

Dr. Stéphanie Perreau-Lenz

Staff Scientist

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Professional Overview

Professional Experience

- From 2012** **Staff Scientist** – Inter-relationship between clock genes and drugs of abuse (alcohol, psychostimulants and opioids) – *Institute of Psychopharmacology, CIMH (Mannheim, Germany)* – Advisee: Prof. Rainer Spanagel.
- 2004 - 2011** **Post-doctoral Research Fellow in Psychopharmacology** – Inter-relationship between clock genes and drugs of abuse (alcohol, psychostimulants and opioids) – *Department of Psychopharmacology, CIMH (Mannheim, Germany)* – Advisee: Prof. Rainer Spanagel.
- 1999-2004** **PhD training in Chronobiology** – Melatonin synthesis regulation in rats - *Netherlands Institute for Brain Research (Amsterdam, The Netherlands) & Laboratoire de Neurobiologie des Rythmes (Strasbourg, France)* – Advisees: Prof. Ruud Buijs, Dr. Andries Kalsbeek and Prof. Paul Pévet.
- 1998-1999** **Post-graduate training in Chronobiology** - Melatonin synthesis regulation in rats - *Laboratoire de Neurobiologie des Rythmes (Strasbourg, France)* – Advisee: Prof. Paul Pévet.

Education

- 2004** **joint PhD in Medical Sciences & Neurosciences**
UvA (Amsterdam, The Netherlands) & ULP (Strasbourg, France)
Dissertation: <http://eprints-scd-ulp.u-strasbg.fr:8080/798/01/Perreau-lenz2004.pdf>
- 1999** **Post-graduate diploma in Neurosciences**
ULP (Strasbourg, France)
- 1998** **Graduate Diploma in Physiology and Cellular Biology**
ULP (Strasbourg, France)

Scientific Focus

Current Research Interest

Investigating the interplay between circadian rhythms and the neurobiological mechanisms leading to drug addiction is my current research interest. Over the last decade, an increasing body of evidence has arisen for the implication of clock genes in mental disorders. In order to unravel the neurobiological

processes involved in the development of drug addiction in particular, we are studying the specific effects that drugs of abuse (i.e. alcohol, opioids and psychostimulants) may have on behavior depending on the time of the day and/or in the absence of functional clock-genes (i.e. *Per1*, *Per2*, *Csnk1e/d*). Reciprocally, we also investigate the impact of drugs of abuse on circadian rhythms, and ultimately seek for proper pharmacological targets that would further help the treatment of addiction. Classical behavioral tests and models (i.e. behavioral sensitization, conditioned-place-preference, alcohol deprivation effect) are used for these purposes while subsequent neurobiological changes are assessed using molecular tools (i.e. microarray and epigenetic analyses, *in situ* hybridization) or *in vivo* microdialysis within the meso-cortico-limbic areas in freely-moving rodents.

