

CURRICULUM VITAE of Yasuyuki Imai

April 1, 2017

Name: **Yasuyuki Imai**
Affiliation: **Laboratory of Microbiology and Immunology
School of Pharmaceutical Sciences
University of Shizuoka**
Position: **Professor**
Office Address: **Yada 52-1, Suruga-ku, Shizuoka-shi, Shizuoka 422-8526, Japan**
E-mail: **imai@u-shizuoka-ken.ac.jp**

Education:

Ph.D. in Pharmaceutical Sciences, University of Tokyo, Japan, March 1982

Employment:

1982 (April)-1983 (January)	Postdoctoral fellow (Japan Society for the Promotion of Science), Division of Chemical Toxicology and Immunochemistry, Faculty of Pharmaceutical Sciences, University of Tokyo, Japan
1983 (February)-1989 (March)	Research Associate, Division of Chemical Toxicology and Immunochemistry, Faculty of Pharmaceutical Sciences, University of Tokyo, Japan
1989 (April)-1992 (March)	Visiting Scholar, Department of Anatomy and Program in Immunology, University of California, San Francisco, USA.
1992 (April)-1997 (March)	Research Associate, Laboratory of Cancer Biology and Molecular Immunology, Graduate School of Pharmaceutical Sciences, University of Tokyo, Japan
1997 (April)-1998 (May)	Associate Professor, Laboratory of Cancer Biology and Molecular Immunology, Graduate School of Pharmaceutical Sciences, University of Tokyo, Japan
1998 (June)-present	Professor, Laboratory of Microbiology and Immunology, School of Pharmaceutical Sciences, University of Shizuoka, Japan

2007 (October) -2011 (March)	Dean of Graduate School of Pharmaceutical Sciences, University of Shizuoka, Japan
2011 (October)- 2013 (March)	Dean of School of Pharmaceutical Sciences, University of Shizuoka, Japan
2013 (April)- 2015 (March)	Chairperson, International Exchange Committee, University of Shizuoka, Japan
2015 (April)-	Executive Director & Vice President, University of Shizuoka, Japan

Research Interest

(1) Mucosal immunology focused on acquired immunity

Immunoglobulin A (IgA) is supposed to prevent entry of harmful antigens through mucosal surface. We established mouse monoclonal antibodies of IgA class against Shiga toxin, cholera toxin, ovalbumin, and recombinant IgA against influenza virus hemagglutinin. We are interested in how Shiga toxin initially invades intestinal epithelium and whether secretory IgA can prevent entry of toxins. We also focus on the production of Shiga toxin-specific secretory IgA by a plant expression system (termed plantibody) aiming at edible IgA therapeutics as well as high profile functional food. We succeeded in the production of secretory IgA against Shiga toxin in *Arabidopsis thaliana* as well as *Lactuca sativa*.

(2) Adjuvant effects of chemicals in allergy

Some chemicals may serve as an adjuvant during sensitization to other chemical haptens. We have been studying a mouse contact hypersensitivity model using fluorescein isothiocyanate as a hapten. We found some types of phthalate esters exhibited adjuvant effects during sensitization, partly due to the enhancement of dendritic cell trafficking from skin sites to draining lymph nodes. We demonstrated that phthalate esters with adjuvant activity stimulate transient receptor potential (TRP) channels, especially TRPA1. We are trying to reveal the relationship between skin sensitization and stimulation of sensory neurons by chemicals. We also address a question of whether the ability of stimulating TRPA1 channels *in vitro* could predict adjuvant activity of chemicals.

Selected Publications

Takeshi Matsuoka, Kohta Kurohane, Wakana Suzuki, Erina Ogawa, Kamiyu Kobayashi, and Yasuyuki Imai: Dibutyl maleate and dibutyl fumarate enhance contact sensitization to fluorescein isothiocyanate in mice. *Biol. Pharm. Bull.*, **39**, 272–277 (2016)

Chie Kobayashi, Kohta Kurohane, and Yasuyuki Imai: Lack of impact of high dietary vitamin A on T helper 2-dependent contact hypersensitivity to fluorescein

isothiocyanate in mice. *Biol. Pharm. Bull.*, 38, 1827–1830 (2015)

