

Igor Theurl

Biographical sketch

After finishing my medical studies (MD) I started in the laboratory of Prof. Guenter Weiss as an PhD student in the infectious disease program of the Medical University of Innsbruck. My interest was focused from the beginning on anemia of chronic disease and the interplay of immune function, iron metabolism and erythropoiesis.

After 3,5years in Prof.Weiss laboratory I started my training in internal medicine and later on also in laboratory medicine. Nevertheless, I stayed an active member of Prof. Weiss group and continued to work on the pathophysiology and new therapeutic concepts for ACD.

After board certification for internal medicine and laboratory medicine and being announced Ass.Prof. I decided to do a second post doc at the MGH/HMS under the guidance of Prof. Fil Swirski and Prof. Dr.Herbert Lin, experts in innate immunity and iron metabolism. I developed several new models in their labs and was able to unveil an unknown mechanism how the body adapts to massive erythrocyte damage.

Coming back to Austria I was tenured to Assoc.Prof.of Internal Medicine. At the moment my group is focusing on interplay of innate immunity, erythropoiesis, infection and cancer.

Curriculum vitae

Medical University of Innsbruck
Department of Internal Medicine II
Infectious Diseases, Immunology, Rheumatology, Pneumology
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Date of birth	11 November 1974
Place of birth	Innsbruck, Austria
Citizenship	Austrian

Curriculum vitae

Education

1981-1985	elementary school in Völs (Austria)
1985-1993	grammar school in Innsbruck (Austria), final exam June 1993
1993-2000	study of human medicine at the Leopold Franzens University, Innsbruck (Austria) and at the Albert-Ludwigs-University, Freiburg (Germany)
06/2000	doctorate (MD) after passing all examinations
1997-1999	thesis at the „Institute of Pathology“, University of Innsbruck on: Histopathological examinations of pre cancer lesions“: approved by the University with distinction in 11/99

Career History

07/2000-02/2004	research assistant (post-doc) at the Lab for „Molecular Immunology and Infectious Disease“: head ao. Univ.-Prof.Dr.Günter Weiss, Department of Internal Medicine, University Hospital, Innsbruck
09/2010-03/2013	PhD-student at the Medical University of Innsbruck in course: Q094 Molecular basis of infectious disease – final exam 03/2013 on: Understanding regulatory pathways controlling hepcidin expression under physiological and pathological conditions as a tool for the development of more selective therapeutic strategies for Anemia of Chronic disease (approved with distinction)

02/2004-04/2009 Clinical training in internal medicine as Univ.Ass. (medical fellow) at the University Hospital of Innsbruck, Department of Internal Medicine I, Clinical Immunology and Infectious diseases

04/2009 **board certification for “Internal Medicine”**

03/2010 **tenure, (Habilitation - veni docendi) for “Internal Medicine” on: Pathophysiology of Anemia of Chronic Disease – diagnostic and therapeutical implication**

02/2011 **promotion to Ass.Prof. (Tenure-Track) at the Medical University of Innsbruck**

08/2011-03/2013 postdoctoral **research Fellow Massachusetts General Hospital and Harvard Medical School (Prof.H.Lin/Prof.F.Swirski)**

04/2013 consultant at the Department of Internal Medicine VI, University Hospital Innsbruck

04/2013-12/2015 training in laboratory medicine at the Medical University of Innsbruck

09/2013 **promotion to Assoc.Prof. of Internal Medicine at the Medical University of Innsbruck**

12/2015 **board certification for “Laboratory Medicine”**

Fellowships, Awards

2006 Science award of the city of Innsbruck

2008 „Paracelsus Award“ from the Society of Internal medicine

2009 Lichtenstein-Award from the government of Lichtenstein

2010 Tubapreis

2010 MaxKade Foundation Award

2011 Second Otto-Kraup-Award (Best medical Habilitation in Austria)

Publications Scientific publications: 79 (Impactfactor >680)
Total number of citations >4000 ; Hirsch Index 35

Research Interests Iron deficiency anemia and anemia of chronic disease, Regulatory interaction between iron homeostasis, immune function and cancer biology

Funds obtained (in €, 5 most important once)

Grant from the OeNB (Nr12558)	80.000	OeNB	2007-2009
Grant from the MFI (2007-416)	128.740	MFI	2008-2010
Grant from the OeNB (Nr14182)	57.000	OeNB	2011-2013
Grant from the FWF (P24749)	291.722	FWF	2013-2016
Grant from the FWF (P28302)	310.306	FWF	2015-2018

