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Education

2013	Doctor of Philosophy, Graduate School of Veterinary Medicine, Hokkaido University
2009	Doctor of Veterinary Medicine, Graduate School of Veterinary Medicine, Hokkaido University

Positions and Employment

2021-present	Research Associate Professor, Department of Biomedical Research, Gifu Pharmaceutical University
2019-2021	Research Assistant Professor, Department of Biomedical Research, Gifu Pharmaceutical University
2019	Research Associate, Department of Ophthalmology, Weill Cornell Medical College
2014-2018	Postdoctoral Associate, Department of Ophthalmology, Weill Cornell Medical College
2013	Visiting Researcher, Graduate School of Veterinary Medicine, Hokkaido University

Research interests

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- Membrane trafficking and intracellular organelle dynamics
 - Protein quality control and degradation pathway
 - Development of the central nervous system
 - Physiology of cone photoreceptors and retinal diseases

Publications

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1. **Otsu W.**, Hara H., and Ogawa K. Protective effect of *Vaccinium myrtillus* L. extract against UVA-induced injury in ARPE-19 cells. *Food Science and Technology Research*, in press.
 2. Ogawa K., Karitani T., **Otsu W.**, Nishiyama K., Kunitake H., Goto Y., Nomiyama S., Hara H., Yamasaki M. Blueberry stem extract suppresses blue light-emitting diode light-induced endoplasmic reticulum stress on retinal photoreceptor cells. *BPB reports*, in press.
 3. **Otsu W.**,[†] Yako T., Sugisawa E., Nakamura S., Tsusaki H., Umigai N., Shimazawa M., and Hara H. Crocetin protects against mitochondrial damage induced by UV-A irradiation in corneal epithelial cell line HCE-T cells. *Journal of Pharmacological Science*, 150(4): 279-288, 2022. [†]**Corresponding author.**
 4. Nishinaka A., Tanaka M., Aoshima K., Kuriyama A., Sasaki T., **Otsu W.**, Yasuda H., Nakamura S., Shimazawa M., Hara H., The pathological association between the anterior eye segment and the retina in a murine model of neovascular glaucoma. *The FASEB Journal*, 36(6):e22323, 2022.
 5. Chuang JZ.*, Yang N.*, Nakajima N.*, **Otsu W.***, Fu C., Yang H., Lee M., Akbar A., Badea T., Guo Z., Nuruzzaman A., Hsu KS., Dunaief J., and Sung CH. Retinal pigment epithelium-specific CLIC4 mutant is a mouse model of dry age-related macular degeneration. *Nature Communications*, 13(1):375, 2022. ***Contributed equally.**
 6. Yako T., **Otsu W.**, Nakamura S., Shimazawa M., and Hara H. Lipid Droplet Accumulation Promotes RPE Dysfunction. *International Journal of Molecular Sciences*, 23(3): 1790, 2022.
 7. Yako T., Nakamura M., **Otsu W.**, Nakamura S., Shimazawa M., and Hara H. Mitochondria dynamics in the aged mice eye and the role in the RPE phagocytosis. *Experimental Eye Research*, 213: 108800, 2021.

