Osamu Shimmi, Ph.D
Institute of Biotechnology
University of Helsinki
Viikinkaari 1 (P.O. Box 65)
00014 Helsinki, Finland
Tel: +358-29-4158758
E-mail: osamu.shimmi@helsinki.fi

CURRICULUM VITAE

Positions and research experience

2015 ~ present	Docent in genetics (adjunct professor), University of Helsinki, Finland
2005 ~ present	Group leader, Institute of Biotechnology, University of Helsinki, Finland
2002 ~ 2005	Research Specialist, Howard Hughes Medical Institute, University of Minnesota, USA, Department of Genetics, Cell Biology, and Development (PI: Mike O'Connor)
1997 ~ 2002	Postdoctoral Associate, University of Minnesota, USA, Department of Genetics, Cell Biology, and Development (PI: Mike O'Connor)
1997	Postdoctoral Associate, University of California, Irvine, USA, Department of Molecular Biology and Biochemistry (PI: Mike O'Connor)
1994 ~ 1997	Researcher, Nippon Roche Research Center, Kamakura, Japan

Education

March 1994	Ph.D. in Biochemistry, University of Tsukuba, Tsukuba, Japan Advisor: Dr. Sadao Kimura Ph.D. Thesis: Analysis of the biosynthetic pathway of endothelin-2 and the characterization of endothelin-converting enzyme
March 1990	M.Sc. in Biochemistry, University of Tsukuba, Tsukuba, Japan
March 1988	B.S. in Applied Biological Science, Science University of Tokyo, Tokyo, Japan

Scientific awards and honors

Biocenter Finland carrier development award (2010)
Academy of Finland Research Fellow (2005 –2010)
Fellowship from Japan Society for Promotion of Science (1992 –1994)

Research funding

Active support

- Academy of Finland, project funding 2017-2021
  Role: PI Direct cost 369,434 euro
- Sigrid Juselius Foundation, research fund 2011-2020
  Role: PI Direct cost 369,000 euro
- Academy of Finland, Center of Excellence 2014-2019
  Experimental and Computational Developmental Biology
  Role: Co-Investigator, Direct cost 1,500,000 euro/year (consortium of 5 groups)

Former support

- Academy of Finland, project funding 2013-2017

Role: PI Direct cost 404,400 euro

- University of Helsinki, research fund 2011-2013
  Role: PI Direct cost 120,000 euro
- Biocenter Finland, research fund 2010-2012
  Role: PI Direct cost 78,000 euro
- Sigrid Juselius Foundation, research fund 2006-2009
  Role: PI Direct costs 110,000 euro
- University of Helsinki, research fund 2006-2008
  Role: PI Direct costs 120,000 euro
- Academy of Finland, research fund 2005-2010
  Role: PI Direct costs 298,900 euro
- Biocentrum Helsinki, research fund 2005-2006
  Role: PI Direct costs 70,000 euro

Scientific and academic merits and activities

- Evaluator of research funding: French National research Agency (ANR) France (2017), The Wellcome Trust, UK (2017, 2015), Swiss National Science Foundation (2017), Medical Research Council (MRC), UK (2016), European Commission (EU) (2016)
- PhD thesis external examiner, University College London, UK (2018)
- Opponent for doctoral dissertation (oral examiner), Umeå University, Sweden (2015)
- Pre-examiner for doctoral thesis, three times, University of Helsinki (2009-)
- Member of PhD thesis committees of eight graduate students (2005-present)
- Reviewer for master thesis, three times, University of Helsinki (2008-)
- Member of the FlyBase Community Advisory Group
- Editorial committees of scientific journals: Review Editor of Frontiers in Experimental Endocrinology
- Refereeing for scientific journals: Dev. Cell, J. Cell Biol., PLoS Biology, PLoS Genetics, Development, J. Biol. Chem., Oncogene, Mol. Biol. Evol., Cell Mol. Life Sci., Fly, G3, Open Biology, Mec Dev, PLoS One, Front. Endocrinol., FEBS Lett., J. Mol. Evol., Arthropod Struct. Dev., Brief. Funct. Genomics., Cell Mol. Biol. Lett., Insect Science.

