

## CURRICULUM VITAE

### PERSONAL INFORMATION

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### RESEARCH INTERESTS

Intestinal epithelial physiology, tight junction biology (claudins), epithelial ion transport, nutrient absorption, and barrier function

### EDUCATION

April 1987 – March 1991

B.Sc., School of Food and Nutritional Sciences

University of Shizuoka, Japan

April 1995 – March 1998

Ph.D., Food and Nutritional Sciences

Graduate School of Nutritional and Environmental Sciences

University of Shizuoka, Japan

Dissertation: "Cellular mechanisms of small intestinal nutrient transport"

Supervisor: Prof. Yuichi Suzuki

### PROFESSIONAL EXPERIENCE

June 1991 – March 1995

Research Assistant

Laboratory of Physiology, School of Food and Nutritional Sciences

University of Shizuoka, Japan

(1991–1993 Prof. Takeshi Hoshi; 1993–1995 Prof. Yuichi Suzuki)

April 1998 – June 1999

Research Assistant

Laboratory of Physiology, School of Food and Nutritional Sciences

University of Shizuoka, Japan

July 1999 – March 2002

Research Fellow

Cell Biology Program, The Hospital for Sick Children, Toronto, Canada

(Supervisor: Prof. Sergio Grinstein)

April 2002 – June 2006

Research Assistant

Laboratory of Physiology, School of Food and Nutritional Sciences

University of Shizuoka, Japan

July 2006 – March 2007

Lecturer (Internal appointment)

School of Food and Nutritional Sciences

University of Shizuoka, Japan

April 2007 – September 2010  
Assistant Professor  
Laboratory of Physiology, School of Food and Nutritional Sciences  
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October 2010 – May 2013  
Lecturer  
Laboratory of Physiology, School of Food and Nutritional Sciences  
University of Shizuoka, Japan

June 2013 – March 2026  
Associate Professor  
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April 2026 – Present  
Professor  
Laboratory of Physiology, School of Food and Nutritional Sciences  
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## MEMBERSHIPS

The Japanese Society of Physiology  
The Japanese Biochemical Society  
The Japanese Society of Digestion and Absorption  
The American Physiological Society

## PUBLICATIONS

1. Sakai T, Kawakita M, Arashi S, Takaoka K, Kurata M, Torikai J, Atsumi S, Yawata K, Noi K, Fukutani Y, Noguchi K, Kiyokawa H, Morimoto M, Takeuchi E, Minegishi K, Aoki Y, Fujimura S, Nishizaka T, Inoue T, Nagaoka K, Tsugawa H, Hayashi H, Ishiguro H, Kozono T, Ohsawa I, Fujita Y, Matsunami H, Hamada H, Shinohara K. Tppp3 determines basal body positioning and identity of respiratory cilia via microtubule assembly and sphingolipid homeostasis. **Proc Natl Acad Sci U S A.** 2025;122(49):e2503931122.
2. Kurihara F, Hempstock W, Ishizuka N, Hayashi H. New indicator of small intestinal ageing in senescence-accelerated mice. **J Physiol Sci.** 2025;75:10030.
3. Nakamura C, Ishizuka N, Yokoyama K, Yazaki Y, Tatsumi F, Ikumi N, Hempstock W, Ikari A, Yoshino Y, Hayashi H. Regulatory mechanisms of glucose absorption in the mouse proximal small intestine during fasting and feeding. **Sci Rep.** 2023;13:10838.
4. Hempstock W, Nagata N, Ishizuka N, Hayashi H. The effect of claudin-15 deletion on cationic selectivity and transport in paracellular pathways of the cecum and large intestine. **Sci Rep.** 2023;13:6799.
5. Ishizuka N, Nagahashi M, Mochida Y, Hempstock W, Nagata N, Hayashi H. Na<sup>+</sup>-dependent intestinal glucose absorption mechanisms and its luminal Na<sup>+</sup> homeostasis across metamorphosis from tadpoles to frogs. **Am J Physiol.** 2023;324:R645-R655.