8. **Otsu W.**, Ishida K., Chinen N., Nakamura S., Shimazawa M., Tsusaki H., and Hara H. Cigarette smoke extract and heated tobacco products promote ferritin cleavage and iron accumulation in human corneal epithelial cells. *Scientific Reports*, 11(1): 18555, **2021**.
9. Takahashi K., Nakamura S., **Otsu W.**, Shimazawa M., and Hara H. Progranulin deficiency in Iba-1+ myeloid cells exacerbates choroidal neovascularization by perturbation of lysosomal function and abnormal inflammation. *Journal of Neuroinflammation*, 18(1):164, **2021**.
10. Ishida K., Yako T., Tanaka M., **Otsu W.**[†], Nakamura S., Shimazawa M., Tsusaki H., and Hara H. Free-Radical Scavenger NSP-116 Protects the Corneal Epithelium against UV-A and Blue LED Light Exposure. *Biological Pharmaceutical Bulletin*, 44(7): 937-946, **2021**. [†]**Corresponding author**.
11. Miyagi S., Nishinaka A., Yamamoto T., **Otsu W.**, Nakamura S., Shimazawa M., Kitaoka T., and Hara H. Establishment of a pigmented murine model abundant with characteristics of retinal vein occlusion. *Experimental Eye Research*, 204: 108441, **2021**.
12. Inagaki S., Shimazawa M., **Otsu W.**, Araki T., Numata Y., Nakamura S., Tsusaki H., and Hara H. Creation of retinal vein occlusion model in cynomolgus monkeys and determination of its pathological features. *Curr. Neurovasc. Res.*, 18(1):123-133, **2021**.
13. Chinen N., **Otsu W.**[†], Ohuchi K., Ando S., Nakamura S., Kono H., Shimazawa M., and Hara H. Brazilian green propolis promotes the cytoprotective expression of heme oxygenase-1 against oxidative stress injury in murine myoblast cells. *Functional Foods in Health and Disease*, 10, 12, **2020**. [†]**Corresponding author**.
14. Ando S., **Otsu W.**, Osanai D., Kamiya S., Ishida K., Nakamura S., Shimazawa M., and Hara H. Survival motor neuron protein modulates lysosomal function through the expression of transcription factor EB in motoneurons. *BPB. Reports*, 3(4): 130-137, **2020**.
15. Saito Y., Okuyoshi H., Nakamura S., **Otsu W.**, Yamaguchi A., Hitchcock P.F., Nagashima M, Shimazawa M., and Hara H. Tauroursodeoxycholic acid promotes neuronal survival and proliferation of tissue resident stem and progenitor cells in retina of adult zebrafish. *BPB. Reports*, 3(3): 92-96, **2020**.
16. Inagaki S., Shimazawa M., Hamaguchi K., **Otsu W.**, Araki T., Sasaki Y., Numata Y., Tsusaki H., and Hara H. Anti-VGEF antibody inhibits vascular leakage and decreases subretinal fibrosis to some degree in a cynomolgus monkey CNV model. *Curr. Neurovasc. Res.*, May 23 **2020**.
17. Kiatpakdee B., Sato K., Otsuka Y., Arashiki N., Chen Y., Tsumita T., **Otsu W.**, Yamamoto A., Kawata R., Yamazaki J., Sugimoto Y., Takada K., Mohandas N., and Inaba M. Cholesterol-binding protein TSPO2 coordinates maturation and proliferation of terminally differentiating erythroblasts. *J. Biol. Chem.*, 295(23):8048-8063, **2020**.
18. **Otsu W.**, Ishida K., Nakamura S., Shimazawa M., Tsusaki H., and Hara H. Blue light-emitting diode irradiation promotes transcription factor EB-mediated lysosome biogenesis and lysosomal cell death in murine photoreceptor-derived cells. *Biochem. Biophys. Res. Commun.*, 526(2):479-484, **2020**.
19. Saito Y., Yako T., **Otsu W.**, Nakamura S., Inoue Y., Muramatsu A., Nakagami Y., Shimazawa M., and Hara H. A triterpenoid NRF2 activator, RS9, promotes LC3-associated phagocytosis of photoreceptor outer segments in a p62-independent manner. *Free Radic. Biol. Med.*, 152:235-247, **2020**.
20. Hsu KS*, **Otsu W***, Li Y., Wang HC., Chen S., Tsang S., Chuang, JZ, and Sung, CH. CLIC4 regulates late endosomal trafficking and matrix degradation activity of MMP14 at focal adhesions in RPE cells. *Sci. Rep.*, in press, ***contributed equally**.
21. **Otsu W.**, Hsu YC, Chuang, JZ, and Sung, CH. The Late Endosomal Pathway Regulates the Ciliary Targeting of Tetraspanin Protein Peripherin 2. *J. Neurosci.* 2019 May 1;39(18). 3376-3393.
22. **Otsu W.**, Chuang, JZ, and Sung, CH. Establishment of a novel cone transfection technique for cone-rod dystrophy mouse models. (under preparation)
23. Saito M, Sakaji, K, **Otsu W.**, and Sung CH. Ciliary Assembly/Disassembly Assay in Non-transformed Cell Lines. *Bio-protocol* 2018 8(6): e2773. DOI: [10.21769/BioProtoc.2773](https://doi.org/10.21769/BioProtoc.2773).