Publications

- Carlson, R.-M., Molander, A., **Perreau-Lenz, S.**, Meade, L., Holmes, A., Tanaka, K., Lovinger, D.M., Spanagel, R. & Heilig, M. (2011) Suppression of ethanol intake and lack of ethanol reward in mice with a deletion of the glutamate transporter GLAST (EAAT1). *Biol Psych* (submitted)
- Berger, S.*, Weber, T.*, **Perreau-Lenz S.**, Kutscherjawy, S., Vogt, M.A., Maser-Gluth, C., Lanfumey, L., Gass, P., Spanagel, R & Bartsch, D. (2011) A functional *Tph2* C1473G polymorphism causes an anxiety phenotype via compensatory, developmental changes in the serotonergic system. *Neuropsychopharm* (submitted)
- Vengeliene V.*, **Perreau-Lenz, S.***, Nouri, H., Corsi, M., Merlo-Pich, E., Corti, C. & Spanagel, R. (2011) Inhibition of the Casein-kinase-1-epsilon/delta prevents relapse-like alcohol drinking. *Neuropsychopharm* (submitted)
- Dragos, I., Vogt, M.A., **Perreau-Lenz, S.**, Schneider, M., Pfeiffer, N., Wojcik, S., Brose, N., Spanagel, R & Gass, P. (2011) Cognitive, social and sensorimotor gating deficits in mice with reduced expression of the vesicular glutamate transporter VGLUT1. *Behavior Brain Research* (in press)
- Hermann, D., Weber-Fahr, W., Sartorius, A., Hoerst, M., Frischknecht, U., Tunc-Skarka, N., **Perreau-Lenz, S.**, Hansson, A.C., Kiefer, F., Spanagel, R., Mann, K., Ende, G & Sommer W.H. (2011) Excessive glutamatergic neurotransmission during withdrawal from alcohol: A translational magnetic resonance spectroscopy study. *PNAS* (in press)
- Dong, L., Bilbao, A., Laucht, M., Hendriksson, R., Yakovleva, T., Ridinger, M., Desrivieres, S., Clarke, T.-K., Lourdasamy, A., Cichon, S., Blomeyer, D., Treutlein, J., **Perreau-Lenz, S.**, Witt, S., Leonardi-Essmann, F., Wodarz, N., Zill, P., Soyka, M., Smolka, M., Albrecht, U., Rietschel, M., Lathrop, M., Bakalkin, G., Spanagel, R., & Schumann, G. (2011) The circadian rhythm gene *Period1* is associated with psychosocial stress-induced alcohol drinking. *Am J Psychiatry*, 168(10):1090-8.
- Halbout, B., **Perreau-Lenz, S.**, Dixon, C.I., Stephens, D.N. & Spanagel, R. (2011) *Per1^{Brdm1}* mice do self-administer cocaine and reinstate cocaine-seeking behaviour. *Behav Pharmacol*, 22:76-80.
- Kalsbeek, A., Scheer, F.A., **Perreau-Lenz, S.**, La Fleur, S.E., Yi, C.X., Fliers, E. & Buijs, R.M. (2011) SCN control of energy metabolism and circadian disruption. *FEBS Lett*, 585:1412-1426.
- Brunk, I., Sanchis-Segura, C., Blex, C., **Perreau-Lenz, S.**, Bilbao, A., Spanagel, R., Ahnert-Hilger, G. (2010) Amphetamine regulates NR2B expression in *Go2α* knockout mice and thereby sustains behavioral sensitization. *J Neurochem*, 115(1):234-46.
- Perreau-Lenz, S.**, Sanchis-Segura, C., Leonardi-Essmann, F., Schneider, M. & Spanagel, R. (2010) Development of morphine-induced tolerance and withdrawal: involvement of the *mPer2* gene. *Eur Neuropsychopharm*, 20(7):509-517.

- Perreau-Lenz, S.**, Zghoul, T., de Fonseca, F.R., Spanagel, R. & Bilbao, A. (2009) Circadian regulation of ethanol CNS sensitivity by the *mPer2* gene. *Addiction Biology*, 14(3):253-259.
- von der Goltz, C., Vengeliene, V., Bilbao, A., **Perreau-Lenz, S.**, Pawlak, C., Kiefer, F. & Spanagel, R. (2009) Cue-induced alcohol-seeking behaviour is reduced by disrupting the reconsolidation of alcohol-related memories. *Psychopharmacol*, 205(3):389-397.
- Bilbao, A., Rodriguez-Parkitna, J., Engblom, D., **Perreau-Lenz, S.**, Sanchis-Segura, C., Schneider, M., Konopka, W., Westphal, M., Breen, G., Desrivieres, S., Klugmann, M., Bading, H., Rodriguez de Fonseca, F., Guindalini, C., Vallada, H., Laranjeira, R., Schumann, G., Schütz' G. & Spanagel, R. (2008) Loss of the Ca²⁺/calmodulin-dependent protein kinase type IV in dopaminergic neurons enhances behavioral effects of cocaine. *PNAS*, 105(45):17549-54.
- Engblom, C., Bilbao-Leis, A., Sanchis-Segura, C., Dahan, L., **Perreau-Lenz, S.**, Lujan, R., Halbout, B., Bolland, B., Mameli, M., Rodriguez-Parkitna, J., Parlato, R., Sprengel, R., Lüscher, C., Schütz, G. & Spanagel, R. (2008) Glutamate Receptors on Dopaminergic Neurons Influence the Persistence of Drug-Seeking. *Neuron*, 59(3):497-508.
- Brunk, I., Blex, C., Sanchis-Segura, C., Sternberg, J., **Perreau-Lenz, S.**, Bilbao, A., Hörtnagl, H., Baron, J., Juranek, J., Laube, G., Birnbaumer, L., Spanagel, R. & Ahnert-Hilger, G. (2008) Deletion of Go2alpha abolishes cocaine-induced behavioral sensitization by disturbing the striatal dopamine system GalphaO2 paper. *FASEB J*, 22(10):3736-46.
- Perreau-Lenz, S.** & Spanagel, R. (2008) The effects of drugs of abuse on clock genes. *Drug News Perspect.*, 21(4):211-217.
- Hampf, G., Ripperger, J.A., Houben, T., Schmutz, I., **Perreau-Lenz, S.**, Brunk, I., Spanagel, R., Ahnert-Hilger, G., Meijer, J.H. & Albrecht, U. (2008) Regulation of monoamine oxidase a by circadian-clock components implies clock influence on mood. *Curr Biol* 18(9):678-83.
- Perreau-Lenz, S.**, Zghoul, T. & Spanagel R. (2007) Clock genes running amok. *EMBO reports*, 8(spec):S20-23.
- Kalsbeek, A., Palm, I.F., La Fleur, S.E., Scheer, F.A., **Perreau-Lenz, S.**, Ruitter, M., Kreier, F., Cailotto, C. & Buijs, R.M. (2006) SCN outputs and the hypothalamic balance of life. *J Biol Rhythms*, 21, 458-469.
- Vengeliene, V., Leonardi-Essmann, F., **Perreau-Lenz, S.**, Gebicke-Haerter, P., Drescher, K., Gross, G. & Spanagel, R. (2006) The dopamine D3 receptor plays an essential role in alcohol-seeking and relapse. *FASEB J*, 20, 2223-2233.
- Kalsbeek, A., **Perreau-Lenz, S.** & Buijs, R.M. (2006) A network of (autonomic) clock outputs. *Chronobiol Int*, 23, 521-535.
- Perreau-Lenz, S.**, Kalsbeek, A., Van Der Vliet, J., Pevet, P. & Buijs, R.M. (2005) In vivo evidence for a controlled offset of melatonin synthesis at dawn by the suprachiasmatic nucleus in the rat. *Neuroscience*, 130, 797-803.
- Perreau-Lenz, S.**, Pevet, P., Buijs, R.M. & Kalsbeek, A. (2004) The biological clock: the bodyguard of temporal homeostasis. *Chronobiol Int*, 21, 1-25.
- Perreau-Lenz, S.**, Kalsbeek, A., Pevet, P. & Buijs, R.M. (2004) Glutamatergic clock output stimulates melatonin synthesis at night. *Eur J Neurosci*, 19, 318-324.
- Perreau-Lenz, S.**, Kalsbeek, A., Garidou, M.L., Wortel, J., Van Der Vliet, J., Van Heijningen, C., Simonneaux, V., Pevet, P. & Buijs, R.M. (2003) Suprachiasmatic control of melatonin synthesis in rats: inhibitory and stimulatory mechanisms. *Eur J Neurosci*, 17, 221-228.
- Bothorel, B., Barassin, S., Saboureau, M., **Perreau, S.**, Vivien-Roels, B., Malan, A. & Pevet, P. (2002) In the rat, exogenous melatonin increases the amplitude of pineal melatonin secretion by a direct action on the circadian clock. *Eur J Neurosci*, 16, 1090-1098.