PhD students since 2013

PhD Student	PhD Thesis	Start	Defense	Paper
Malte Asshoff	New therapeutic approaches in Anaemia of chronic disease	2013	ongoing	5

International collaborators

	Project	Joint public.	lab for stay abroad
Filip Swirski (Harvard Med. School (HMS) Boston, USA)	Macrophages in RBC disposal	2	yes
Martin Guilliams (University of Gent, Belgium)	Iron metabolism in KC	0	yes
Delphine Meynard (INSERM, France)	Effects of BMPs on macrophages	0	yes

Igor Theurl; 10 most important scientific publications

1. Asshoff M, Petzer V, Warr MR, Haschka D, Tymoszuk P, Demetz E, Seifert M, Posch W, Nairz M, Maciejewski P, Fowles P, Burns CJ, Smith G, Wagner KU, Weiss G, Whitney JA, **Theurl I**. *: Momelotinib inhibits ACVR1/ALK2, decreases hepcidin production and ameliorates anemia of chronic disease in rodents. **Blood**. 2017 Feb 10 * **corresponding authors**
2. **Theurl I**, Hilgendorf I, Nairz M, Tymoszuk P, Haschka D, Asshoff M, He S, Gerhardt LM, Holderried TA, Seifert M, Sopper S, Fenn AM, Anzai A, Rattik S, McAlpine C, Theurl M, Wieghofer P, Iwamoto Y, Weber GF, Harder NK, Chousterman BG, Arvedson TL, McKee M, Wang F, Lutz OM, Rezoagli E, Babitt JL, Berra L, Prinz M, Nahrendorf M, Weiss G, Weissleder R, Lin HY, Swirski FK.: On-demand erythrocyte disposal and iron recycling requires transient macrophages in the liver. **Nat Med**. 2016 Aug;22(8):945-51
3. **Hilgendorf I***, **Theurl I***, Gerhardt LM, Robbins CS, Weber GF, Gonen A, Iwamoto Y, Degousee N, Holderried TA, Winter C, Zirlik A, Lin HY, Sukhova GK, Butany J, Rubin BB, Witztum JL, Libby P, Nahrendorf M, Weissleder R, Swirski FK. Innate Response Activator B Cells Aggravate Atherosclerosis by Stimulating TH1 Adaptive Immunity. **Circulation**. 2014 Jan 31. [Epub ahead of print] * **both authors contributed equally**
4. Sonnweber T, Nachbaur D, Schroll A, Nairz M, Seifert M, Demetz E, Haschka D, Mitterstiller AM, Kleinsasser A, Burtscher M, Trübsbach S, Murphy AT, Wroblewski V, Witcher DR, Mleczko-Sanecka K, Vecchi C, Muckenthaler MU, Pietrangelo A, **Theurl I***, **Weiss G***.: Hypoxia induced downregulation of hepcidin is mediated by platelet derived growth factor BB. **Gut**. 2014 Mar 5. doi: 10.1136/gutjnl-2013-305317. * **co-corresponding authors**
5. Theurl M, Nairz M, Schroll A, Sonnweber T, ABhoff M, Haschka D, Seifert M, Willenbacher W, Wilflingseder D, Posch W, Murphy AT, Witcher DR, **Theurl I**, **Weiss G**.:Hepcidin as a predictive factor and therapeutic target in erythropoiesis-stimulating agent treatment for anemia of chronic disease in rats. **Haematologica**. 2014 Jun 3. * **co-corresponding authors**
6. Robbins CS, Hilgendorf I, Weber GF, **Theurl I**, Iwamoto Y, Figueiredo JL, Gorbato R, Sukhova GK, Gerhardt LM, Smyth D, Zavitz CC, Shikatani EA, Parsons M, van Rooijen N, Lin HY, Husain M, Libby P, Nahrendorf M, Weissleder R, Swirski FK.; Local proliferation dominates lesional macrophage accumulation in atherosclerosis. **Nat Med**. 2013 Sep;19(9):1166-72.
7. Rauch PJ, Chudnovskiy A, Robbins CS, Weber GF, Etzrodt M, Hilgendorf I, Tiglaio E, Figueiredo JL, Iwamoto Y, **Theurl I**, Gorbato R, Waring MT, Chicoine AT, Mouded M, Pittet MJ, Nahrendorf M, Weissleder R, Swirski FK.: **Science**. 2012 Feb 3;335(6068):597-60
8. **Theurl I** .*, Schroll A, Nairz M, Seifert M, Theurl M, Sonnweber T, Kulaksiz H, Weiss G*; Pathways for the regulation of hepcidin expression in anemia of chronic disease and iron deficiency anemia in vivo: **Haematologica**. 2011 Dec;96(12):1761-9 * **co-corresponding authors**
9. **Theurl I**, Schroll A, Sonnweber T, Nairz M, Theurl M, Willenbacher W, Eller K, Wolf D, Seifert M, Sun CC, Babitt JL, Hong CC, Menhall T, Gearing P, Lin HY, Weiss G, Pharmacologic inhibition of hepcidin expression reverses anemia of chronic disease in rats: **Blood** 2011, Nov3;118(18):4977-84
10. **Theurl I**, Aigner E, Theurl M, Nairz M, Seifert M, Schroll A, Sonnweber T, Eberwein L, Witcher DR, Murphy AT, Wroblewski VJ, Wurz E, Datz C, Weiss G: Regulation of iron homeostasis in anemia of chronic disease and iron deficiency anemia: diagnostic and therapeutic implications; **Blood** 2009; 113(21):5277-86.

