Born-Bunge Institute (IBB)
Neuropathology and neurobiobanking in the past 2 decades

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Background

The Born-Bunge Institute (IBB) was founded in Antwerp in 1933. In those years, the IBB was a small institute where patients could receive the best medical care. Thanks to the efforts of different families and the leading role of Dr. Ludo van Bogaert, this medical institute was among the first to integrate clinical, neuropathological, biochemical and genetic data of patients with neurological conditions. [1,2]

1995 - Brain dissection with prof. Jean-Jacques Martin, prof. Patrick Cras and prof. John-Paul Bogers

Nowadays, the IBB is a research group affiliated with the University of Antwerp that integrates fundamental, clinical and neuropathological data of neurological conditions, uniting the research laboratories:

IBB-Neurobiobank (IBB-NBB, FAGG registration number FA190113), Laboratory for Neuropathology, Laboratory for Neuromuscular Pathology, Laboratory for Neurobiology (Creutzfeldt-Jakob disease), Laboratory for Neurogenetics (Neurodegenerative Brain Diseases, Peripheral Neuropathies, Neurogenetics, Molecular Neurogenomics), Laboratory for Neurochemistry and Behaviour, and the Laboratory of Theoretical Neurobiology.

The Neurobiobank contains over 6500 brains of patients with neurodegenerative diseases.

Next to biobanking, the labs of the IBB work closely with the referring physicians to offer an integrated diagnosis in the neuromuscular and neurodegenerative pathology, including Creutzfeldt-Jakob disease.

Methods

Cases are included from hospitals throughout Belgium, with ICF and application form:
www.uantwerpen.be/autopsy
www.uantwerpen.be/sampling

Based on the reason for referral, standardized procedures are followed for optimal diagnostics and biobanking. [3,4]

Analysis of CSF protein biomarkers (both established and emerging) are offered in scientific, diagnostic and public health surveillance context (CJD). Diagnostic histopathology is offered with a full range of routine histology techniques, immuno-histochemistry and electron microscopy.

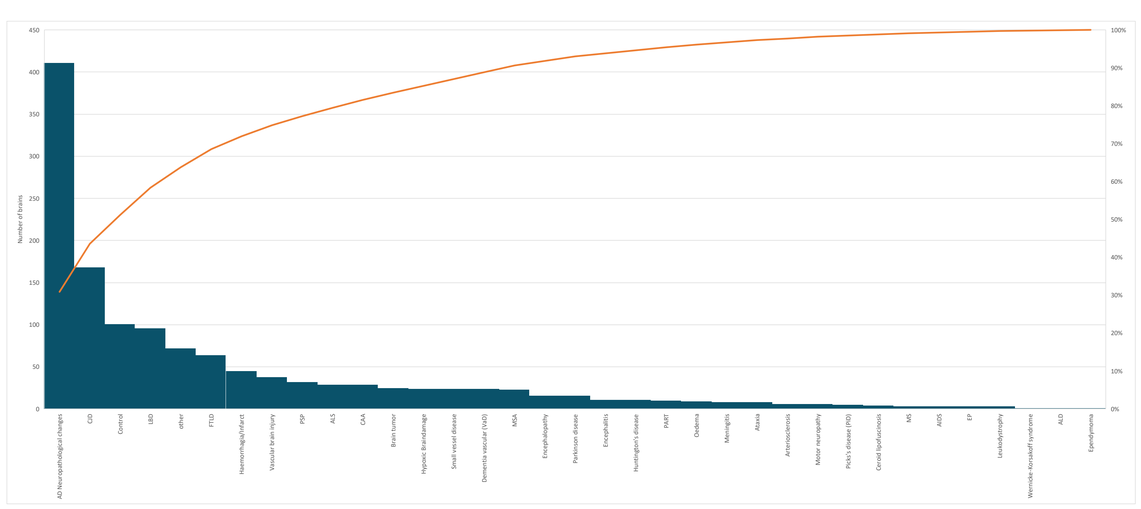
Results

In this specific field of neuromuscular and neurodegenerative neuropathology, the IBB-Neurobiobank is one of the largest biobanks in Europe.

The IBB-Neurobiobank	
Total number of Neuropathologically confirmed brains, FFPE partially with frozen hemispheres	**> 4500**
of which neurodegenerative diseases	> 2000
cases of AD, CJD, VB, LB, PD	≥ 1200
cases of ALS, FTLD, MS, PSP, MSA, CAA, Huntington	≥ 300
cases of cerebellar atrophy, necrosis, encephalitis, hypoxia,...	≥ 260
cases with myopathy, DMD, ...	≥ 15
control brains	> 200
total nr. CSF samples, frozen	**> 15000**
total nr. blood plasma samples, frozen	**> 4000**
total nr. blood serum samples, frozen	**> 6000**
total nr. urine samples, frozen	**> 1000**
total nr. muscle samples, frozen	**> 1500**
total nr. Skin or nerve samples, frozen	**> 700**

Every brain in the IBB-Neurobiobank has an updated neuropathological dagnosis, based on latest morphological and immunohistochemical techniques.