Price/Awards

- 2010** Travel award GSK
- 2004** Prix de Thèse, Université Louis Pasteur, Strasbourg, France
- 2003** Prix Servier, 31^{ème} Colloque de la Société de Neuroendocrinologie, Paris, France
- 2002** Melatonin Club Travel Award, European Pineal and Biological Rhythms Society, Aberdeen, UK

Academic Focus

Teaching

- 2011** Master's thesis supervision (Laura Hölters), University of Heidelberg (shared with Prof. Spanagel)
- 2011** Seminar SS2011 "Biologie der Drogenabhängigkeit – Neurobiology of Addiction", University of Heidelberg, Faculty of Biology (shared with Prof. Spanagel)
- 2010/2011** Supervision of IZN-Rotation Practicum's, University of Heidelberg, Faculty of Biology
- 2009** Supervision of Bachelor's Practicum (Cyril Costines), University of Heidelberg, Faculty of Biology (shared with Prof. Spanagel)
- 2008** Seminar SS2008 "Biologie der Drogenabhängigkeit", University of Heidelberg, Faculty of Biology (shared with Prof. Spanagel and Dr. Schneider)
- 2007** Practical HP-F "Verhaltens- und molekulare Untersuchungen zur Drogenwirkung", University of Heidelberg, Faculty of Biology (shared with Prof. Spanagel and Dr. Schneider)

Invited Reviewer

Addiction Biology – Alcoholism – Alcoholism Clinical and Experimental Research – Behav Brain Research - Chronobiol Intern – Eur J Pharmacol – Neuropharmacology –

Membership

Society for Research on Biological Rhythms – European Biological Rhythms Society

Skills

Technical skills

- Microdialysis in freely moving animals (rats & mice);
- Rats and Mice Behavioural tests and Models (conditioned place preference or aversion tests, behavioural sensitization tests, tolerance and withdrawal assessments, operant alcohol drinking and alcohol deprivation models in rats and mice, pre-pulse inhibition tests and startle paradigms)
- HPLC (electrochemical detection of monoamines);
- Radio-immunoassays; Immuno-histochemistry;
- Mice breeding;

Languages

French: mother tongue; **English:** fluent; **German:** oral/written comprehension and basic expression; **Spanish:** oral/written comprehension; **Dutch:** bases.