

## Mayo Clinic Jacksonville Brain Bank for Alzheimer's, Parkinson's and Related Disorders

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From its inception in September 1997 to the present (January 2008), the Brain Bank at Mayo Clinic Jacksonville (MCJ) has received over 2000 brains from 49 states, the District of Columbia and 6 provinces of Canada. A small number of cases are also sent from outside North America. The yearly average is  $202 \pm 27$  brains. The major studies that contribute material to the MCJ brain bank are the State of Florida Alzheimer Disease Initiative (38%), the Society for Progressive Supranuclear Palsy (31%), the Mayo Clinic Alzheimer's Disease Research Center (11%), Mayo Clinic's Udall Center for Excellence in Parkinson's Disease Research (9%) and the Einstein Aging Study (3%). In addition, cases are sent from a variety of sources for consultation (7%).

The brain donors include an equal number of men and women, with an average age at death of  $76 \pm 11$  years and an age range of 26 to 105 years. Most patients are Caucasian (97%), but a small number are Hispanic (2.2%), African-American (0.8%) or Asian-American (0.4%). Donations from minority and underserved populations are highly encouraged.

In most circumstances, both fixed and frozen brain tissue samples are sent for diagnosis and research. The MCJ brain bank will pay for shipping costs and provide shipping containers and dry ice, if needed, but it does not pay for harvesting of the brain tissue at local site or for any funeral, transportation or other related expenses. The MCJ brain bank currently holds 1720 frozen specimens and 1920 fixed tissue specimens, as well as glass slides and paraffin blocks on 2040 and 1940 cases, respectively. On each case 15-20 paraffin blocks are made and 20-30 slides. The archives hold about 35,000 paraffin blocks and over 60,000 glass slides that have been stained for histologic and immunohistochemical studies and fluorescent microscopy.

DNA is extracted from all of the frozen tissue, banked for genetic research and provided to qualified investigators. Quantitative measures are collected on all cases based upon microscopic studies, including semi-quantitative estimates of severity of Alzheimer type pathology, density of Lewy bodies, and glial and neuronal tau pathology. A Braak neurofibrillary tangle stage (ranging from 0 to 6) is recorded on each case. The average neurofibrillary tangle stage on all cases is 4. (Neurofibrillary tangle stages greater than 4 are associated with dementia). The brain weight is recorded on all cases, and the average brain weight is 1020 grams (normal adult 1100-1400 grams).

A diagnostic report is issued within a month ( $4.1 \pm 3.0$  weeks) to the referring pathologist, and a copy of the report, along with an explanatory letter, is mailed to the next-of-kin. The diagnostic evaluation is provided without charge to the family.

The primary neuropathologic diagnoses for all cases in the MCJ brain bank at present are Alzheimer's disease (42%), progressive supranuclear palsy (27%), Lewy body disease (8%), frontotemporal dementia (6%), corticobasal degeneration (4%), multiple system atrophy (2%), vascular dementia (2%), amyotrophic lateral sclerosis (1%) and Creutzfeldt-Jakob disease (1%). Many of the cases (63%) have more than one type of pathology, with Alzheimer type pathology, cerebrovascular disease and Lewy bodies frequent comorbid conditions. There are also a small number of normal brains (3%), and a wide range of rare miscellaneous conditions (4%)

Samples have been donated from the MCJ brain bank to research laboratories in the United States, England, Spain, Poland, Israel and Japan. Biochemical studies and genetic studies are the current focus of research on the major disorders, including Alzheimer's disease, progressive supranuclear palsy, Lewy body disease and frontotemporal dementia. For example, the MCJ brain bank has contributed samples to genome wide association studies on Alzheimer's disease, Lewy body disease and progressive supranuclear palsy in efforts to determine genetic risk factors for these disorders.