Igor Theurl, all publications since 2013

1. Wermke M, Eckoldt J, Götze KS, Klein SA, Bug G, de Wreede LC, Kramer M, Stölzel F, von Bonin M, Schetelig J, Laniado M, Plodeck V, Hofmann WK, Ehninger G, Bornhäuser M, Wolf D, **Theurl I**, Platzbecker U.: Enhanced labile plasma iron and outcome in acute myeloid leukaemia and myelodysplastic syndrome after allogeneic haemopoietic cell transplantation (ALLIVE): a prospective, multicentre, observational trial. **Lancet Haematol**. 2018 May;5(5):
2. Valent P, Stauder R, **Theurl I**, Geissler K, Sliwa T, Sperr WR, Bettelheim P, Sill H, Pfeilstöcker M.: Diagnosis, management and response criteria of iron overload in myelodysplastic syndromes (MDS): updated recommendations of the Austrian MDS platform. **Expert Rev Hematol**. 2018 Feb;11(2):109-116.
3. Stauder R, Valent P, **Theurl I**.: Anemia at older age: etiologies, clinical implications, and management. **Blood** 2018 Feb 1;11(2):109-116.
4. Nairz M, Haschka D, Dichtl S, Sonnweber T, Schroll A, Abhoff M, Mindur JE, Moser PL, Wolf D, Swirski FK, **Theurl I**, Cerami A, Brines M, Weiss G.: Cibinetide dampens innate immune cell functions thus ameliorating the course of experimental colitis. **Sci Rep**. 2017 Oct 12;7(1):13012. doi: 10.1038/s41598-017-13046-3
5. Wu A, Tymoszuk P, Haschka D, Heeke S, Dichtl S, Petzer V, Seifert M, Hilbe R, Sopper S, Talasz H, Bumann D, Lass-Flörl C, **Theurl I**, Zhang K, Weiss G.: Salmonella utilizes zinc to subvert anti-microbial host defense of macrophages via modulation of NF-κB signaling. **Infect Immun**. 2017 Sep 5. pii: IAI.00418-17. doi: 10.1128/IAI.00418-17
6. Nairz M, Schroll A, Haschka D, Dichtl S, Tymoszuk P, Demetz E, Moser P, Haas H, Fang FC, **Theurl I**, Weiss G., Genetic and Dietary Iron Overload Differentially Affect the Course of Salmonella Typhimurium Infection. **Front Cell Infect Microbiol**. 2017 Apr 11;7:110. doi: 10.3389/fcimb.2017.00110. eCollection 2017.
7. Nairz M, **Theurl I**, Swirski FK, Weiss G., "Pumping iron"-how macrophages handle iron at the systemic, microenvironmental, and cellular levels. **Pflugers Arch**. 2017 Apr;469(3-4):397-418. doi: 10.1007/s00424-017-1944-8. Epub 2017 Mar 1. Review.
8. Asshoff M, Petzer V, Warr MR, Haschka D, Tymoszuk P, Demetz E, Seifert M, Posch W, Nairz M, Maciejewski P, Fowles P, Burns CJ, Smith G, Wagner KU, Weiss G, Whitney JA, **Theurl I**. *: Momelotinib inhibits ACVR1/ALK2, decreases hepcidin production and ameliorates anemia of chronic disease in rodents. **Blood**. 2017 Feb 10 ***corresponding authors**
9. Nairz M, **Theurl I**, Wolf D, Weiss G: Iron deficiency or anemia of inflammation? : Differential diagnosis and mechanisms of anemia of inflammation. **Wien Med Wochenschr**. 2016 Oct;166(13-14):411-423.
10. Asshoff M, Petzer V, Warr MR, Haschka D, Tymoszuk P, Demetz E, Seifert M, Posch W, Nairz M, Maciejewski P, Fowles P, Burns CJ, Smith G, Wagner KU, Weiss G, Whitney JA, **Theurl I**. *: Momelotinib inhibits ACVR1/ALK2, decreases hepcidin production and ameliorates anemia of chronic disease in rodents. **Blood**. 2017 Feb 10 ***corresponding authors**
11. **Theurl I**, Hilgendorf I, Nairz M, Tymoszuk P, Haschka D, Asshoff M, He S, Gerhardt LM, Holderried TA, Seifert M, Sopper S, Fenn AM, Anzai A, Rattik S, McAlpine C, Theurl M, Wieghofer P, Iwamoto Y, Weber GF, Harder NK, Chousterman BG, Arvedson TL, McKee M, Wang F, Lutz OM, Rezoagli E, Babitt JL, Berra L, Prinz M, Nahrendorf M, Weiss G, Weissleder R, Lin HY, Swirski FK.: On-demand erythrocyte disposal and iron recycling requires transient macrophages in the liver. **Nat Med**. 2016 Aug;22(8):945-51