Symposium organizer

- Finnish-Japanese joint symposium on Morphogenesis and Signaling, Helsinki, 3-4 March, 2015
- Symposium Signaling in Morphogenesis and Patterning, Helsinki, 13-15 March, 2013
- DevSginalNet Final Symposium, Helsinki, Finland, 8 January, 2010
- The 22nd Sigrid Juselius Symposium, Espoo, Finland, 3-6 June, 2007

Supervision of research work (post-doc researchers)

Ongoing:

- Kenji Kikushima, PhD (October 2016 – present) responsible supervisor
- Daniel Toddie-Moore, PhD (February 2014 – present) responsible supervisor
- Martin Kracklauer, PhD (August 2014 – present) responsible supervisor

Finished:

- Jorge Blanco, PhD (June 2011 – August 2012) responsible supervisor

Supervision of research work (doctoral and undergraduate students)

Officially appointed

Ongoing:

- Yunxian Huang, PhD student (January 2014 – present) responsible supervisor
- Jakke Neiro, master student, (June 2016 – present) responsible supervisor

Finished:

- Petra Tauscher, (PhD February 2018) responsible supervisor
- Jinghua Gui, (PhD January 2018) responsible supervisor
- Jaana Vulli (PhD, November 2013) responsible supervisor
- Shinya Matsuda (PhD, August 2013) responsible supervisor
- Swaroop Achuta, (M.Sc., December 2011) responsible supervisor
- Zhao Zeng, (M.Sc., May 2010) responsible supervisor
- Evely Vridolin, (M.Sc., June 2009) responsible supervisor
- Ida Björkgren, (M. Sc., May 2008) responsible supervisor
- Jenni Liljavirta, (M.Sc., June 2008) responsible supervisor
- Jaana Künnapuu, (M.Sc., August 2008), responsible supervisor

Courses taught and/or coordinated

- Advanced Developmental Biology (2007, 2008, 2011), responsible teacher of the course
- Stem cells and organogenesis (2009-2018), lecturer
- Developmental Biology, practical course/ Methods in functional genetics and development (2007 – 2010, 2015), lecturer
- Genes and Ontogenesis (2015), lecturer
- Brush up Molecular Biology (2005), lecturer
- Developmental Biology Journal Club (2013 – 2018), coordinator

Other educational merits

- Biocentrum Helsinki International Summer School, 2005, 2008. I give lectures for visiting students from Wuhan University, China.
- Exchange program between Helsinki University and Osaka University, arranging activities for the visitors of 8 PhD students from Osaka, March 2015.
- Supervision of 12-week project works for the visiting students (Maria Kowalski from Germany, 2009; Hannes Thomaschik from Germany, 2009; Xin Chen from China, 2009, Dominic Banfai from Germany, 2017; Victor Diez from Spain, 2018; Tessa Criel from Belgium, 2018; Julia Birkhoven from Germany, 2018).

Significant invitational lectures

- The Crick Institute, UK, 14 December 2018
- Academia Sinica, Taipei, Taiwan, 31 October 2018
- International BMP conference, Tokyo, Japan, 24-28 October 2018
- University of Tokyo, Japan, 22 October 2018
- University of Osaka, Japan, 22 June 2018
- Waseda University, Tokyo, Japan 18 May 2017
- Kyoto University, Kyoto, Japan 17 May 2017
- University of Tokyo, Japan, 15 May 2017
- Arizona State University, USA, 23 September 2016
- University of Minnesota, USA, 22 September 2016
- National Institute of Health, USA, 19 September 2016

- Ferris State University, USA, 16 September 2016
- University of Osaka, Japan, 9 April 2014
- National Institute for Basic Biology, Okazaki, Japan, 8 April 2014
- Ecole Polytechnique, Palaiseau, France, 3 March 2014
- University of Ehime, Japan, 20 November 2013
- University of Helsinki, Finland (Viikki Biocentr Monday Lectures), 21 May 2012
- University of Tokyo, Japan, 20 December 2011
- University of Oulu, Finland, 11 October 2011
- Gakushuin University, Tokyo, Japan, 15 December 2009
- University of Tsukuba, Japan, 26 November 2008
- Freiburg University, Freiburg, Germany, 18 April 2008
- University of Tokyo, Japan, 25 December 2006
- Stockholm University, Stockholm, Sweden, 13 December 2006
- Tartu University, Tartu, Estonia, 5 May 2006
- Simon Fraser University, Burnaby, BC, Canada, 23 February 2004
- University of California, Irvine, USA, 28 June 2003
- Florida Atlantic University, USA, 19 March 2003

