

Alexander R Moschen

Biographical sketch

I graduated in 2004 from the Medical University Innsbruck, Austria with an intercalated MD thesis on the RANK/RANKL/OPG system in inflammatory bowel diseases. Three years of postdoctoral training were received in Professor Tilg's Gastroenterology Research Laboratory in Innsbruck. Subject of my PhD thesis was the impact of adipose tissue-derived mediators (adipocytokines) on leukocyte biology. I completed my clinical training in Internal Medicine at the University Hospital Innsbruck. After passing my board exams, I accepted a 12 months Senior Clinical Fellowship in Gastroenterology and Endoscopy at the Division of Gastroenterology of the Department of Medicine of the University of Cambridge (UK) in January 2012. Returning to Innsbruck in 2013, I completed my specialty training in Gastroenterology and Hepatology and started my own research group. Here we investigate the mechanisms that underlie inflammation at the intestinal mucosal surface and particularly pathways that maintain a mutualistic relationship between the most complex and densely populated habitat of the microbiota and the intestinal immune systems. To address these questions, we engage animal models of intestinal inflammation in genetically modified animals in combination with quantitative biochemical and imaging approaches and we hold a comprehensive human biobank in IBD under valid ethical approval.

Curriculum vitae

Medical University Innsbruck
Christian Doppler Laboratory for Mucosal Immunology
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Date of birth	December 8, 1978
Place of birth	Innsbruck, Austria
Citizenship	Austrian

Education

1997	Matura (A levels), Gymnasium of the Franciscans, Hall i.T., Austria
1998	Military Services, Military Music Tyrol, Head: Oberst Prof. Hans Eibl
2004	MD graduation, Medical University Innsbruck, Austria
2007	PhD graduation, Medical University Innsbruck, Austria
2012	Specialist diploma for general Internal Medicine (consultant physician)
2015	Specialist diploma for Gastroenterology and Hepatology (consultant gastroenterologist)

Career History

2002-2004	Research Assistant with Prof. Herbert Tilg, Gastroenterology Research Laboratory, Medical University Innsbruck
2004-2007	Postdoctoral research fellow and PhD student, Gastroenterology Research Laboratory, Medical University Innsbruck, Austria
2007-2012	'Senior' postdoctoral research fellow, Christian Doppler Research Laboratory for Gut Inflammation (head: Prof. H. Tilg), AND Fellowship (clinical lecturer) in General Internal Medicine, Department of Internal Medicine, Medical University Innsbruck, Austria

2012-2013 Visiting Clinical Fellow in Prof. Kaser's group for mucosal immunology, AND Senior Clinical Fellow in Gastroenterology and Endoscopy, Division of Gastroenterology, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust

2013-ongoing Assistant Professor of Medicine and Senior Scientist, Medical University Innsbruck

Jan 2017 Head of Christian Doppler Research Laboratory for Mucosal Immunology.

Fellowships, Awards Paracelsus award (2016)
 Otto-Kraupp award for Austria's prime medical habilitation 2013 (2014)
 Rising Star Award of the United European Gastroenterology (2014)
 sanofi-aventis award (2011)

Publications Number of publications=76, cumulative impact factor 40, h-index=31, cited>5100

Patents None

Other Functions Reviewer for: Gastroenterology, Hepatology, Gut, Journal of Hepatology, Am J Gastroenterology, PlosOne, SFP, etc.
 Member of: European Crohn's Colitis Organisation, ÖGGH, ÖGIM, Austrian Microbiome Initiative

Research Interests Host pathogen interaction at the epithelial border of the gastrointestinal mucosal border, mechanisms involved in homeostasis, inflammation and tissue regeneration and repair.

