

## Thomas Scherer

### Deputy Director of Research

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### SCIENTIFIC & ACADEMIC CAREER

since 2020	Deputy Chief of the Division of Endocrinology and Metabolism, Medical University of Vienna
since 2019	Associate Professor of Medicine
2017 – 2019	Assistant Professor of Medicine
2017	<i>Venia docendi</i> (lecture qualification) in Medicine
2011 – 2017	Clinical Fellow and Research Group Leader, Department of Medicine III, Division of Endocrinology and Metabolism, Medical University of Vienna
2008 – 2011	Postdoctoral Fellow, Buettner Lab, Department of Medicine, Division of Endocrinology, Icahn School of Medicine at Mount Sinai, New York, NY, USA
2001 – 2007	Medical School, Medical University of Vienna

### MAIN AREA OF RESEARCH

My lab focuses on hormonal feedback mechanisms (i.e. insulin and leptin) in the brain that affect whole body energy metabolism via modulation of autonomic nervous system outputs to peripheral organs, such as the liver, white and brown adipose tissue. We characterized several physiological CNS-interorgan-crosstalk axes and found that insulin and leptin signaling in the brain can modulate white adipose tissue lipolysis and de novo lipogenesis independent of peripheral insulin and leptin signaling events and that both hormones act via the CNS to regulate hepatic lipid metabolism to protect from fatty liver disease. Furthermore, our aspiration is to quickly translate our findings from basic research (rodent studies) into the clinics in order to advance patient care in human metabolic diseases, such as diabetes type 2, NAFLD and rare diseases such as lipodystrophy.

### ADDITIONAL RESEARCH ACTIVITIES (10 most important)

#### Research Projects

- Austrian Science Fund (FWF) Project grant – KLI 782 € 404.794,95 (PI) – The Role of Leptin in Regulating Hepatic Lipid Metabolism in Humans. This translational project aims to expand on rodent studies from our lab and assess whether leptin treatment in humans affects VLDL secretion and de novo lipogenesis.
- Austrian Science Fund (FWF) Project grant – P26766, € 255.538,50 (PI) – The role of brain insulin and leptin action in modulating hepatic triglyceride secretion. The goal of this project is to delineate the effects of CNS insulin and leptin signaling in regulating hepatic triglyceride secretion and how this affects liver lipid content.
- The Role of Leptin in Regulating Hepatic Lipid Metabolism in Lipodystrophy – FA716B1501 # € 43.031,00 (PI) Amryt Pharmaceuticals (Investigator initiated trial). Based on preliminary data from

rodent studies, the goal of this project is to investigate the mechanism by which metreleptin reduces hepatic lipid content in patients with lipodystrophy independent of changes in food intake.

### **Selected Presentations**

- Basic Science Seminar on “Liver autonomic innervation and hepatic lipid metabolism” **European Association for the Study of the Liver** (EASL) Congress 2023
- Leptin and fatty acids signals in the cross talk between adipose tissue and other organs. Annual Meeting of the **European Association for the study of Diabetes** (EASD) 2020; Session: The role of altered lipid handling in diabetes.

### **Honors & Awards**

- **Forschungsförderungspreis** 2019 der Österreichischen Gesellschaft für Endokrinologie
- **Habilitationspreis** 2018 des Vereins zur Förderung von Wissenschaft und Forschung
- **Langerhans Award** of the Austrian Diabetes Association 2015 (biennial award)
- **Austrian Society of Nuclear Medicine Research Award** for Thyroid Diseases 2015
- **Keystone Symposia Scholarship** 2011