LIST OF PUBLICATIONS

Peer-reviewed scientific articles (*corresponding authors)

- Gui, J., Huang, Y., Kracklauer, M., Toddie-Moore, D., Kikushima, K., Nix, S., Ishimoto, Y. and Shimmi, O.* Dynamic 3D tissue architecture directs BMP morphogen signaling during *Drosophila* wing morphogenesis. (https://www.biorxiv.org/content/early/2018/09/06/411009; *Proc. Natl. Acad. Sci. U.S.A.*).

1. Huang, Y., Hatakeyama, M.* and Shimmi, O.* (2018). Wing vein development in the sawfly *Athalia rosae* is regulated by spatial transcription of Dpp/BMP signaling components. Arthropod Struct. Dev. 47, 408-415.
2. Matamoro-Vidal, A.*, Huang, Y., Salazar-Ciudad, I., Shimmi, O. and Houle, D.* (2018). Quantitative morphological variation in the developing *Drosophila* wing. G3 8(7), 2399-2409.
3. Gui, J., Huang, Y. and Shimmi, O.* (2016). Scribbled Optimizes BMP Signaling through its Receptor Internalization to the Rab5 Endosome and Promote Robust Epithelial Morphogenesis. PLoS Genetics 12(11), e1006424.
4. Tauscher, P., Gui, J. and Shimmi, O.* (2016). Adaptive protein divergence of BMP ligands takes place under developmental and evolutionary constraints. Development 143, 3742-3750.
5. Quijano, J.C., Wisotzkey, R.G., Tran, N., Huang, Y., Stinchfield, R., Haerry, T.E., Shimmi, O. and Newfeld, S.J.* (2016). *lolal* is a new epigenetic regulator of dpp transcription during dorsal-ventral axis formation. Mol. Biol. Evol. 33, 2621-2632.
6. Künnapuu, J., Tauscher, P.M., Tiusane, N., Nguyen, M., Löytynoja, A., Arora, K.* and Shimmi, O.* (2014). Cleavage of the *Drosophila* Screw prodomain is critical for a dynamic BMP morphogen gradient in embryogenesis. Dev. Biol. 389, 149-159.
7. Shimmi, O.*, Matsuda, S. and Hatakeyama, M.* (2014). Insights into the molecular mechanisms underlying diversified wing venation among insects. Proc. R. Soc. B. 281 (1789). (Review)
8. Zeng, Z., de Gorter, D.J.J., Kowalski, M., ten Dijke, P. and Shimmi, O.* (2014). Ter94/VCP is a novel component involved in BMP signaling. PLoS One 9, e114475.
9. Matsuda, S., Blanco, J. and Shimmi, O.* (2013). A Feed-Forward Loop Coupling Extracellular BMP Transport and Morphogenesis in Drosophila Wing. PLoS Genetics 9(3), e1003403.
10. Matsuda, S., Yoshiyama, N., Künnapuu-Vulli, J., Hatakeyama, M.* and Shimmi, O.* (2013). Dpp/BMP transport mechanism is required for wing venation in the sawfly Athalia rosae. Insect Biochem. Mol. Biol. 43, 466-473.
11. Shimmi, O.* and Newfeld, S.J.* (2013). New insights into extracellular and post-translational regulation of TGF-b family signaling pathways. J. Biochem. 154, 11-19. (Review)
12. Matsuda, S. and Shimmi, O.* (2012). Directional transport and active retention of Dpp/BMP create wing vein patterns in Drosophila. Dev. Biol. 366, 153-162.
13. Stinchfield, M.J., Takaesu, N.T., Quijano, J.C., Castillo, A.M., Tiusanen, N., Shimmi, O., Dupont, S., Piccolo, S., Newfeld, S.J.* (2012). Fat facets

deubiquitination of Medea modulates interpretation of the Dpp dorsal-ventral morphogen gradient. Development, 139, 2721-2729.

14. Umulis, D.M., Shimmi, O., O'Connor, M.B.* and Othmer, H.G.* (2010). Organism-scale modeling of early Drosophila patterning via Bone Morphogenetic Proteins. Dev. Cell 18, 260-274.
15. Künnapuu, J. and Shimmi, O.* (2010). Evolutional imprints on the sequences of BMP2/4/DPP type proteins. Fly 4, 21-23.
16. Künnapuu, J., Björkgren, I. and Shimmi, O.* (2009). The Drosophila DPP signal is produced by cleavage of its proprotein at evolutionary diversified furin-recognition sites. Proc. Natl. Acad. Sci. U.S.A. 106, 8501-8506.
17. Akiyama, T., Firkus, C., Takeo, S., Shimmi, O. and Nakato, H.* (2008). Molecular mechanisms of glypican co-receptor function: the role of Drosophila Dally in Dpp signaling. Dev. Biol. 313, 408-419.
18. Shimmi, O., Umulis D. Othmer H.* and O'Connor, M. B.* (2005). Facilitated transport of a Dpp/Scw heterodimer by Sog/Tsg leads to robust patterning of the Drosophila blastoderm embryo. Cell 120, 873-886.
19. Shimmi, O., Ralston, A., Blair S. S. and O'Connor, M. B.* (2005). The *crossveinless* gene encodes a new member of the Twisted gastrulation family of BMP binding proteins which, with Short gastrulation, promotes BMP signaling in the crossveins of the Drosophila wing. Dev. Biol. 282, 70-83.
20. Petryk, A., Shimmi, O., Jia, X., Carlson, A.E., Tervonen, L., Jarcho, M.P., O'Connor, M.B. and Gopalakrishnan, R.* (2005). Twisted gastrulation and chordin inhibit differentiation and mineralization in MC3T3-E1 osteoblast-like cells. Bone 36, 617-626.
21. Shimmi, O. and O'Connor, M. B.* (2003). Physical properties of Tld, Sog, Tsg and Dpp protein interactions are predicted to help create a sharp boundary in BMP signals during dorsal-ventral patterning of the Drosophila embryo. Development 130, 4673-4682.
22. Ross, J.J., Shimmi, O., Vilmos, P., Petryk, A., Kim, H., Gaudenz, K., Hermanson, S., Ekker, S. C., O'Connor, M. B.* and Marsh, J.L.* (2001). Twisted gastrulation is a conserved extracellular BMP antagonist. Nature 410, 479-483.
23. Blitz, I. L., Shimmi, O., Wunnenberg-Stapleton, K., O'Connor, M.B. and Cho, K.W.Y.* (2000). Is Chordin a Long-Range- or Short-Range-Acting Factor? Roles for BMP1-Related Metalloproteases in Chordin and BMP4 Autofeedback Loop Regulation. Dev. Biol. 223, 120-138.
24. Yu, K., Srinivasan, S., Shimmi, O., Biehs, B., Rashka, K.E., Kimelman, D., O'Connor, M.B. and Bier, E.* (2000). Processing of the Drosophila Sog protein creates a novel BMP inhibitory activity. Development 127, 2143-2154.
25. Yamada-Okabe, T., Doi, R., Shimmi, O., Arisawa, M. and Yamada-Okabe, H.* (1998). Isolation and characterization of a human cDNA for mRNA 5' capping enzyme. Nucleic Acids Res. 26, 1700-1706.

26. Yamada-Okabe, T., Shimmi, O., Doi, R., Mizumoto, K., Arisawa, M. and Yamada-Okabe, H.* (1996). Isolation of the mRNA-capping enzyme and ferric-reductase-related genes from *Candida albicans*. Microbiology 142, 2515-2523.
27. Uchida, Y., Shimmi, O., Sudoh, M., Arisawa, M. and Yamada-Okabe, H. * (1996). Characterization of chitin synthase 2 of Saccharomyces cerevisiae: Both full size and processed enzymes are active for chitin synthesis. J. Biochem. 119, 659-666.
28. Sawamura. T., Shinmi, O., Kishi, N., Sugita, Y., Yanagisawa, M., Goto, K., Masaki, T. and Kimura, S.* (1993). Characterization of phosphoramidon-sensitive metalloproteinases with endothelin-converting enzyme activity in porcine lung membrane. Biochim. Biophys. Acta. 1161, 298-302.
29. Shinmi, O., Yorimitsu, K., Moroi, K., Nishiyama, M., Sugita, Y., Saito, T., Inagaki, Y., Masaki, T. and Kimura, S.* (1993). Endothelin-2-converting enzyme from human renal adenocarcinoma cells is a phosphoramidon-sensitive, membrane-bound metalloprotease. J. Cardiovasc. Pharmacol. 22, S61-64.
30. Yorimitsu, K., Shinmi, O., Nishiyama, M., Moroi, K., Sugita, Y., Saito, T., Inagaki, Y., Masaki, T. and Kimura, S.* (1992). Effect of phosphoramidon on big endothelin-2 conversion into endothelin-2 in human renal adenocarcinoma (ACHN) cells. Analysis of endothelin-2 biosynthetic pathway. FEBS Lett. 314, 395-398.
31. Ishikawa, T., Li, L.M., Shinmi, O., Kimura, S., Yanagisawa, M., Goto, K. and Masaki, T.* (1991). Characteristics of binding of endothelin-1 and endothelin-3 to rat hearts. Developmental changes in mechanical responses and receptor subtypes. Circ Res. 69, 918-926.
32. Sawamura, T., Kasuya, Y., Matsushita, Y., Suzuki, N., Shinmi, O., Kishi, N., Sugita, Y., Yanagisawa, M., Goto, K., Masaki, T. and Kimura, S.* (1991). Phosphoramidon inhibits the intracellular conversion of big endothelin-1 to endothelin-1 in cultured endothelial-cells. Biochem. Biophys. Res. Commun. 174, 779-784.
33. Giaid, A., Polak, J.M., Gaitonde, V., Hamid, Q.A., Moscoso, G., Legon, S., Uwanogho, D., Roncalli, M., Shinmi, O., Sawamura, T., Kimura, S., Yanagisawa, M., Masaki, T. and Springall, D.R.* (1991). Distribution of endothelin-like immunoreactivity and mRNA in the developing and adult human lung. Am. J. Respir. Cell Mol. Biol. 4, 50-58.
34. Sawamura, T., Shinmi, O., Kishi, N., Sugita, Y., Yanagisawa, M., Goto, K., Masaki, T. and Kimura, S.* (1990). Analysis of big endothelin-1 digestion by cathepsin-D. Biochem. Biophys. Res. Commun. 172, 883-889.
35. Giaid, A., Hamid, Q.A., Springall, D.R., Yanagisawa, M., Shinmi, O., Sawamura, T., Masaki, T., Kimura, S., Corrin, B. and Polak, J.M.* (1990). Detection of endothelin immunoreactivity and mRNA in pulmonary tumors. J. Pathol. 162, 15-22.
36. Sawamura, T., Kimura, S.*, Shinmi, O., Sugita, Y., Kobayashi, M., Mitsui, Y., Yanagisawa, M., Goto, K. and Masaki, T. (1990). Characterization of endothelin

converting enzyme activities in soluble fraction of bovine cultured endothelial cells. Biochem. Biophys. Res. Commun. 169, 1138-1144.