6. Tanifuji K, Shiozaki Y, Koike M, Uga M, Komiya A, Miura M, Higashi A, Shimohata T, Takahashi A, Ishizuka N, Hayashi H, Ichida Y, Ohtomo S, Horiba N, Miyamoto K, Segawa H. Effects of EOS789, a novel pan-phosphate transporter inhibitor, on phosphate metabolism: Comparison with a conventional phosphate binder. **J Med Invest.** 2023;70:260-270.
7. Okamoto E, Matsuda S, Yoshino Y, Morikawa Y, Suenami K, Tabuchi Y, Matsunaga T, Hayashi H, Ikari A. Increase in paracellular leakage of amino acids mediated by aging-induced reduction of claudin-4 expression. **J Nutr.** 2023;153:3360-3372.
8. Furuse M, Nakatsu D, Hempstock W, Sugioka S, Ishizuka N, Furuse K, Sugawara T, Fukazawa Y, Hayashi H. Reconstitution of functional tight junctions with individual claudin subtypes in epithelial cells. **Cell Struct Funct.** 2023;48:1-17.
9. Hempstock W, Ishizuka N, Hayashi H. Functional assessment of intestinal tight junction barrier and ion permeability in native tissue by Ussing chamber technique. **J Vis Exp.** 2021;171.
10. Hayashi H, Nagai H, Ohba K, Soleimani M, Suzuki Y. Segmental differences in Slc26a3-dependent Cl<sup>-</sup> absorption and HCO<sub>3</sub><sup>-</sup> secretion in the mouse large intestine in vitro in Ussing chamber. **J Physiol Sci.** 2021;71:5.
11. Hirota C, Takashina Y, Ikumi N, Ishizuka N, Hayashi H, Tabuchi Y, Yoshino Y, Matsunaga T, Ikari A. Inverse regulation of claudin-2 and -7 expression by p53 and hepatocyte nuclear factor 4 $\alpha$  in colonic MCE301 cells. **Tissue Barriers.** 2021;9:1860409.
12. Hempstock W, Sugioka S, Ishizuka N, Sugawara T, Furuse M, Hayashi H. Angulin-2/ILDR1 does not affect water transport in the mouse large intestine. **Sci Rep.** 2020;10:10374.
13. Takashina Y, Ishizuka N, Ikumi N, Hayashi H, Manabe A, Hirota C, Tabuchi Y, Matsunaga T, Ikari A. Upregulation of claudin-7 expression by angiotensin II in colonic epithelial cells of mice fed with NaCl-depleted diets. **Int J Mol Sci.** 2020;21:1442.
14. Nakayama M, Ishizuka N, Hempstock W, Ikari A, Hayashi H. Na<sup>+</sup>-coupled nutrient cotransport induced luminal negative potential and claudin-15 play important roles in paracellular Na<sup>+</sup> recycling. **Int J Mol Sci.** 2020;21:376.
15. Ishizuka N, Nakayama M, Watanabe M, Tajima H, Yamauchi Y, Ikari A, Hayashi H. Luminal Na<sup>+</sup> homeostasis in intestinal peptide absorption. **Am J Physiol.** 2018;296:G799-G809.
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23. Khan MRS, Anisuzzaman ASM, Semba S, Ma Y, Uwada J, Hayashi H, Suzuki Y, Takano T, Ikeuchi H, Uchino M, Maemoto A, Ushikubi F, Muramatsu I, Taniguchi T. M1 is a major subtype of muscarinic acetylcholine receptors on mouse colonic epithelial cells. **J Gastroenterol.** 2013;48:885-896.
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Na<sup>+</sup> deficiency and glucose malabsorption in mouse small intestine. **Gastroenterology**. 2011;140:913-923.

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56. Kitaoka S, Hayashi H, Yokogoshi H, Suzuki Y. Transmural potential changes associated with in vitro absorption of theanine in guinea pig intestine. **Biosci Biotechnol Biochem.** 1996;60:1768-1771.
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58. Ikuma M, Hanai H, Kaneko E, Hayashi H, Hoshi T. Effects of aging on microclimate pH of rat jejunum. **Biochim Biophys Acta.** 1996;1280:19-26.
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### **Review**

1. Ishizuka N, Hempstock W, Hayashi H. Mode of action of NHE3 inhibitors in intestinal Na<sup>+</sup> absorption. **Gastroenterol Med Res.** 2019;4:297-301.
2. Hayashi H, Szász K, Grinstein S. Multiple modes of regulation of Na<sup>+</sup>/H<sup>+</sup> exchangers. **Ann N Y Acad Sci.** 2002;976:248-258.