Department of Neurology

Principal Investigator: Nobutaka Hattori (Professor)

Our department was established in 1968, and Prof. Hirotaro Narabayashi was appointed as the first professor of neurology at Juntendo University. Then, the second professor, Prof. Mizuno, and I, Nobutaka Hattori, the third professor, were involved in research on the molecular mechanisms of Parkinson's disease (PD), starting in 1989. I found a decrease in the amount of complex I in the substantia nigra of PD patients[1]. More recently, my collaborators and I identified the disease gene for an autosomal recessive form of young-onset familial PD, and named it "parkin"[2]. This is the second form of familial PD in which the disease gene has been identified. In addition, my collaborators and I found that the gene product, parkin, is directly linked to the ubiquitin-proteasome pathway as an ubiquitin ligase[3]. This discovery suggested that the protein degradation system is involved in the pathogenesis of not only the monogenic form of PD but also sporadic PD.

We are currently working hard on the investigation and development of therapeutic methods not only for PD, but also other neurological diseases. I would like to introduce our department as follows.

Publications:

Group Leaders and Research Topics
1. Yasushi Shimo (Associate Professor)

Deep brain stimulation (DBS) has been widely performed for various medically refractory movement disorders. For PD, the target of DBS is the subthalamic nucleus (STN) or globus pallidus internus (GPI). There is some evidence to demonstrate its effectiveness on motor function and QOL. Our lab has also been interested in the pathophysiological mechanisms of basal ganglia disorders. Since 2012, we have been collaborating with the Department of Research and Therapeutics for Movement Disorders (described below) and have investigated the therapeutic mechanisms of DBS using electrophysiological methods.

Publications:

2. Shigeto Sato (Associate Professor)

Our groups are investigating the molecular pathogenesis of PD using model mice. The recent discovery of genes and the associated etiology of familial PD has shed light on the fundamental role of mitochondrial dysfunction in PD. The discovery and increasing knowledge of protein and mitochondrial degradation associated with PINK1/parkin should enhance our understanding of the common pathological mechanism of PD[1].

Publications:

3. Shinji Saiki (Associate Professor)

The purpose of our research is to develop anti-parkinsonian drugs, especially ones modulating apoptosis and autophagy, an indispensable protein degradation system[1]-[3]. In addition, we aim to determine the exact molecular mechanisms of mitophagy using chemical biology techniques[4].

Publications:


4. Manabu Funayama (Associate Professor)
To elucidate the etiology of PD and related disorders, we are constructing a DNA/RNA bank of PD. So far, this bank has data on over 3,500 patients with PD and related disorders, and over 800 controls. Using these resources, we recently identified CHCHD2 as a novel causal gene of autosomal dominant PD.

Publications:

5. Ryota Tanaka (Associate Professor)
Stroke is a leading cause of death around the world. Our lab has investigated the mechanisms of ischemic neuronal cell death and discovered a strong neuroprotective effect of small heat shock protein (HSP27) for acute ischemic stroke. Other research interests are regenerative medicine, such as the mobilization of endogenous neural and oligodendrocyte progenitor cells and axon re-growth after stroke. We have also reported a lot of important clinical evidence associated with stroke, such as diabetes, microbleeds, visceral fat, and TEE. Now, we are planning to investigate the association between vascular risk factors and neurodegenerative disorders.

Publications:


6. Kazumasa Yokoyama (Lecturer)
Our lab has attempted to elucidate the pathomechanisms of neuroimmunological diseases, especially multiple sclerosis (MS). We have treated more than 700 patients with neuro-immunological disorders in our outpatient clinic and performed clinical as well as basic research. We are very interested in the new MRI analytical methods in MS, and investigating neurodegenerative roles by analyzing specimens from patients. We have been collaborating with the Neuroradiology Department and Immunological Department of our university, and the Division of Molecular Neuroimmunology of Hokkaido Univ. and the Neurological Dept. of TMDU for breakthrough therapy.

Publications:


7. Masashi Takanashi (Associate Professor)
We participate in diagnostic neuropathology and the construction of a brain bank of neurodegenerative diseases in cooperation with other institutions. We have a lot of brain samples of Parkinson’s disease and other movement disorders for pathological diagnosis and biological research.

8. Kazuaki Kanai (Associate Professor)
Our group is investigating mainly clinical neuromuscular diseases. We are interested in the contributions of abnormal nerve/muscular excitability to the pathogenesis of neuromuscular diseases, and the development of physiological disease biomarkers.
Publications:

9. Yumiko Motoi (Senior Associate Professor; Department of Diagnosis, Prevention and Treatment of Dementia)
Our team has devoted itself to patients with dementia, especially Alzheimer’s disease. In basic neuroscience, we have focused on the molecular pathogenesis of tau with the aim of establishing a new tau-based drug. In our outpatient clinic, we have taken care of hundreds of patients with AD, MCI, DLB, vascular dementia, and iNPH. We are planning to perform a preventative exercise trial for MCI.
Publications:

10. Yuzuru Imai (Senior Associate Professor; Department of Research for Parkinson’s Disease)
Our group focuses on the molecular dissection of Parkinson’s disease–associated proteins, which include PINK1, Parkin, LRRK2, and Vps35, using Drosophila genetics, and biochemical and cell biological approaches.
Publications:

11. Atsushi Umemura (Senior Associate Professor; Department of Research and Therapeutics for Movement Disorders)
Our department was established for a multidisciplinary approach to movement disorders. We organize a “Movement Disorder Unit” with neurologists, neurosurgeons, psychiatrists, and rehabilitation doctors. The main topic of our research is deep brain stimulation for movement disorders.
Publications: