oxford Brain Bank (OBB), John Radcliffe Hospital, Headley Way, Headington, Oxford, OX3 9DU

Telephone: **01865 234204**

Email: brainbank@ndcn.ox.ac.uk

Coverage: Midlands, Thames Valley, South and South-West of England. Focus on donors taking part in clinical trials and cohort studies, but other donations accepted. No costs to the family. Logistics may prevent donation in some cases.

Feedback: Information on neuropathological findings (diagnosis) will be provided to the donor's next of kin or clinician if requested.

Funding: The Oxford Brain Bank is supported by the Biomedical Research Centre, Brains for Dementia Research, the Concussion Legacy Foundation and the Nuffield Department of Clinical Neurosciences of the University of Oxford.

Sheffield

Sheffield Institute for Translational Neuroscience, University of Sheffield, 385a Glossop Road, Sheffield, S10 1HQ

Prof Pamela Shaw, Prof Christopher McDermott, or Lee Tuddenham

Telephone: **0114 222 2266**, or **01142261049**; out of hours service possible via the Royal Hallamshire Hospital switchboard on 0114 271 1900.

Email: pamela.shaw@sheffield.ac.uk; christopher.mcdermott@sth.nhs.uk; lee.tuddenham@sheffield.ac.uk

Coverage: Funding is only available for local donations, but donations can be accepted from further afield if transport costs are covered by the family.

Feedback: Details of the neuropathological findings (diagnosis) will be provided to the relatives or clinicians if requested.

Funding: Local transport costs can be covered from research funds.



8: How do I find out more?

Further information

Living with motor neurone disease – our main guide to help you manage the impact of the disease

Caring and MND: support for you – comprehensive information for unpaid or family carers, who support someone living with MND

Caring and MND: quick guide – the summary version of our information for carers

You can download most of our publications from our website at www.mndassociation.org/publications or order in print from the MND Connect helpline, who can provide further information and support.

MND Connect can also help locate external services and providers, and introduce you to our available services, including your local branch, group, Association visitor or regional care development adviser.



MND Connect

Telephone: 0808 802 6262

Email: mndconnect@mndassociation.org

Research Development Team

Telephone: 01604 611 880

Email: research@mndassociation.org

MND Association website and online forum

Website: www.mndassociation.org

Online forum: forum.mndassociation.org or through the website