Funds obtained (5 most important ones)

Tiroler Wissenschaftsfonds, 2013	35.000	TWF	2013-2016
Tiroler Wissenschaftsfonds, 2015 (Co-Antrag mit Prof. Kapferer)	25.000	TWF	2010-2017
Christian Doppler Research Society 2016	800,000	CDG	2014-2017

10 most important scientific publications

1. **Moschen AR**, Gerner RR, Wang J, Klepsch V, Adolph TE, Reider SJ, Hackl H, Pfister A, Schilling J, Moser PL, Kempster SL, Swidsinski A, Orth Höller D, Weiss G, Baines JF, Kaser A, Tilg H. Lipocalin 2 Protects from Inflammation and Tumorigenesis Associated with Gut Microbiota Alterations. *Cell Host Microbe*. 2016 Apr 13;19(4):455-69. doi: 10.1016/j.chom.2016.03.007.
2. Ballak DB, van Diepen JA, **Moschen AR**, Jansen HJ, Hijmans A, Groenhof GJ, Leenders F, Bufler P, Boekschoten MV, Müller M, Kersten S, Li S, Kim S, Eini H, Lewis EC, Joosten LA, Tilg H, Netea MG, Tack CJ, Dinarello CA, Stienstra R (2014). IL-37 protects against obesity-induced inflammation and insulin resistance. *Nat Commun*. Sep 3;5:4711. doi: 10.1038/ncomms5711.
3. Kiechl S, Wittmann J, Giaccari A, Knoflach M, Willeit P, Bozec A, **Moschen AR**, Muscogiuri G, Sorice GP, Kireva T, Summerer M, Wirtz S, Luther J, Mielenz D, Billmeier U, Egger G, Mayr A, Oberhollenzer F, Kronenberg F, Orthofer M, Penninger JM, Meigs JB, Bonora E, Tilg H, Willeit J, Schett G (2013). Blockade of receptor activator of nuclear factor - kB (RANKL) signaling improves hepatic insulin resistance and prevents development of diabetes mellitus. *Nat Med*. 19: 358-363. doi: 10.1038/nm.3084.

4. **Moschen AR**, Gerner R, Schroll A, Fritz T, Kaser A, Tilg H (2011): A key role for Pre-B cell colony-enhancing factor in experimental hepatitis; *Hepatology* 54: 675-686. doi: 10.1002/hep.24416.
5. Nairz M, Schroll A, **Moschen AR**, Sonnweber T, Theurl M, Theurl I, Taub N, Jamnig C, Neurauter D, Huber LA, Tilg H, Moser PL, Weiss G (2011): Erythropoietin contrastingly affects bacterial infection and experimental colitis by inhibiting nuclear factor- κ B-inducible immune pathways; *Immunity* 34:61-74. doi: 10.1016/j.immuni.2011.01.002.
6. **Moschen AR**, Fritz T, Clouston AD, Rebhan I, Bauhofer O, Barrie HD, Powell EE, Kim SH, Dinarello CA, Bartenschlager R, Jonsson JR, Tilg H (2011): Interleukin-32: a new proinflammatory cytokine involved in hepatitis C virus-related liver inflammation and fibrosis; *Hepatology* 53:1819-1829. doi: 10.1002/hep.24285.
7. **Moschen ARR**, Molnar C, Geiger S, Graziadei I, Ebenbichler CF, Weiss H, Kaser S, Kaser A, Tilg H (2010): Anti-inflammatory effects of excessive weight loss: potent suppression of adipose interleukin 6 and tumour necrosis factor alpha expression; *Gut* 59:1259-1264. doi: 10.1136/gut.2010.214577.
8. **Moschen AR**, Molnar C, Wolf AM, Weiss H, Graziadei I, Kaser S, Ebenbichler CF, Stadlmann S, Moser PL, Tilg H (2009): Effects of weight loss induced by bariatric surgery on hepatic adipocytokine expression; *J Hepatol* 51: 765-777. doi: 10.1016/j.jhep.2009.06.016.
9. **Moschen AR**, Kaser A, Enrich B, Mosheimer B, Theurl M, Niederegger H, Tilg H (2007): Visfatin, an adipocytokine with proinflammatory and immunomodulating properties; *J Immunol* 178:1748-1758.
10. Tilg H, **Moschen AR** (2006): Adipocytokines: mediators linking adipose tissue, inflammation and immunity; *Nat Rev Immunol* 6: 772-783.

