Division of Biochemistry
Department of Molecular Biosciences

Outline

We are approaching to various diseases using the biochemical techniques at the molecular level. In recent years, elucidation of pathogenesis at the molecular level is rapidly progressing in many diseases, and we believe that our basic research can contribute to prevention, early diagnosis and early treatment of various diseases. In addition, we are developing analytical methods for genetic polymorphisms that have a great influence on drug effects and side effects. The basis of personalized medicine is to select the optimal drug and to adjust the dose for individuals based on the analysis results of genetic polymorphism. We believe that we can promptly provide the optimal care for each patient by developing simpler and faster analysis methods.

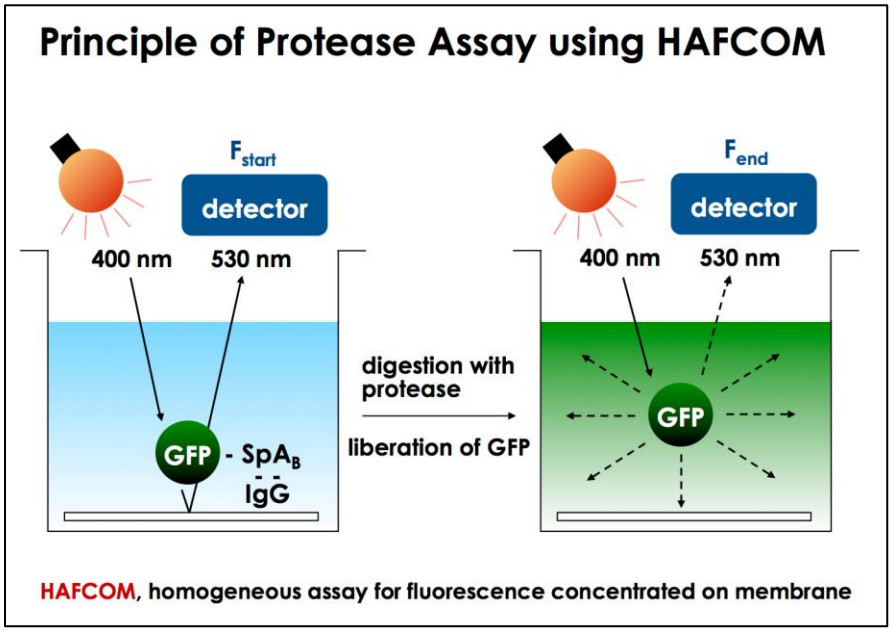
Faculty members

Professor; Takashi AOKI, Ph.D.

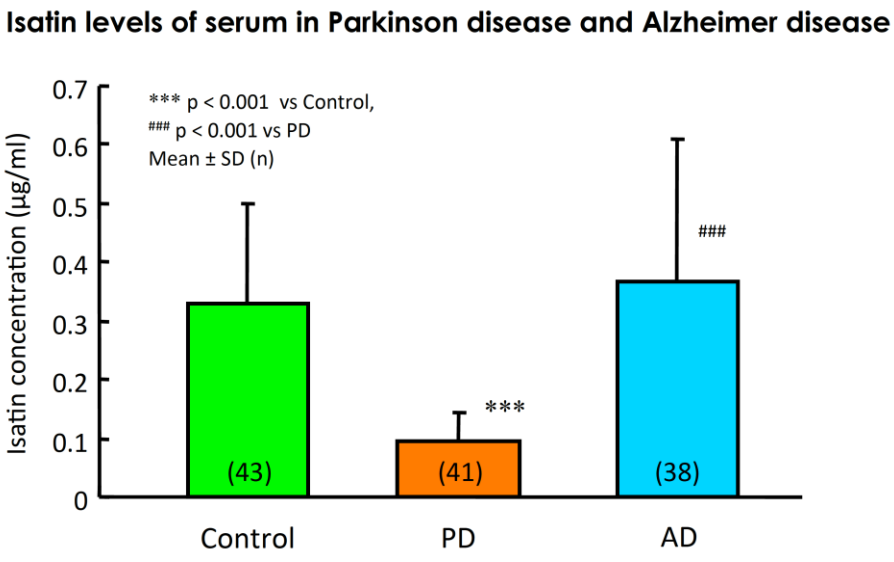
Lecturer; Shirou TSUCHIDA, Ph.D.