Koichiro Tsuboi, Mayo Nishitani, Atsushi Takakura, Yasuyuki Imai, Masaaki Komatsu, and Hiroto Kawashima: Autophagy protects against colitis by the maintenance of normal gut microflora and mucus secretion. *J. Biol. Chem.*, 290, 20511–20526 (2015)

Kohta Kurohane, Ayako Kimura, Rie Terasawa, Yurina Sahara, Kamiyu Kobayashi, Wakana Suzuki, Takeshi Matsuoka, Tatsuo Watanabe, and Yasuyuki Imai: Adjuvant effect of an alternative plasticizer diisopropyl adipate on a contact hypersensitivity mouse model: link with sensory ion channel TRPA1 activation. *Biol. Pharm. Bull.*, 38, 1054–1062 (2015)

Ryuji Matsumura, Jotaro Hirakawa, Kaori Sato, Toshiaki Ikeda, Motoe Nagai, Minoru Fukuda, Yasuyuki Imai, and Hiroto Kawashima: Novel antibodies reactive with sialyl Lewis X in both humans and mice define its critical role in leukocyte trafficking and contact hypersensitivity responses. *J. Biol. Chem.*, 290, 15313–15326 (2015)

Kentaro Shoji, Tadanobu Takahashi, Kohta Kurohane, Koki Iwata, Takeshi Matsuoka, Shogo Tsuruta, Takatomo Sugino, Masaki Miyake, Takashi Suzuki, and Yasuyuki Imai: Recombinant IgA specific for influenza A virus hemagglutinin: production, functional analysis and formation of secretory IgA. *Viral Immunol.*, 28, 170–178 (2015)

Kohta Kurohane, Kyoko Nagano, Katsuhiko Nakanishi, Koki Iwata, Masaki Miyake, and Yasuyuki Imai: Shiga toxin-induced apoptosis is more efficiently inhibited by dimeric recombinant hybrid-IgG/IgA immunoglobulins than by the parental IgG monoclonal antibodies. *Virulence*, 5, 819–824 (2014)

Koki Iwata, Kohta Kurohane, Katsuhiko Nakanishi, Masaki Miyake, and Yasuyuki Imai: Stable expression and characterization of monomeric and dimeric recombinant hybrid-IgG/IgA immunoglobulins specific for Shiga toxin. *Biol. Pharm. Bull.*, 37, 1510–1515 (2014) Highlighted Paper (Editor-in-Chief selection)

Katsuhiko Nakanishi, Sanshiro Narimatsu, Shiori Ichikawa, Yuki Tobisawa, Kohta Kurohane, Yasuo Niwa, Hirokazu Kobayashi and Yasuyuki Imai: Production of hybrid-IgG/IgA plantibodies with neutralizing activity against Shiga toxin 1. *PLoS ONE*, 8, e80712 (2013)

Koichiro Tsuboi, Jotaro Hirakawa, Emiko Seki, Yasuyuki Imai, Yu Yamaguchi, Minoru Fukuda and Hiroto Kawashima: Role of high endothelial venule-expressed heparan sulfate in chemokine presentation and lymphocyte homing. *J. Immunol.*, 191, 448–455 (2013)

Kohta Kurohane, Yurina Sahara, Ayako Kimura, Masataka Narukawa, Tatsuo

Watanabe, Takashi Daimon, and Yasuyuki Imai: Lack of transient receptor potential melastatin 8 activation by phthalate esters that enhance contact hypersensitivity in mice. *Toxicol. Lett.*, 217, 192–196 (2013)

Takahiro Shiba, Takuma Tamai, Yurina Sahara, Kohta Kurohane, Tatsuo Watanabe, and Yasuyuki Imai: Transient receptor potential ankyrin 1 activation enhances hapten sensitization in a T-helper type 2-driven fluorescein isothiocyanate-induced contact hypersensitivity mouse model. *Toxicol. Appl. Pharmacol.*, 264, 370–376 (2012)

Toshihiko Harada, Takashi Tanikawa, Yasunori Iwasaki, Masao Yamada, Yasuyuki Imai, and Masaki Miyake: Phagocytic entry of *Legionella pneumophila* into macrophages through phosphatidylinositol 3, 4, 5-trisphosphate-independent pathway. *Biol. Pharm. Bull.*, 35, 1460-1468 (2012)