24. Saito M, **Otsu W**, Hsu KS, Chuang JZ, Yanagisawa T, Shieh V, Kaitsuka T, Wei FY, Tomizawa K, Sung CH. Tctex-1 controls ciliary resorption by regulating branched actin polymerization and endocytosis. *EMBO Rep.* 2017 Aug;18(8):1460-1472.
25. Chou SY*, Hsu KS*, **Otsu W***, Hsu YC, Luo YC, Yeh C, Shehab SS, Chen J, Shieh V, He GA, Marean MB, Felsen D, Ding A, Poppas DP, Chuang JZ, Sung CH. CLIC4 regulates apical exocytosis and renal tube luminogenesis through retromer- and actin-mediated endocytic trafficking. *Nat Commun.* 2016 Jan 20;7:10412.***contributed equally.**
26. **Otsu W**, Kurooka T, Otsuka Y, Sato K, Inaba M. A new class of endoplasmic reticulum export signal PhiXPhiXPhi for transmembrane proteins and its selective interaction with Sec24C. *J Biol Chem.* 2013 Jun 21;288(25):18521-32.
27. Sato K, **Otsu W**, Otsuka Y, Inaba M. Modulatory roles of NHERF1 and NHERF2 in cell surface expression of the glutamate transporter GLAST. *Biochem Biophys Res Commun.* 2013 Jan 11;430(2):839-45.
28. Wang CC, Sato K, Otsuka Y, **Otsu W**, and Inaba M. Clathrin-mediated endocytosis of mammalian erythroid AE1 anion exchanger 1 facilitated by a YXXPhi or a noncanonical YXXXPhi motif in the N-terminal stretch. *J. Vet. Med. Sci.* 2012 74: 17-25.
29. Adachi H, Kurooka T, **Otsu W**, and Inaba M. The forced aggresome formation of a bovine anion exchanger 1 (AE1) mutant through association with deltaF508-cystic fibrosis transmembrane conductance regulator upon proteasome inhibition in HEK293 cells. *Jpn. J. Vet. Res.* 2010 58:101-110.

Awards

1. Student Poster Presentation award in the 31st annual meeting, the Membrane Society of Japan (2009)

Completed Research Support

1. Research Fellowship for Young Scientist (DC1), the Japan Society for the Promotion Sciences (approx. \$30,000 USD per year, 2010-2013)

Professional Skills

***In vitro* (molecular cloning, biochemistry, imaging in cell culture)**

1. Gene Engineering: fundamental techniques for PCR and subcloning (>100 plasmid vectors), genomic DNA or RNA isolation, cDNA synthesis, real time PCR (StepOne, invitrogen)
2. Cell Biology: general skills for cell culture (293, HeLa, MEF, LLC-PK1, MDCK, RPE-1, ARPE19, 661W), plasmid transfection (Lipofectamine, electroporation), gene knockdown (siRNA, miRNA), lentivirus isolation and infection, pulse-chase analysis using radio-isotope, ciliary assembly/disassembly assay
3. Biochemistry: cell/tissue lysis, immunoblotting, immunoprecipitation, cell surface biotinylation assay, sucrose gradient fractionation, protein purification with affinity chromatography
4. Proteomics: liquid chromatography tandem-mass spectrometry (Dionex UltiMate 3000 and LTQ Orbitrap Fourier transform-MS/MS system, Thermo Fisher)
5. Imaging: confocal microscopy (Zeiss LSM 5 and LSM880; Leica TCS SP2), live imaging with tracer (MitoTracker, fluorescence tagged EGF, dextran, transferrin), photobleaching after recovery assay