PP01/02 Alexander Moschen; all publications in the last five years (2011-2016)

1. Tilg H, **Moschen AR**, Roden M. NAFLD and diabetes mellitus. *Nat Rev Gastroenterol Hepatol*. 2016 Oct 12. doi: 10.1038/nrgastro.2016.147. [Epub ahead of print].
2. Gerner RR, Feistritz C, **Moschen AR**, Kircher B, Moser P, Tilg H, Nachbaur D. Treatment With α -1-Antitrypsin for Steroid-Refractory Acute Intestinal Graft-Versus-Host Disease: A Report of 2 Cases. *Transplantation*. 2016 [Epub ahead of print]
3. Wieser V, Adolph TE, Enrich B, Moser P, **Moschen AR**, Tilg H. Weight loss induced by bariatric surgery restores adipose tissue PNPLA3 expression. *Liver Int*. 2016 Aug 12. doi: 10.1111/liv.13222. [Epub ahead of print]
4. **Moschen AR**, Gerner RR, Wang J, Klepsch V, Adolph TE, Reider SJ, Hackl H, Pfister A, Schilling J, Moser PL, Kempster SL, Swidsinski A, Orth Höller D, Weiss G, Baines JF, Kaser A, Tilg H. Lipocalin 2 Protects from Inflammation and Tumorigenesis Associated with Gut Microbiota Alterations. *Cell Host Microbe*. 2016 Apr 13;19(4):455-69. doi: 10.1016/j.chom.2016.03.007.
5. Novacek G, Dejaco C, Gröchenig HP, Högenauer C, Knoflach P, Miehsler W, **Moschen AR**, Petritsch W, Vogelsang H, Tilg H. Vedolizumab in der Behandlung der Colitis ulcerosa und des Morbus Crohn - ein Konsensus der Arbeitsgruppe "Chronisch Entzündliche Darmerkrankungen" der Österreichischen Gesellschaft für Gastroenterologie und Hepatologie. *Z Gastroenterol*. 2016 May;54(5):456-67. doi: 10.1055/s-0042-103694.
6. Tilg H, **Moschen AR**, Szabo G. Interleukin-1 and inflammasomes in ALD/AAH and NAFLD/NASH. *Hepatology*. 2016 Jan 16. doi: 10.1002/hep.28456.
7. Wieser V, Tymoszuk P, Adolph TE, Grander C, Grabherr F, Enrich B, Pfister A, Lichtmanegger L, Gerner R, Drach M, Moser P, Zoller H, Weiss G, **Moschen AR**, Theurl I,