Chie Kobayashi, Kohta Kurohane, and Yasuyuki Imai: High dose dietary pyridoxine induces T-helper type 1 polarization and decreases contact hypersensitivity response to fluorescein isothiocyanate in mice. *Biol. Pharm. Bull.*, 35, 532–538 (2012)

Yuki Tobisawa, Takashi Maruyama, Takashi Tanikawa, Katsuhiko Nakanishi, Kohta Kurohane, and Yasuyuki Imai: Establishment of recombinant hybrid-IgG/IgA immunoglobulin specific for Shiga toxin. *Scand. J. Immunol.*, 76, 574–584 (2011)

Takashi Tanikawa, Kohta Kurohane, and Yasuyuki Imai: Regulatory effect of cannabinoid receptor agonist on chemokine-induced lymphocyte chemotaxis. *Biol. Pharm. Bull.*, 34, 1090–1093 (2011)

Yukari Ohmichi, Jotaro Hirakawa, Yasuyuki Imai, Minoru Fukuda, and Hiroto Kawashima: Essential role of peripheral node addressin in lymphocyte homing to nasal-associated lymphoid tissues and allergic immune responses. *J. Exp. Med.*, 208, 1015–1025 (2011)

Jotaro Hirakawa, Koichiro Tsuboi, Kaori Sato, Motohiro Kobayashi, Sota Watanabe, Atsushi Takakura, Yasuyuki Imai, Yuki Ito, Minoru Fukuda, and Hiroto Kawashima: Novel anti-carbohydrate antibodies reveal the cooperative function of sulfated *N*- and *O*-glycan in lymphocyte homing. *J. Biol. Chem.*, 285, 40864–40878 (2010)

Tsuyoshi Hayashi, Masahiro Nakamichi, Hirotaka Naitou, Norio Ohashi, Yasuyuki Imai, and Masaki Miyake: Proteomic analysis of growth phase-dependent expression of *Legionella pneumophila* proteins which involves regulation of bacterial virulence traits. *PLoS One*, 5, e11718 (2010)

Tomoko Matsuda, Takashi Maruyama, Hiromi Iizuka, Ayumi Kondo, Takuma Tamai, Kohta Kurohane, Yasuyuki Imai: Phthalate esters reveal skin-sensitizing activity

of phenethyl isothiocyanate in mice. *Food Chem. Toxicol.*, 48, 1704–1708 (2010)

Yuki Tobisawa, Yasuyuki Imai, Minoru Fukuda, and Hiroto Kawashima: Sulfation of colonic mucins by *N*-acetylglucosamine-6-*O*-sulfotransferase-2 and its protective function in experimental colitis in mice. *J. Biol. Chem.*, 285, 6750–6760 (2010)

Takashi Tanikawa, Kohta Kurohane, and Yasuyuki Imai: Regulatory effect of lysophosphatidic acid on lymphocyte migration. *Biol. Pharm. Bull.*, 33, 204–208 (2010)

Tomoko Matsuda, Kohta Kurohane, and Yasuyuki Imai: Di-(2-ethylhexyl) phthalate enhances skin sensitization to isocyanate haptens in mice. *Toxicol. Lett.*, 192, 97–100 (2010)

Mari Kashiwamura, Kohta Kurohane, Takashi Tanikawa, Aya Deguchi, Daisei Miyamoto, and Yasuyuki Imai: Shiga toxin kills epithelial cells isolated from distal but not proximal part of mouse colon. *Biol. Pharm. Bull.*, 32, 1614–1617 (2009)

Takahiro Shiba, Takashi Maruyama, Kohta Kurohane, Yusaku Iwasaki, Tatsuo Watanabe, and Yasuyuki Imai: TRPA1 and TRPV1 activation is a novel adjuvant effect mechanism in contact hypersensitivity. *J. Neuroimmunol.*, 207, 66–74 (2009)

Tetsuya Taniguchi, Toshihiko Harada, Tsuyoshi Hayashi, Takashi Tanikawa, Kohta Kurohane, Masaki Miyake, and Yasuyuki Imai: Elevated production of *Legionella*-specific immunoglobulin A in A/J mice is accompanied by T-helper 1-type polarization. *Immunol. Lett.*, 121, 123–126 (2008)

Takashi Tanikawa, Tomoyuki Ishikawa, Takeshi Maekawa, Kohta Kurohane, and Yasuyuki Imai: Characterization of monoclonal immunoglobulin A and G against Shiga toxin binding subunits produced by intranasal immunization. *Scand. J. Immunol.*, 68, 414–422 (2008)