12. 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
13. Nairz M, Schroll A, Haschka D, Dichtl S, Sonnweber T, **Theurl I**, Theurl M, Lindner E, Demetz E, Aßhoff 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.
14. Schaefer B, Haschka D, Finkenstedt A, Petersen BS, **Theurl I**, Henninger B, Janecke AR, Wang CY, Lin HY, Veits L, Vogel W, Weiss G, Franke A, Zoller H: Impaired hepcidin expression in alpha-1-antitrypsin deficiency associated with iron overload and progressive liver disease. **Hum Mol Genet**. 2015 Nov 1;24(21):6254-63.
15. Altamura S, Bärtzsch P, Dehnert C, Maggiorini M, Weiss G, **Theurl I**, Muckenthaler MU, Mairbäurl H: Increased hepcidin levels in high-altitude pulmonary edema. **J Appl Physiol** (1985). 2015 Feb 1;118(3):292-8
16. 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.
17. Bulycheva E, Rauner M, Medyouf H, **Theurl I**, Bornhäuser M, Hofbauer LC, Platzbecker U.: Myelodysplasia is in the niche: novel concepts and emerging therapies. **Leukemia**. 2014 Nov 14.
18. Nairz M, Schroll A, Demetz E, Tancevski I, **Theurl I**, Weiss G.: 'Ride on the ferrous wheel'--the cycle of iron in macrophages in health and disease. **Immunobiology**. 2015 Feb;220(2):280-94.
19. Zumbrennen-Bullough K, Wu Q, Core AB, Canali S, Chen W, **Theurl I**, Meynard D, Babitt JL.: MicroRNA-130a is upregulated in mouse liver by iron deficiency and targets the bone morphogenetic protein (BMP) receptor ALK2 to attenuate BMP signaling and hepcidin transcription. **J Biol Chem**. 2014 Jul 7.
20. Theurl M, Nairz M, Schroll A, Sonnweber T, Asshoff M, Haschka D, Seifert M, Willenbacher W, Wilflingseder D, Posch W, Murphy AT, Witcher DR, **Theurl I**, **Weiss G**.: Hepcidin as a predictive factor and therapeutic target in erythropoiesis-stimulating agent treatment for anemia of chronic disease in rats. **Haematologica**. 2014 Jun 3. * **co-corresponding authors**
21. Weber GF, Chousterman BG, Hilgendorf I, Robbins CS, **Theurl I**, Gerhardt LM, Iwamoto Y, Quach TD, Ali M, Chen JW, Rothstein TL, Nahrendorf M, Weissleder R, Swirski FK.: Pleural innate response activator B cells protect against pneumonia via a GM-CSF-IgM axis. **J Exp Med**. 2014 Jun 2;211(6):1243-56.
22. Tymoszuk P, Evens H, Marzola V, Wachowicz K, Wasmer MH, Datta S, Müller-Holzner E, Fiegl H, Böck G, Rooijen NV, **Theurl I**, Doppler W.: In situ proliferation contributes to accumulation of tumor-associated macrophages in spontaneous mammary tumors. **Eur J Immunol**. 2014 May 5.
23. Sonnweber T, Nachbaur D, Schroll A, Nairz M, Seifert M, Demetz E, Haschka D, Mitterstiller AM, Kleinsasser A, Burtscher M, Trübsbach S, Murphy AT, Wroblewski V, Witcher DR, Mleczko-Sanecka K, Vecchi C, Muckenthaler MU, Pietrangelo A, **Theurl I***, **Weiss G*:**