37. Sawamura, T., Kimura, S.*, Shinmi, O., Sugita, Y., Yanagisawa, M., Goto, K. and Masaki, T. (1990). Purification and characterization of putative endothelin converting enzyme in bovine adrenal medulla: evidence for a cathepsin D-like enzyme. Biochem. Biophys. Res. Commun. 168, 1230-1236.
38. Yoshizawa, T., Shinmi, O., Giaid, A., Yanagisawa, M., Gibson, S.J., Kimura, S., Uchiyama, Y., Polak, J.M., Masaki, T. and Kanazawa, I.* (1990). Endothelin: a novel peptide in the posterior pituitary system. Science 247, 462-464.
39. Shinmi, O., Kimura, S., Sawamura, T., Sugita, Y., Yoshizawa, T., Uchiyama, Y., Yanagisawa, M., Goto, K., Masaki, T. and Kanazawa, I.* (1989). Endothelin-3 is a novel neuropeptide: isolation and sequence determination of endothelin-1 and endothelin-3 in porcine brain. Biochem. Biophys. Res. Commun. 164, 587-593.
40. Sawamura, T., Kimura, S., Shinmi, O., Sugita, Y., Yanagisawa, M. and Masaki, T.* (1989). Analysis of endothelin related peptides in culture supernatant of porcine aortic endothelial cells: evidence for biosynthetic pathway of endothelin-1. Biochem. Biophys. Res. Commun. 162, 1287-1294.
41. Shinmi, O., Kimura, S., Yoshizawa, T., Sawamura, T., Uchiyama, Y., Sugita, Y., Kanazawa, I., Yanagisawa, M., Goto, K. and Masaki,T.* (1989). Presence of endothelin-1 in porcine spinal cord: isolation and sequence determination. Biochem. Biophys. Res. Commun. 162, 340-346.
42. Kimura, S.*, Kasuya, Y., Sawamura, T., Shinmi, O., Sugita, Y., Yanagisawa, M., Goto, K. and Masaki, T. (1989). Conversion of big endothelin-1 to 21-residue endothelin-1 is essential for expression of full vasoconstrictor activity: structure-activity relationships of big endothelin-1. J. Cardiovasc. Pharmacol. 13, S5-S7.
43. Kimura, S., Kasuya, Y., Sawamura, T., Shinmi, O., Sugita, Y., Yanagisawa, M., Goto, K. and Masaki, T.* (1988). Structure-activity relationships of endothelin: importance of the C-terminal moiety. Biochem. Biophys. Res. Commun. 156, 1182-1186.
44. Saito, H., Shinmi, O., Watanabe, Y., Nishimura, K. and Aso, K.* (1988). Papain-catalyzed hydrolysis of zein in an aqueous organic-system. Agricul. Biol. Chem. 52, 855-856.

Non-refereed scientific articles

1. Shimmi, O. (2001). Tsg is involved in the embryonic dorso-ventral axis formation by modulating BMP activities. Experimental Medicine (Japanese). 19, 1240-1242.
2. Shimmi, O. (2000). The mechanism of dorsoventral axis formation by Drosophila DPP/SOG/TLD. Experimental Medicine (Japanese). 18, 1194-1199.

Scientific books

1. Toddie-Moore, D., Marin-Riera, M., Salazar-Ciudad, I. and Shimmi, O. (2017). The molecular and cellular mechanisms coupling epithelial morphogenesis and developmental signalling. Mec. Dev. 145, S94.

2. Tauscher, P. and Shimmi, O. (2014). An unique N-glycosylation in Drosophila BMP-type ligand Screw contributes to a robust BMP morphogen gradient in embryogenesis. FEBS J. 281 S1, 317-318.
3. Matsuda, S., Yoshiyama, N., Kunnapuu, J., Hatakeyama, M. and Shimmi, O. (2010). Directional transport of Dpp/BMP draws diversified wing vein patterns in insects. Differentiation 80, S27.
4. Matsuda, S., Hatakeyama, M. and Shimmi, O. (2009). Facilitated transport and active retention of BMP draw diversified wing vein patterns in insects. Mec. Dev. 126, S81.
5. Kunnapuu, J., Bjorkgren, I. and Shimmi, O. (2007). Differential cleavage of Dpp precursor modulates morphogen gradient in the Drosophila. FEBS J. 274 S1, 133.

Theses

1. Shimmi, O. (1994). Analysis of the biosynthetic pathway of endothelin-2 and the characterization of endothelin-converting enzyme. Ph.D. Thesis, University of Tsukuba, Japan.
2. Shimmi, O. (1990). Analysis of endothelin-related peptides in the central nervous system. M.Sc. Thesis, University of Tsukuba, Japan.