Tsuyoshi Hayashi, Masaki Miyake, Takashi Fukui, Noriko Sugaya, Takashi Daimon, Saotomo Itoh, Teruaki Oku, Tsutomu Tsuji, Satoshi Toyoshima, and Yasuyuki Imai: Exclusion of actin-binding protein p57/coronin-1 from bacteria-containing phagosomes in macrophages infected with *Legionella*. *Biol. Pharm. Bull.*, 31, 861–865 (2008)

Toshihiko Harada, Masaki Miyake, and Yasuyuki Imai: Evaluation of *Legionella pneumophila* from the bactericidal system by reactive oxygen species (ROS) in macrophages. *Microbiol. Immunol.*, 51, 1161–1170 (2007)

Takashi Tanikawa, Kohta Kurohane and Yasuyuki Imai: Production and characterization of IgA monoclonal antibody against ovalbumin. *Hybridoma*, 26, 328–332 (2007)

- Takashi Tanikawa, Kohta Kurohane, and Yasuyuki Imai: Induction of preferential chemotaxis of unstimulated B-lymphocytes by 2-arachidonoylglycerol in immunized mice. *Microbiol. Immunol.*, 51, 1013–1019 (2007)
- Takashi Maruyama, Takahiro Shiba, Hiromi Iizuka, Tomoko Matsuda, Kohta Kurohane, and Yasuyuki Imai: Effects of phthalate esters on dendritic cell subsets and interleukin-4 production in fluorescein isothiocyanate-induced contact hypersensitivity. *Microbiol. Immunol.*, 51, 321–326 (2007)
- Takashi Maruyama, Hiromi Iizuka, Yuki Tobisawa, Takahiro Shiba, Tomoko Matsuda, Kohta Kurohane, and Yasuyuki Imai: Influence of local treatments with capsaicin or allyl isothiocyanate in the sensitization phase of an FITC-induced contact sensitivity model. *Int. Arch. Allergy Immunol.*, 143, 144–154 (2007)
- Yasuyuki Imai, Ayumi Kondo, Hiromi Iizuka, Takashi Maruyama, and Kohta Kurohane: Effects of phthalate esters on the sensitization phase of contact hypersensitivity induced by fluorescein isothiocyanate. *Clin. Exp. Allergy*, 36, 1462–1468 (2006)
- Masaki Miyake, Takashi, Fukui, and Yasuyuki Imai: Differences in protein synthesis between wild type and intracellular growth-deficient strains of *Legionella pneumophila* in U937 and *Acanthamoeba polyphaga*. *Microb. Pathog.*, 40, 161–170 (2006)
- Masaki Miyake, Takuro Watanabe, Hitomi Koike, Maëlle Molmeret, Yasuyuki Imai, and Yousef Abu Kwaik: Characterization of *Legionella pneumophila pmiA*, an essential gene for infectivity of protozoa and macrophages. *Infect. Immun.*, 73, 6272–6282 (2005)
- Yasuyuki Imai, Tomoyuki Ishikawa, Takashi Tanikawa, Hiroki Nakagami, Takeshi Maekawa, Kohta Kurohane: Production of IgA monoclonal antibody against Shiga toxin binding subunits employing nasal-associated lymphoid tissue. *J. Immunol. Methods*, 302, 125–135 (2005)
- Kayoko Sato, Yasuyuki Imai, Nobuaki Higashi, Yosuke Kumamoto, Thandi M. Onami, Stephen M. Hedrick, and Tatsuro Irimura: Lack of antigen-specific tissue remodeling in mice deficient in the macrophage galactose-type calcium-type lectin 1/CD301a. *Blood*, 106, 207–215 (2005)
- Yasuyuki Imai, Rio Nagai, Yousuke Ono, Tomoyuki Ishikawa, Hiroki Nakagami, Takashi Tanikawa, and Kohta Kurohane: Production of secretory immunoglobulin A against Shiga toxin binding subunits in mice by mucosal immunization. *Infect. Immun.*, 72, 889–895 (2004)
- Yasuyuki Imai, Takashi Fukui, Kohta Kurohane, Daisei Miyamoto, Yasuo Suzuki,