Hypoxia induced downregulation of hepcidin is mediated by platelet derived growth factor BB. **Gut**. 2014 Mar 5. doi: 10.1136/gutjnl-2013-305317. [Epub ahead of print] * **co-corresponding authors**

24. **Hilgendorf I***, **Theurl I***, Gerhardt LM, Robbins CS, Weber GF, Gonen A, Iwamoto Y, Degousee N, Holderried TA, Winter C, Zirlik A, Lin HY, Sukhova GK, Butany J, Rubin BB, Witztum JL, Libby P, Nahrendorf M, Weissleder R, Swirski FK. Innate Response Activator B Cells Aggravate Atherosclerosis by Stimulating TH1 Adaptive Immunity. **Circulation**. 2014 Jan 31. [Epub ahead of print] * **both authors contributed equally**
25. Robbins CS, Hilgendorf I, Weber GF, **Theurl I**, Iwamoto Y, Figueiredo JL, Gorbatov R, Sukhova GK, Gerhardt LM, Smyth D, Zavitz CC, Shikatani EA, Parsons M, van Rooijen N, Lin HY, Husain M, Libby P, Nahrendorf M, Weissleder R, Swirski FK.; Local proliferation dominates lesional macrophage accumulation in atherosclerosis. **Nat Med**. 2013 Sep;19(9):1166-72.
26. Eller K, Schroll A, Banas M, Kirsch AH, Huber JM, Nairz M, Skvortsov S, Weiss G, Rosenkranz AR, **Theurl I**.; Lipocalin-2 expressed in innate immune cells is an endogenous inhibitor of inflammation in murine nephrotoxic serum nephritis. **PLoS One**. 2013 Jul 4;8(7)
27. Goetze O, Schmitt J, Spliethoff K, **Theurl I**, Weiss G, Swinkels DW, Tjalsma H, Maggiorini M, Krayenbühl P, Rau M, Fruehauf H, Wojtal KA, Müllhaupt B, Fried M, Gassmann M, Lutz T, Geier; Adaptation of iron transport and metabolism to acute high-altitude hypoxia in mountaineers. A. **Hepatology**. 2013 Dec;58(6):2153-62.
28. Nairz M, Schleicher U, Schroll A, Sonnweber T, **Theurl I**, Ludwiczek S, Talasz H, Brandacher G, Moser PL, Muckenthaler MU, Fang FC, Bogdan C, Weiss G.; Nitric oxide-mediated regulation of ferroportin-1 controls macrophage iron homeostasis and immune function in Salmonella infection. **J Exp Med**. 2013 May 6;210(5):855-73.
29. Sun CC, Vaja V, Chen S, **Theurl I**, Stepanek A, Brown DE, Cappellini MD, Weiss G, Hong CC, Lin HY, Babitt JL.; A hepcidin lowering agent mobilizes iron for incorporation into red blood cells in an adenine-induced kidney disease model of anemia in rats.: **Nephrol Dial Transplant**. 2013 Jan 22. [Epub ahead of print]
30. Lass-Flörl C, Mutschlechner W, Aigner M, Grif K, Marth C, Girschikofsky M, Grander W, Greil R, Russ G, Cerkl P, Eller M, Kropshofer G, Eschertzhuber S, Kathrein H, Schmid S, Beer R, Lorenz I, **Theurl I**, Nachbaur D.; Utility of PCR in diagnosis of invasive fungal infections: real-life data from a multicenter study.: **J Clin Microbiol**. 2013 Mar;51(3):863-8.