- Tilg H. Lipocalin 2 drives neutrophilic inflammation in alcoholic liver disease. *J Hepatol.* 2016 Apr;64(4):872-80. doi: 10.1016/j.jhep.2015.11.037.
8. Nairz M, Schroll A, Haschka D, Dichtl S, Sonnweber T, Theurl I, Theurl M, Lindner E, Demetz E, Abhoff M, Bellmann-Weiler R, Müller R, Gerner RR, **Moschen AR**, Baumgartner N, Moser PL, Talasz H, Tilg H, Fang FC, Weiss G. Lipocalin-2 ensures host defense against *Salmonella Typhimurium* by controlling macrophage iron homeostasis and immune response. *Eur J Immunol.* 2015 Nov;45(11):3073-86. doi: 10.1002/eji.201545569.
 9. Thiele M, Kerschbaumer RJ, Tam FW, Völkel D, Douillard P, Schinagl A, Kühnel H, Smith J, McDaid JP, Bhangal G, Yu MC, Pusey CD, Cook HT, Kovarik J, Magelky E, Bhan A, Rieger M, Mudde GC, Ehrlich H, Jilma B, Tilg H, **Moschen AR**, Terhorst C, Scheiflinger F. Selective Targeting of a Disease-Related Conformational Isoform of Macrophage Migration Inhibitory Factor Ameliorates Inflammatory Conditions. *J Immunol.* 2015 Sep 1;195(5):2343-52. doi: 10.4049/jimmunol.1500572.
 10. Tilg H, **Moschen AR**. Food, immunity, and the microbiome. *Gastroenterology.* 2015 May;148(6):1107-19. doi: 10.1053/j.gastro.2014.12.036.
 11. Kump PK, Krause R, Steininger C, Gröchenig HP, **Moschen AR**, Madl C, Novacek G, Allerberger F, Högenauer C. [Recommendations for the use of faecal microbiota transplantation "stool transplantation": consensus of the Austrian Society of Gastroenterology and Hepatology (ÖGGH) in cooperation with the Austrian Society of Infectious Diseases and Tropical Medicine]. *Z Gastroenterol.* 2014 Dec;52(12):1485-92. doi: 10.1055/s-0034-1385562.
 12. Demetz E, Schroll A, Auer K, Heim C, Patsch JR, Eller P, Theurl M, Theurl I, Theurl M, Seifert M, Lener D, Stanzl U, Haschka D, Asshoff M, Dichtl S, Nairz M, Huber E, Stadlinger M, **Moschen AR**, Li X, Pallweber P, Scharnagl H, Stojakovic T, März W, Kleber ME, Garlaschelli K, Uboldi P, Catapano AL, Stellaard F, Rudling M, Kuba K, Imai Y, Arita M, Schuetz JD, Pramstaller PP, Tietge UJ, Trauner M, Norata GD, Claudel T, Hicks AA, Weiss G, Tancevski I. The arachidonic acid metabolome serves as a conserved regulator of cholesterol metabolism. *Cell Metab.* 2014 Nov 4;20(5):787-98.
 13. Tilg H, **Moschen AR**. Mechanisms behind the link between obesity and gastrointestinal cancers. *Best Pract Res Clin Gastroenterol.* 2014 Aug;28(4):599-610. doi: 10.1016/j.bpg.2014.07.006.
 14. Ballak DB, van Diepen JA, **Moschen AR**, Jansen HJ, Hijmans A, Groenhof GJ, Leenders F, Bufler P, Boekschoten MV, Müller M, Kersten S, Li S, Kim S, Eini H, Lewis EC, Joosten LA, Tilg H, Netea MG, Tack CJ, Dinarello CA, Stienstra R. IL-37 protects against obesity-induced inflammation and insulin resistance. *Nat Commun.* 2014 Sep 3;5:4711. doi: 10.1038/ncomms5711.
 15. Kienzl-Wagner K*, **Moschen AR** *, Geiger S, Bichler A, Aigner F, Brandacher G, Pratschke J, Tilg H. The role of lipocalin-2 in liver regeneration. *Liver Int.* 2015 Apr;35(4):1195-202. doi: 10.1111/liv.12634.
 16. Tilg H, **Moschen AR**. Microbiota and diabetes: an evolving relationship. *Gut.* 2014 Sep;63(9):1513-21. doi: 10.1136/gutjnl-2014-306928.
 17. Tilg H, **Moschen AR**. Evolving therapies for non-alcoholic steatohepatitis. *Expert Opin Drug Discov.* 2014 Jun;9(6):687-96. doi:10.1517/17460441.2014.911283.
 18. Tancevski I, Nairz M, Duwensee K, Auer K, Schroll A, Heim C, Feistritzer C, Hoefler J, Gerner RR, **Moschen AR**, Heller I, Pallweber P, Li X, Theurl M, Demetz E, Wolf AM, Wolf D, Eller P, Ritsch A, Weiss G. Fibrates ameliorate the course of bacterial sepsis by promoting neutrophil recruitment via CXCR2. *EMBO Mol Med.* 2014 Apr 22;6(6):810-20. doi: 10.1002/emmm.201303415.
 19. Novacek G, Dejaco C, Knoflach P, **Moschen AR**, Petritsch W, Vogelsang H, Reinisch W. [Adalimumab for the treatment of ulcerative colitis--a consensus report by the working group

inflammatory bowel diseases of the Austrian Society of Gastroenterology and Hepatology]. *Z Gastroenterol.* 2014 Feb;52(2):204-11. doi: 10.1055/s-0033-1355818.