Tomoyuki Ishikawa, Yousuke Ono, and Masaki Miyake: Restricted expression of Shiga toxin binding sites on mucosal epithelium of mouse distal colon. *Infect. Immun.*, 71, 985–990 (2003)

Yasuyuki Imai, Takashi Fukui, Asano Ikegaya, Tomoyuki Ishikawa, Yousuke Ono, and Kkohta Kurohane: Lack of Shiga-like toxin binding sites in germinal centers of mouse lymphoid tissues. *Immunology*, 105, 509–514 (2002)

Yasuyuki Imai, Yasumi Matsuura, Yousuke Ono, Tomoyuki Ishikawa, and Yukishige Ito: Demonstration of the pH sensitive binding of multivalent carbohydrate ligands to immobilized Shiga-like toxin 1 B subunits. *J. Biochem. (Tokyo)*, 130, 665–670 (2001)

Sayuri Miyashita, Yasumi Matsuura, Daisei Miyamoto, Yasuo Suzuki, Y. and Yasuyuki Imai: Development of recombinant B subunit of Shiga-like Toxin 1 as a probe to detect carbohydrate ligands in immunochemical and flowcytometric application. *Glycoconj. J.*, 16, 697–705 (1999)

Kayoko Sato, Yasuyuki Imai and Tatsuro Irimura: Contribution of dermal macrophage trafficking in the sensitization phase of contact hypersensitivity. *J. Immunol.*, 161, 6835–6844 (1998)

Naoki Nakatsubo, Hirotatsu Kojima, Kazuya Kikuchi, Hiroshi Nagoshi, Yasunobu Hirata, Daisuke Maeda, Yasuyuki Imai, Tatsuro Irimura, and Tetsuo Nagano: Direct evidence of nitric oxide production from bovine aortic endothelial cells using new fluorescence indicators: diaminofluoresceins. *FEBS Lett.*, 427, 263–266 (1998)

Takeshi Hosoi, Yasuyuki Imai, and Tatsuro Irimura: Coordinated binding of sugar, calcium, and antibody to macrophage C-type lectin. *Glycobiology*, 8, 791–798 (1998)

Shigeki Mizuochi, Yoshihiro Akimoto, Yasuyuki Imai, Hiroshi Hirano, and Tatsuro Irimura: Unique tissue distribution of a mouse macrophage C-type lectin. *Glycobiology*, 7, 137–146 (1997)

Yasuyuki Imai, Yoshihiro Akimoto, Shigeki Mizuochi, Toshifumi Kimura, Hiroshi Hirano, Tatsuro and Irimura: Restricted expression of galactose/*N*-acetylgalactosamine-specific macrophage C-type lectin to connective tissue and to metastatic lesions in mouse lung. *Immunology*, 86, 591–598 (1995)

Toshifumi Kimura, Yasuyuki Imai, and Tatsuro Irimura: Calcium-dependent conformation of a mouse macrophage calcium-type lectin. Carbohydrate binding activity is stabilized by an antibody specific for a calcium-dependent epitope. *J. Biol. Chem.*, 270, 16056–16062 (1995)

Yasuyuki Imai, Laurence A. Lasky, and Steven D. Rosen: Sulfation requirement for GlyCAM-1, an endothelial ligand for L-selectin. *Nature*, 361, 555–557 (1993)

Laurence A. Lasky, Mark S. Singer, Donald Dowbenko, Yasuyuki Imai, William J. Henzel, Chris Grimley, Christopher Fennie, Nancy Gillett, Susan R. Watson, and Steven D. Rosen: An endothelial ligand for L-selectin is a novel mucin-like molecule. *Cell*, 69, 927–938 (1992)

Yasuyuki Imai, Mark S. Singer, Christopher Fennie, Laurence A. Lasky, and Steven D. Rosen: Identification of a carbohydrate-based endothelial ligand for a lymphocyte homing receptor. *J. Cell Biol.*, 113, 1213–1221 (1991)

Yasuyuki Imai, David D. True, Mark S. Singer, and Steven D. Rosen: Direct demonstration of the lectin activity of gp90MEL, a lymphocyte homing receptor. *J. Cell Biol.*, 111, 1225–1232 (1990)

URL of Laboratory of Microbiology and Immunology

<http://w3pharm.u-shizuoka-ken.ac.jp/bisei/English/index.html>