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**BIOGRAPHICAL SKETCH**NAME: **Dr. Stefan Vestring, MD**

POSITION TITLE: Clinician Scientist

## EDUCATION/TRAINING



INSTITUTION AND LOCATION	DEGREE	Start Date	Completion Date	FIELD OF STUDY
Technical University Munich and Ludwig-Maximilians-University Munich Technical University Dresden Autonomous University of Madrid		2007	2014	Medicine
Teófilo Hernando Institute, Madrid	(Visiting Researcher)	2011	2012	Basic Neuroscience
Technical University Dresden	M.D.	2012	2015	Basic Neuroscience/ Neurophysiology
Dept. of Psychiatry, Zentrum für Psychiatrie Reichenau		2015	2016	Psychiatry (Resident)
Dept. of Internal Medicine at Helios Klinikum Überlingen		2016	2017	Internal Medicine (Resident)
Dept. of Neurology, Schmieder Kliniken Konstanz		2017	2018	Neurology (Resident)
Dept. of Psychiatry and Psychotherapy, University of Freiburg	Clinician Scientist (PGY-IV completed)	2018	present	Neuroplasticity and Psychopharmacology

## **A. Expertise/Research Aims**

During my visiting research year at Teófilo Hernando Institute at the Universidad Autónoma de Madrid, I first became familiar with advanced techniques in electrophysiology and research on exocytotic processes. After this basic science experience, I decided to focus on translating the obtained findings into clinical practice and found an optimal work opportunity at Prof. Normann's Lab, which I joined in 2018. Using a bench-to-bedside approach, we generate innovative hypotheses on the pathophysiology of depression and the mechanism of action of antidepressant interventions in brain slices and animal models and translate them to pilot trials in depressed patients. We focus on the interaction of neural plasticity and the environment, in order to better understand the mechanisms of MDD and finally to improve the treatment of mood disorders. A profound understanding of the underlying mechanisms is necessary to develop novel treatment strategies and to improve already existing approaches. The used techniques in our RG range from patch-clamp measurements of specific receptor currents in single cells to the usage of non-invasive brain stimulation in patients. From my point of view, the translation of novel findings from applied and basic sciences into clinical practice is able to generate real advances for patients. A more effective treatment and prevention of mood disorders is the overall goal of my research activities.

## **B. Positions, Scientific Appointments and Honors**

### **Positions**

2018-present	Clinician Scientist at the Dept. of Psychiatry and Psychotherapy, University of Freiburg
2017-2018	Resident, Dept. of Neurology at the Schmieder Clinic Konstanz
2016-2017	Resident, Dept. of Internal Medicine at the Helios Clinic Überlingen
2015-2016	Resident, Dept. of Psychiatry at the Center for Psychiatry Reichenau
2011-2012	Visiting Researcher at the Teófilo Hernando Institute, Madrid

### **Scientific Appointments and Honors, Contributions to International Conferences**

2021	Scholarship to attend the 14 <sup>th</sup> Göttingen Meeting of the German Neuroscience society, Göttingen, Germany
2020	Grant from the Berta-Ottenstein Clinician Scientist program, University of Freiburg, Germany (3 years funding for independent research)
2020	Scholarship to attend the ECNP Workshop for Early Career Scientists in Europe, Nice, France
2020	Scholarship to attend the 33 <sup>rd</sup> European Congress of Neuropsychopharmacology (ECNP), Vienna, Austria
2020	Ketamine modulates synaptic plasticity by interneuron disinhibition and AMPA-current augmentation, 33 <sup>rd</sup> ECNP Congress, Vienna, Austria
2020	Scholarship to attend the 7 <sup>th</sup> Neuroscience Inter-Academy Symposium by the Deutsche Akademie der Wissenschaften Leopoldina, Jerusalem, Israel
2020	Antidepressive potency of statins, DGPPN Congress, Berlin, Germany