20. Gerner RR, **Moschen AR**, Tilg H. Targeting T and B lymphocytes in inflammatory bowel diseases: lessons from clinical trials. *Dig Dis.* 2013;31(3-4):328-35. doi: 10.1159/000354687.
21. Gerner RR, Wieser V, **Moschen AR**, Tilg H. Metabolic inflammation: role of cytokines in the crosstalk between adipose tissue and liver. *Can J Physiol Pharmacol.* 2013 Nov;91(11):867-72. doi: 10.1139/cjpp-2013-0050.
22. Wieser V, Gerner R, **Moschen AR**, Tilg H. Liver complications in inflammatory bowel diseases. *Dig Dis.* 2013;31(2):233-8. doi: 10.1159/000353377.
23. **Moschen AR**, Wieser V, Gerner RR, Bichler A, Enrich B, Moser P, Ebenbichler CF, Kaser S, Tilg H. Adipose tissue and liver expression of SIRT1, 3, and 6 increase after extensive weight loss in morbid obesity. *J Hepatol.* 2013 Dec;59(6):1315-22. doi: 10.1016/j.jhep.2013.07.027.
24. **Moschen AR**, Kaser S, Tilg H. Non-alcoholic steatohepatitis: a microbiota-driven disease. *Trends Endocrinol Metab.* 2013 Nov;24(11):537-45. doi: 10.1016/j.tem.2013.05.009.
25. Tilg H, Koch R, **Moschen AR**. Proinflammatory wheat attacks on the intestine: alpha-amylase trypsin inhibitors as new players. *Gastroenterology.* 2013 Jun;144(7):1561-3; discussion 1563-4. doi: 10.1053/j.gastro.2013.04.035.
26. Tilg H, **Moschen AR**. Malnutrition and microbiota--a new relationship? *Nat Rev Gastroenterol Hepatol.* 2013 May;10(5):261-2. doi:10.1038/nrgastro.2013.48.
27. Kiechl S, Wittmann J, Giaccari A, Knoflach M, Willeit P, Bozec A, **Moschen AR**, Muscogiuri G, Sorice GP, Kireva T, Summerer M, Wirtz S, Luther J, Mielenz D, Billmeier U, Egger G, Mayr A, Oberhollenzer F, Kronenberg F, Orthofer M, Penninger JM, Meigs JB, Bonora E, Tilg H, Willeit J, Schett G. Blockade of receptor activator of nuclear factor- κ B (RANKL) signaling improves hepatic insulin resistance and prevents development of diabetes mellitus. *Nat Med.* 2013 Mar;19(3):358-63. doi: 10.1038/nm.3084.
28. Skoien R, Richardson MM, Jonsson JR, Powell EE, Brunt EM, Neuschwander-Tetri BA, Bhathal PS, Dixon JB, O'Brien PE, Tilg H, **Moschen AR**, Baumann U, Brown RM, Couper RT, Manton ND, Ee LC, Weltman M, Clouston AD. Heterogeneity of fibrosis patterns in non-alcoholic fatty liver disease supports the presence of multiple fibrogenic pathways. *Liver Int.* 2013 Apr;33(4):624-32. doi: 10.1111/liv.12100.
29. Wieser V, **Moschen AR**, Tilg H. Inflammation, cytokines and insulin resistance: a clinical perspective. *Arch Immunol Ther Exp (Warsz).* 2013 Apr;61(2):119-25. doi: 10.1007/s00005-012-0210-1.
30. **Moschen AR**, Wieser V, Tilg H. Dietary Factors: Major Regulators of the Gut's Microbiota. *Gut Liver.* 2012 Oct;6(4):411-6. doi: 10.5009/gnl.2012.6.4.411.
31. Wieser V, **Moschen AR**, Tilg H. Adipocytokines and hepatocellular carcinoma. *Dig Dis.* 2012;30(5):508-13. doi: 10.1159/000341702.
32. **Moschen AR**, Wieser V, Tilg H. Adiponectin: key player in the adipose tissue-liver crosstalk. *Curr Med Chem.* 2012;19(32):5467-73.
33. Tilg H, **Moschen AR**. IL-1 cytokine family members and NAFLD: neglected in metabolic liver inflammation. *J Hepatol.* 2011 Nov;55(5):960-2. doi: 10.1016/j.jhep.2011.04.007.
34. Tilg H, **Moschen AR**, Kaneider NC. Pathways of liver injury in alcoholic liver disease. *J Hepatol.* 2011 Nov;55(5):1159-61. doi: 10.1016/j.jhep.2011.05.015.
35. **Moschen AR**, Gerner R, Schroll A, Fritz T, Kaser A, Tilg H. A key role for Pre-B cell colony-enhancing factor in experimental hepatitis. *Hepatology.* 2011 Aug;54(2):675-86. doi: 10.1002/hep.24416.