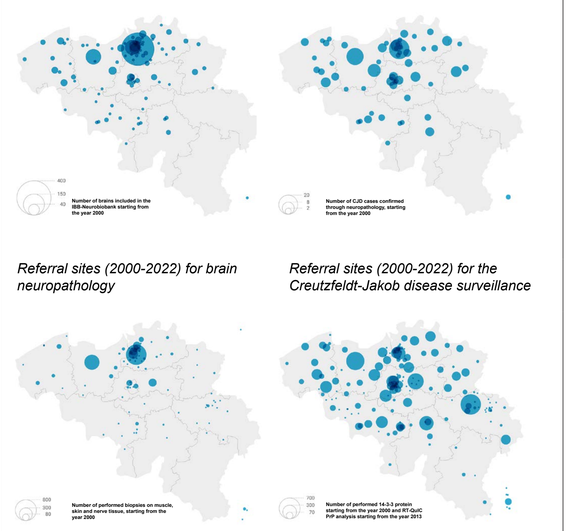
Number of brains sorted by diagnosis (2000-2022)



Neurodegenerative Brain diseases: neuropathological diagnoses in the IBB neurobiobank (2000-2022). AD: Alzheimer's disease, CJD: Creutzfeldt-Jakob disease, LBD: Lewy body disease, FTLD: frontotemporal lobar degeneration, PSP: progressive supranuclear palsy, ALS: amyotrophic lateral sclerosis, CAA: cerebral amyloid angiopathy, MSA: multiplesystem atrophy, PART: primary age-related tauopathy, MS: multiple sclerosis, AIDS: acquired immune deficiency syndrome, EP: epilepsy, ALD: adrenoleukodystrophy

Because of its specific domain of expertise, referrals to the IBB come from throughout Belgium.

Demography



Referral sites (2000-2022) for brain neuropathology

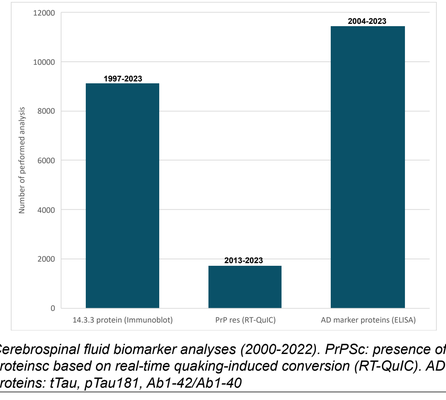
Referral sites (2000-2022) for the Creutzfeldt-Jakob disease surveillance

Referral sites (2000-2022) for neuromuscular pathology

Referral sites (2000-2022) for the Creutzfeldt-Jakob disease biomarkers in cerebrospinal fluid

As an expertise and referral centre for CJD, more than 15.000 cerebrospinal fluids were examined for biomarkers of neurodegeneration.

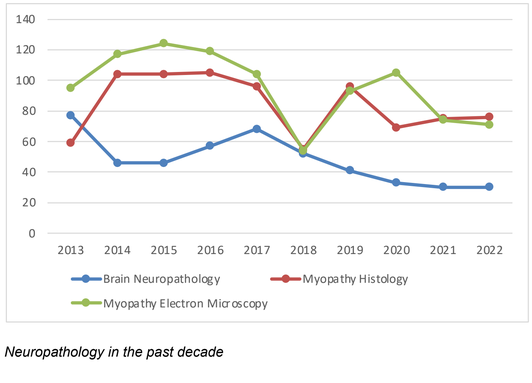
Cerebrospinal fluid



Cerebrospinal fluid biomarker analyses (2000-2022). PrPSc: presence of prion proteinsc based on real-time quaking-induced conversion (RT-QuIC). AD marker proteins: tTau, pTau181, Ab1-42/Ab1-40

Throughout the last 10 years, there is a relatively stable number of referrals for myopathy histology and electron microscopy, as well as neuropathological brain analysis.

Muscle biopsy - brain autopsy 2013-2022



Neuropathology in the past decade

This close collaboration in IBB between the research groups, the labs and the biobank, allowed the IBB to be a partner of national and international research groups:

- VIB-UAntwerpen Center for Molecular Neurology
- Cognitive genetics, Universiteit Antwerpen, Centrum medische genetica
- Departement Neurowetenschappen, KU Leuven
- Department of Biomolecular Medicine, Gent University
- Centre For Proteomics - UAntwerp/VITO
- Facio Therapies BV
- Maastricht University Toxicogenomics (TGX)
- Department of Neuromuscular Diseases, University College London
- Neurogenetics department at the University Hospital Salpêtrière
- Radboud University Medical Center
- Neurochemistry Lab; UMC Amsterdam

Conclusion

Founded nearly a century ago, the primary goal of the IBB remains to help the patient by assisting his treating physician in the diagnostic workout.

Additionally, the IBB has a unique position between the domains of neurology, neuropathology and translational neurosciences facilitating research in the field of neurodegenerative and neuromuscular diseases.

Additionally the IBB-Neurobiobank has a priceless value in the rapidly evolving field of translational neurosciences.

For additional information, including application forms, informed consent documents and methodology, see QR code:

or contact us:
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References

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[4] McGuire LI, Peden AH, Orrú CD, et al. RT-QuIC analysis of cerebrospinal fluid in sporadic Creutzfeldt–Jakob disease. Ann Neurol. 2012;72:278-285.

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