



# Brain Bank Bulletin

Issue 6  
Spring  
2006

The PDS Tissue Bank is sponsored by the Parkinson's Disease Society

The PDS Tissue Bank at Imperial aims to help understand what causes Parkinson's and assist in the development of better drug treatments by providing high quality brain tissue to researchers working in the field of Parkinson's and related neurological disorders. The Tissue Bank also aims to enhance the public's awareness of Parkinson's, promote the work of the Tissue Bank and increase the numbers of volunteers who are willing to sign up to the donor scheme. The Tissue Bank also aims to collect the tissue so that it is suitable for all research needs and that it is collected in the most ethical manner.



## Tissue Bank receives National Publicity following the BA Festival of Science in Dublin

Dr Kirstin Goldring attended the BA (British Association for the Advancement of Science) Festival of Science in Dublin in September 2005. "The BA Festival of Science is one of the UK's biggest science festivals. It attracts 400 of the best scientists and science communicators from home and abroad who reveal the latest developments in research to a general audience" ([www.the-ba.net](http://www.the-ba.net)). As a result of the presentation about the importance of brain donation, the Tissue Bank received a great deal of publicity. There was coverage of the need for more brain donations in 'The Times' and 'The Guardian' newspapers in September 2005, BBC news on-line and health related websites also covered the story. In addition the Tissue Bank was then approached to do TV interviews on the subject, and Dr David Dexter was interviewed on BBC News 24 and he was also interviewed and the laboratories were filmed for BBC London news. The publicity resulted in an increased number of enquiries to the Tissue Bank, with the number of packs we sent out increasing from 20-30 per month to 40-50 in September, October and November. It also led to an increase in the number of people registering with the Tissue Bank, with over 30 people registering in October, well over the average of 15. We were very pleased with the publicity and increased interest in the work of the tissue which can only help us to provide the valuable tissue which is essential for research in to Parkinsons.



## Update on how the tissue is being used for research

The tissue kindly donated to the Tissue Bank is being used for a variety of different research projects in the UK and worldwide. Tissue is currently being supplied to research groups at various Institutions which include: National Institute of Health (NIH) USA, Kuopio University Finland, RWTH University Aachen Germany, Essex Neuroscience Centre UK, Cambridge University UK, West London Neurosciences Centre UK, Kings College London UK, Institute of Neurology London UK. Tissue is also being supplied to a number of research groups here at Imperial College, including a large Programme Grant awarded to Professor Manuel Graeber by the PDS. The tissue is being utilised for the following research areas: differences in gene expression in Parkinson's, metabolic and transcriptional changes in Parkinson's, the pathways involved in Parkinson's and Lewy Body Disease, the role of inflammation in Parkinson's, the pathways underlying causes of dyskinesia in Parkinson's, the role of alpha-synuclein in Parkinson's, the involvement of the olfactory (smell) system in Parkinson's, measurement of nuclear strand breaks in different cell types and brain regions in Parkinson's. Some of the research also involves standardisation of the protocols and the diagnosis of Parkinson's and related disorders used in Tissue Banks across Europe .

A number of these research projects have led to publications in scientific journals, but for those of you who do not have access to these specialist journals, you can find out about the results here in our regular newsletters. Look out for our regular article on research in future issues.

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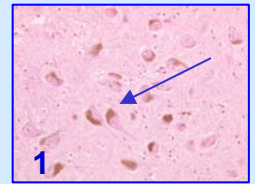


**Parkinson's  
Disease Society**

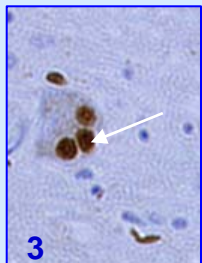
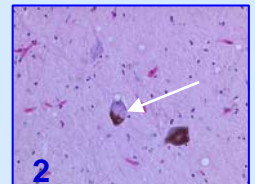


## A Crime Scene in Technicolor

The various staining techniques used by the Tissue Bank not only emphasise the beautiful architecture of the cells within the brain, they also give vital information to the neuropathologist. This allows a definitive diagnosis of the disorder experienced in life by the person who donated tissue. Although we do not exactly know what causes brain cells to die in Parkinson's, the different staining techniques allow us to identify key pathological features associated with cell death in Parkinson's and other disorders. This is just like the "scene of a crime" in that we don't know who committed the crime but gather evidence such as finger prints, DNA samples etc from the scene which may help us to track down the criminal. In the same way the information we gather on pathological markers in the brain may give clues as to why cells die in Parkinson's. Sections from each donated brain are exposed to a variety of staining techniques, all of which highlight different pathological processes or "clues". The pictures here depict some of these clues.