36. Kireva T, Erhardt A, Tiegs G, Tilg H, Denk H, Haybaeck J, Aigner E, **Moschen AR**, Distler JH, Schett G, Zwerina J. Transcription factor Fra-1 induces cholangitis and liver fibrosis. *Hepatology*. 2011 Apr;53(4):1259-69. doi: 10.1002/hep.24175.
37. Tilg H, **Moschen AR**. Relevance of TNF- α gene polymorphisms in nonalcoholic fatty liver disease. *Expert Rev Gastroenterol Hepatol*. 2011 Apr;5(2):155-8. doi: 10.1586/egh.11.17.
38. **Moschen AR**, Molnar C, Enrich B, Geiger S, Ebenbichler CF, Tilg H. Adipose and liver expression of interleukin (IL)-1 family members in morbid obesity and effects of weight loss. *Mol Med*. 2011;17(7-8):840-5. doi: 10.2119/molmed.2010.00108.
39. **Moschen AR**, Fritz T, Clouston AD, Rebhan I, Bauhofer O, Barrie HD, Powell EE, Kim SH, Dinarello CA, Bartenschlager R, Jonsson JR, Tilg H. Interleukin-32: a new proinflammatory cytokine involved in hepatitis C virus-related liver inflammation and fibrosis. *Hepatology*. 2011 Jun;53(6):1819-29. doi: 10.1002/hep.24285.
40. Riss C, **Moschen AR**, Sausgruber N, Tschoner A, Graziadei I, Weiss H, Schgoer W, Ebenbichler CF, Konrad RJ, Patsch JR, Tilg H, Kaser S. The role of apolipoprotein A5 in non-alcoholic fatty liver disease. *Gut*. 2011 Jul;60(7):985-91. doi: 10.1136/gut.2010.222224.
41. Zwerina J, Bach C, Martorana D, Jatzwauk M, Hegasy G, Moosig F, Bremer J, Wieczorek S, **Moschen AR**, Tilg H, Neumann T, Spriewald BM, Schett G, Vaglio A. Eotaxin-3 in Churg-Strauss syndrome: a clinical and immunogenetic study. *Rheumatology (Oxford)*. 2011 Oct;50(10):1823-7. doi: 10.1093/rheumatology/keq445.
42. Nairz M, Schroll A, **Moschen AR**, Sonnweber T, Theurl M, Theurl I, Taub N, Jamnig C, Neurauter D, Huber LA, Tilg H, Moser PL, Weiss G. Erythropoietin contrastingly affects bacterial infection and experimental colitis by inhibiting nuclear factor- κ B-inducible immune pathways. *Immunity*. 2011 Jan 28;34(1):61-74. doi: 10.1016/j.immuni.2011.01.002.