***In vivo* (handling and tissue sampling)**

6. General skills for handling laboratory animals (mouse, rat, dog, and cattle), maintaining colonies of transgenic mice (conditional knock-out in rod, cone, or RPE), and harvesting tissues (blood, kidney, retina)
7. Cardiac perfusion fixation in mouse and rat
8. Mouse retina vibratome sectioning and analysis by immunofluorescence or immunoelectron microscopy
9. Mouse rod photoreceptor perikarya sorting (FACS Aria II, Becton Dickinson)

***In vivo* (surgery, functional analysis, and imaging in live animals)**

10. Laparotomy and in utero electroporation (cone transfection) in mouse (>100 mice)
11. Electoretinography (ColorDome, Diagnosys LLC, >100 mice)
12. Fundus imaging and fluorescein angiography (Micron III, Phoenix Research Labs, >50 mice)
13. Optical coherence tomography and indocyanine green angiography (Spectralis HRA+OCT, Heidelberg Engineering, >30 mice)

Others

14. Softwares for data analysis, and organizing figures: Microsoft Office, Pages, Numbers, Keynote, EndNote, Adobe Photoshop, Illustrator, Prism 7, Image J, G*Power 2, Proteome Discoverer 1.0, SnapGene

Teaching experience

1. Teaching assistant in the Veterinary Clinical Examination Class (for undergraduate students in Japanese) and in the Practice of Analytical Machines Class (for graduate students in English), in Hokkaido University (2009-2012).
2. Lab mentor of technicians and rotation/summer students (2014-2018).

Conference Poster/Talk Presentations

International

1. **Otsu W.**, Tsusaki H., Shimazawa M. Progranulin regulates the ciliary transport of tetraspanins in murine photoreceptors. ARVO Annual Meeting 2023, New Orleans, USA. Apr 23-27, 2023
2. Nakamura S., Saito Y., Yako T., **Otsu W.**, Inoue Y., Muramatsu A., Nakagami Y., Shimazawa M., Hara H. Triterpenoid Nrf2 activator, RS9, promotes LC3-associated phagocytosis of photoreceptor outer segments without p62 induction. ARVO 2020 Annual Meeting, Baltimore, USA, May 3-7, 2020.
3. **Otsu W.**, Hsu KS, Dunaief JL, Li Y, Tsang SH, Chuang JZ, and Sung CH. Mice with RPE-specific CLIC4 deficiency exhibit AMD-like changes in the retina-RPE-choroid complex. ARVO Annual Meeting 2019, Vancouver, Canada, Apr 28-May 2, 2019.
4. **Otsu W.**, Chuang JZ, and Sung CH. Establishment of a novel cone transfection technique for cone-rod dystrophy mouse models. ARVO Annual Meeting 2018, Honolulu, USA, Apr 29-May 3, 2018.
5. **Otsu W.**, Otsuka Y, Miyazono K, Sato K, and Inaba M. Different roles of Derlin-1 and Derlin-2 in the ubiquitination-independent ER-associated degradation of a bovine AE1 anion exchanger mutant. The 35th Naito Conference on The Ubiquitin-Proteasome System: From Basic Mechanisms to Pathophysiological Roles, Sapporo, Japan, July 9-12, 2013.

Domestic

6. Made oral or poster presentations in almost all the annual meetings of The Membrane Society of Japan, The Japanese Biochemical Society, and The Japanese Society of Veterinary Science, from 2008 to 2013.

Professional Memberships

2018-present	The Association for Research in Vision and Ophthalmology
2019-present	The Molecular Biology Society of Japan
2008-2013	The Japanese Biochemical Society
2008-2013	The Membrane Society of Japan
2008-2013	The Japanese Society of Veterinary Science

Outreach activity

1. Japanese Association of Scholars in Science (JASS, <https://jass-newyork.webnode.com/>), committee (2018-present, maintenance of website)
2. Japanese Medical Society of America (JMSA, <https://www.jmsa.org/ja/>), committee for JMSA New York Life Science Forum 2019

References

Available Upon Request