### **10 MOST IMPORTANT PUBLICATIONS**

1. Brain insulin signaling suppresses lipolysis in the absence of peripheral insulin receptors and requires the MAPK pathway M Metz, J O’Hare, B Cheng, M Puchowicz, C Buettner, T Scherer **Mol Metab** 2023 Apr 24:101723 10.1016/j.molmet.2023.101723
2. Leptin increases hepatic triglyceride export via a vagal mechanism in humans. Metz M, Beghini M, Wolf P, Pfleger L, Hackl M, Bastian M, Freudenthaler A, Harreiter J, Zeyda M, Baumgartner-Parzer S, Marculescu R, Marella N, Hannich T, Györi G, Berlakovich G, Roden M, Krebs M, Risti R, Lookene A, Trauner M, Kautzky-Willer A, Krssak M, Stangl H, Fürnsinn C, Scherer T **Cell Metab** 2022 Nov 1;34(11):1719-1731.e5. doi: 10.1016/j.cmet.2022.09.020
3. Brain insulin signaling in metabolic homeostasis and disease. Scherer T, Sakamoto K, Buettner C. **Nat Rev Endocrinol.** 2021 Jun 9. doi: 10.1038/s41574-021-00498-x. \*corresponding author
4. Brain leptin reduces liver lipids by increasing hepatic triglyceride secretion and lowering lipogenesis in rats. MT Hackl, C Fürnsinn, CM Schuh, M Krssak, F Carli, S Guerra, A Freudenthaler, S Baumgartner-Parzer, T Helbich, A Luger, M Zeyda, A Gastaldelli, C Buettner, T Scherer **Nat Commun.** 2019 Jun 20;10(1):2717. doi: 10.1038/s41467-019-10684-1.
5. Chronic intranasal insulin does not affect hepatic lipids, but lowers circulating BCAAs in healthy male subjects. T Scherer, P. Wolf, S. Smajis, M. Gaggini, M. Hackl, A. Gastaldelli, P. Klimek, E. Einwallner, R. Marculescu, A. Luger, C. Fürnsinn, S. Tratting, C Buettner, M. Krššák, M. Krebs **J Clin Endocrinol Metab** 2017 Apr 1;102(4):1325-1332. doi: 10.1210/jc.2016-3623.
6. Insulin regulates hepatic triglyceride secretion and lipid content via the brain. T Scherer, C Lindtner, J O’Hare, Hackl M, E Zielinski, A Freudenthaler, S Baumgartner-Parzer, K Tödter, J Heeren, M Krššák, L Scheja, C Fürnsinn & C Buettner. **Diabetes.** 2016 Jun;65(6):1511-20. doi: 10.2337/db15-1552.
7. Intranasal insulin administration suppresses systemic but not subcutaneous lipolysis in healthy humans. T Scherer#, KA Iwen#, M Heni, F Sayk, T Wellnitz, F Machleidt, H Preissl, HU Haering, A

Fritsche, H Lehnert, M Hallschmid#, C Buettner#. **J Clin Endocrinol Metab.** 2014 Feb;99(2):E246-51. doi: 10.1210/jc.2013-3169. (# equal contribution)

8. De novo lipogenesis in human fat and liver is linked to ChREBP- $\beta$  and metabolic health. T Scherer#, L Eissing#, K Toedter, U Knippschild, JW Greve, W Buurman, HO Pinnschmidt, S Rensen, AM Wolf, A Bartelt, J Heeren, C Buettner, L Scheja. **Nat Commun.** 2013 Feb 26;4:1528. doi: 10.1038/ncomms2537 (# equal contribution)
9. Short-term voluntary overfeeding disrupts brain insulin control of liver and adipose tissue function. T Scherer, C Lindtner, E Zielinski, J O'Hare, N Filatova, C Buettner. **J. Biol. Chem** 2012 Sep 21;287(39):33061-9. doi: 10.1074/jbc.M111.307348
10. Brain insulin controls adipose tissue lipolysis and lipogenesis. Scherer T., O'Hare J, Diggs-Andrews K, Schweiger M, Cheng B, Lindtner, C., Zielinski, E, Vempati, P, Su, K, Dighe S, Milsom T, Puchowicz M, Scheja L, Zechner R, Fisher SJ, Previs SF, Buettner C. (2011) **Cell Metab** 13, 183-194. 2011 doi: 10.1016/j.cmet.2011.01.008