Main research in progress

1) Application of green fluorescent protein (GFP) to biochemical techniques
   · Development of homogeneous assay for fluorescence concentrated on membrane (HAFCOM) using GFP
   · Development of a novel cloning vector using GFP as an indicator
2) Construction of MFE 2-hydratase mutants and their activity
3) Study on genetic polymorphism of UGT1A promoter region
4) Relationship between isatin and Parkinson's disease
5) Study on lupus anticoagulant detection



When fluorescence-labeled analyte bind to ligand that is fixed onto a membrane, fluorescence intensity of the membrane increase chronologically, because fluorescence scattering accompanying movement of an analyte is restricted by immobilization. On the other hand, when analyte dissociate from a membrane, the fluorescence intensity decrease chronologically.



Isatin, an endogenous mono-amine oxidase inhibitor, has an important role in the control of neurotransmitter concentration. Serum isatin concentration of Parkinson disease was lower than that of healthy control and neurodegenerative disease (e.g. Alzheimer disease). Isatin may be a specific biomarker of Parkinson disease.

Current publications

* Tsuchida S et al., Effects of naturally occurring missense mutations and G525V in the hydratase domain of human D-bifunctional protein on hydratase activity. Mol. Genet. Metab. Reports, 2: 41-45, 2015.

* Kumano O et al., Verification of the guidelines for lupus anticoagulant detection: usefulness of index for circulating anticoagulant in APTT mixing test. Thromb. Res., 134: 503-509, 2014.

* Kumano O et al., Lupus anticoagulant diagnosis in activated partial thromboplastin time mixing test: optimization of the index of circulating anticoagulant cut-off value. Clin. Lab., 60: 2115-2118, 2014.

* Tsuchida S et al., Screening of recombinant Escherichia coli using activation of green fluorescent protein as an indicator. Biochem. Biophys. Res. Commun., 452: 32-35, 2014.

* Xiao Z et al., Comparative studies of human UDP-glucuronosyltransferase 1A8 and 1A9 proximal promoters using single base substitutions. Drug Metab. Pharmacokinet., 29: 90-93, 2014.

* Kumano O et al., Index of circulating anticoagulant cut-off value establishment in activated partial thromboplastin time mixing test for lupus anticoagulant diagnosis. J. Thromb. Haemost., 11: 1919-1922, 2013.

* Tsuchida S et al., Hydratase activities of green fluorescent protein tagged human multifunctional enzyme type 2 hydratase domain and its variants. J. Oleo Sci., 61: 443-450, 2012.

* Tsuchida S et al., Analysis of enoyl-coenzyme A hydratase activity and its stereospecificity using high-performance liquid chromatography equipped with chiral separation column. J. Oleo Sci., 60: 221-228, 2011.

* Tsuchida S et al., Chiral separation, determination of absolute configuration, and high-performance liquid chromatography detection of enantiomeric 3-hydroxyhexadecanoyl-CoA. J. Oleo Sci., 60: 87-92, 2011.

* Tsuchida S et al., Application of "homogeneous assay for fluorescence concentrated on membrane" to the analysis of the substrate specificity of protease. Biosci. Biotechnol. Biochem., 74: 869- 871, 2010.

* Hamaue N et al., Entacapone, a catechol-*O*-methyltransferase inhibitor, improves the motor activity and dopamine content of basal ganglia in a rat model of Parkinson's disease induced by Japanese encephalitis virus. Brain Res., 1309: 110-115, 2010.