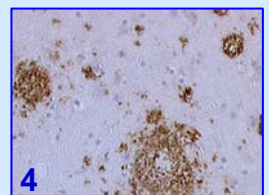


The first two figures, depict tissue exposed to a traditional stain called Haematoxylin & Eosin that has been used for decades in histology to highlight components of cells and tissue. The Haematoxylin component stains the nuclei of the cell (contains our genetic information) blue and the Eosin stains the rest of the cell shades of pink. The large cells (blue arrow) contains brown granules which help identify dopaminergic neurons/ nerve cells of the substantia nigra, these brown granules are neuromelanin that cause the tissue to appear dark, hence the latin term used for the tissue is nigra or black. The first thing to notice is that in the healthy brain (fig 1) there are considerably more dopaminergic neurons than in the brain from a person with Parkinson's (fig 2).

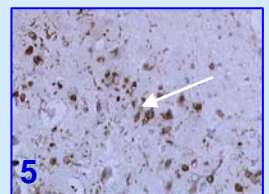


Secondly, in the Parkinson's brain we detect structures within the dopaminergic neurons that have a pink core and a clear halo (white arrow fig 2). These are Lewy bodies that are thought to be a protective storage site for things like altered/ damaged protein which can be toxic to the cell. Two of the most common altered proteins in the Lewy body are alpha-synuclein and ubiquitin. The full function of these proteins is not fully understood, nor do we understand how the proteins become altered. However, we can visualise such proteins using a modern staining technique called immunocytochemistry, where antibodies with coloured markers can selectively bind to the protein. Fig 3 shows alpha-synuclein staining in the Nucleus Basalis Meynert, another brain area affected in Parkinson's, where you can see the Lewy bodies clearly stained brown (White arrow).

Parkinson's in some cases not only affects the person's ability to move but in certain individuals it can affect their memory, this is similar to the dementia experienced in Alzheimer's disease. Indeed, in some cases we can therefore also detect the "neurofibrillary plaques and tangles" similar to those observed in Alzheimer's brains. Again these structures contain an altered protein, in this case beta-amyloid, which can also be detected by immunocytochemical stains. Fig 4 shows clumps of amyloid



within the tissue forming "plaques" of various sizes in the frontal lobe region of the Parkinson's brain. Neurons are not the only type of cells in the brain, there are also glial cells in the brain that can have "Jekyll & Hyde" type characteristics. They are helpful in maintaining a healthy environment for neurons to survive in and they can remove bits of cell debris when a cell dies. However, when activated they can release chemicals that stimulate a type of inflammatory response that can damage neurons. CR3/43 is a specific antibody that we utilise in immunocytochemical stains which will detect activated glial cells (fig 5 white arrow). There are a number of these activated glial cells in this tissue from a Parkinson's brain, showing evidence of the inflammatory reactions in the tissue.



This article highlights a few of the staining tools that help us in the neuropathological diagnosis of Parkinson's and other pathologies.



### F.A.Q's

#### Q. Can you work with other donor schemes?

**A.** Yes, we can work with other national donor and regional donor schemes, if we are notified in advance of your wishes and we have their full contact details. However we cannot work with whole body donations as they require the whole body!

#### Q. What happens if I die on holiday?

**A.** If you were to pass away whilst on holiday within the United Kingdom it maybe possible for us to procure tissue if we are contacted in time, however if you are holidaying abroad it is unlikely to retrieve tissue in appropriate time frame.

#### Q. When should the Next of Kin contact the Tissue Bank?

**A.** We advise the Next of Kin to contact the tissue bank as soon as possible after the person dies. However if a registered donor becomes increasingly ill and is not expected to live much longer, the next of kin may wish to contact us in advance so that we can start making arrangements, so that the donation occurs more smoothly when the time comes.

#### Q. What happens if a Post Mortem is necessary?

**A.** If there is to be a post mortem we have to take guidance from the Coroner. We are often allowed to take tissue, however this is entirely at the discretion of the Coroner but we do try to persuade them to let us take tissue within the time frame.

#### Q. Do you have to have PD or related disease to register as a potential donor?

**A.** No, we need people to donate that don't have a neurological condition, these are called control donors and are extremely important as they are used as a comparison against the PD brains.