- 2020 Interneurons play a key role in rapid antidepressant action of ketamine, DGPPN Congress, Berlin, Germany
- 2019 Modulation of synaptic plasticity by ketamine, DGPPN Congress, Berlin, Germany
- 2019 Lovastatin verbessert teilweise die Leistungsfähigkeit von BDNF-Val-66Met-Trägern in unterschiedlichen Lernaufgaben, DGPPN Congress, Berlin, Germany
- 2019 Modulation of synaptic plasticity by ketamine and its metabolites, 1st Meeting of the Center for Basics in Neuromodulation, Freiburg, Germany
- 2011 Differential regulation by mitochondria of calcium currents, calcium transients and quantal catecholamine release from chromaffin cells of rat embryos and their mothers, 6<sup>th</sup> EPHAR European Congress of Pharmacology, Granada, Spain
- 2011 Differential regulation of exocytosis by mitochondria in chromaffin cells of rat, XXXII conference of the Spanish group of Neurotransmission (GEN), Orense, Spain
- 2011 Grant from the International University of Menendez Pelayo (UIMP) to participate in the pharmacological summer course: "Neuroprotection and neurorepair of the damaged brain", Santander, Spain

### C. Contributions to Science

**Early career:** I began my research career at Prof. Antonio Garcia's lab in Madrid. Our field of interest was the control of exocytotic processes in monoaminergic transmitter release by means of the electrophysiological techniques patch-clamp and amperometry.

1. **Vestring S**, Fernández-Morales JC, Méndez-López I, C Musial D, G de Diego AM, Padín JF, G García A. Tight mitochondrial control of calcium and exocytotic signals in chromaffin cells at embryonic life. **Pflugers Arch.** 2015;467(12):2589-2601. doi:10.1007/s00424-015-1724-2
2. Fernández-Morales JC, Fernando Padín J, **Vestring S**, Musial DC, de Diego A-MG, García AG. Blockade by NNC 55-0396, mibefradil, and nickel of calcium and exocytotic signals in chromaffin cells: implications for the regulation of hypoxia-induced secretion at early life. **Eur J Pharmacol.** 2015;751:1-12. doi:10.1016/j.ejphar.2015.01.025
3. Fernández-Morales JC, Padín JF, Arranz-Tagarro JA, **Vestring S**, García AG, de Diego AMG. Hypoxia-elicited catecholamine release is controlled by L-type as well as N/PQ types of calcium channels in rat embryo chromaffin cells. **Am J Physiol Cell Physiol.** 2014;307(5):C455-465. doi:10.1152/ajpcell.00101.2014
4. Padín J-F, Fernández-Morales J-C, Olivares R, **Vestring S**, Arranz-Tagarro J-A, Calvo-Gallardo E, de Pascual R, Gandía L, García AG. Plasmalemmal sodium-calcium exchanger shapes the calcium and exocytotic signals of chromaffin cells at physiological temperature. **Am J Physiol Cell Physiol.** 2013;305(2):C160-172. doi:10.1152/ajpcell.00016.2013

**Postdoctoral career:** My current research is focused on the mechanism of action of antidepressants and the modulation of synaptic plasticity by antidepressants. We follow a translational approach including electrophysiological investigation, behavioral experiments in rodents and clinical trials with humans. (Various articles are currently under revision or in preparation.)

5. Casarotto PC, Girych M, Fred SM, Kovaleva V, Moliner R, Enkavi G, Biojone C, Cannarozzo C, Sahu MP, Kaurinkoski K, Brunello CA, Steinzeig A, Winkel F, Patil S, **Vestring S**, Serchov T, Diniz CRAF, Laukkanen L, Cardon I, Antila H, Rog T, Piepponen TP, Bramham CR, Normann C, Lauri SE, Saarma M, Vattulainen I, Castrén E. Antidepressant drugs act by directly binding to TRKB neurotrophin receptors. **Cell**. 2021;184(5):1299-1313.e19. doi:10.1016/j.cell.2021.01.034
6. Frase L, Mertens L, Krahl A, Bhatia K, Feige B, Heinrich SP, **Vestring S**, Nissen C, Domschke K, Bach M, Normann C. Transcranial direct current stimulation induces long-term potentiation-like plasticity in the human visual cortex. **Transl Psychiatry**. 2021;11(1):17. doi:10.1038/s41398-020-01134-4
7. **Vestring S**, Würz L, Elicker J, Moos J, Wendler E, Du Vinage C, Heynicke F, Theiß A, Bader D, Zell D, Domschke K, Normann C. P.405 Ketamine modulates synaptic plasticity by interneuron disinhibition and AMPA-current augmentation. **Eur Neuropsychopharmacol**. 2020;31:S78. doi:10.1016/j.euroneuro.2019.12.102