#### Q. How do I register with the Tissue Bank?

**A.** To become a potential donor you have to register with us. This involves completing 3 forms, the first form is for you to complete, the second is for you Next of Kin to complete. Legally we need these forms to be completed before we are allowed to take tissue. There is also a form about your health and who is your GP etc...

#### Q. Which number do I ring if I have a question or problem?

**A.** If you have a question regarding the donation process, or anything that is worrying you, please call us in the office on **020 8383 4917** during office hours. Please only use the emergency bleep number when a person has died or is expected to die shortly, **07659 10 45 37**.

#### Q. What do I do if some of my details change?

**A.** Please contact us if any of your details on the forms you have completed change, it is very important that your details are kept up to date.

#### Q. What happens if I don't have a next-of-kin or they live abroad?

**A.** The Tissue Bank needs a signature from your next-of-kin as well as yourself as the potential donor before we can collect tissue. However, if you do not have any next-of-kin or they live abroad you can nominate someone to act as your next-of-kin as long as this is done legally through a solicitor.

#### Q. What happens if I change my mind and decide donating tissue is not for me?

**A.** You are free to change your mind about being a registered potential donor at any time but please notify the Tissue Bank of your change in wishes!

#### Change of Address/ Comments Form

Date: Name of Donor: Donor No:

Old Address:

New Address:

Post Code:

Date of address change:

Contact No:



## Contact Information

### UK Parkinson's Disease Society Tissue Bank at Imperial College

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Clockwise from top left: Dr David Dexter, Scientific Director; Neuropathology Team: Prof Manuel Graeber not pictured; Dr Federico Roncaroli, Dr Stephen Gentleman; Dr Ronald Pearce, Consultant Neurologist; Prof Richard Reynolds, Technical Advisor; Laura McKay, Tissue Bank Secretary; Veena Supramaniam, Research Technician; Louisa McGuinness, Research Technician; Helen Cairns, Research Assistant; Dr Kirstin Goldring, Tissue Bank Manager.

## Future Branch Talks



- 10th May 06, **Aberdeen**
- 14th June 06, **Chichester** 7.30pm;
- 22nd June 06, **Reigate** afternoon;
- 10th July 06, **Leamington** 2pm;
- 25th July 06, **Bridport** 2.30pm;
- 3rd Aug 06, **West Herts** 7.30pm;
- 19th Oct 06, **Atherstone**, afternoon
- 6th Oct 06, **Macclesfield** evening;
- 2nd Nov 06, **Rochdale** 7.15pm;
- 14th Nov 06, **Bolton** 7.30pm.

**Please contact us if you require further details.**



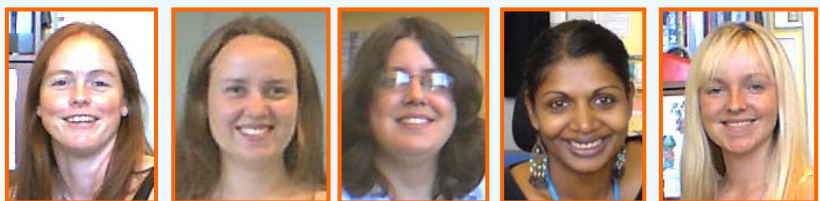
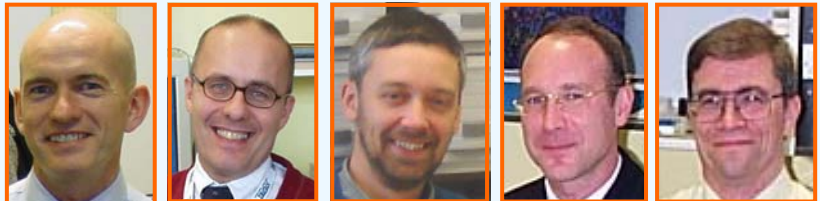
### Notices

We would like to thank everyone who has donated money to the Tissue Bank. Anyone who is thinking of donating please note we have to ask you to make the cheques payable to 'Imperial College'.

If you have any comments or suggestions relating to the Brain Bank Bulletin please complete the slip as we welcome all ideas.

If you have any problems reading this please let us know and we can send you a text only version.

### Our Team



Please tear this section off and return to us free of charge with your comments or change of address.

**Comments/ Suggestions/ Questions:**

**Please detach slip and return to us in an envelope free of charge using the enclosed label.**