BIOGRAPHICAL SKETCH

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NAME: Coolen, Lique Martina

eRA COMMONS USER NAME (credential, e.g., agency login): COOLENLM

POSITION TITLE: Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Utrecht, The Netherlands	M.Sc.	08/90	Biopsychology
University of Nijmegen, The Netherlands	Ph.D.	12/95	Neuroanatomy
Yale University School of Medicine, New Haven	Postdoctoral	08/96	Neuroendocrinology
University of Maryland, Baltimore	Postdoctoral	08/98	Neurophysiology

A. Personal Statement

Dr. Lique Coolen is currently Professor of Physiology and Biophysics at the University of Mississippi Medical Center, and serves as Associate Dean for Postdoctoral Studies in the School of Graduate Studies in the Health Sciences. She received her Ph.D. from the University of Nijmegen in the Netherlands in 1995, and has been on faculty at the University of Cincinnati, University of Western Ontario, and University of Michigan. She has received numerous awards for her research and teaching, including the CJ Herrick award from the American Association of Anatomists, the Canada Research Chair in Neurobiology of Motivation and Reward, and the Norman Nelson award for Teaching Excellence at the University of Mississippi Medical Center. She has published over 109 papers describing her research on drug addition, neuroendocrine function, and spinal cord injury and is well known for her expertise in a wide range of techniques, including neuropharmacology, molecular biology, chemogenetics, neuroanatomy, and behavioral techniques. Moreover, she utilizes numerous animal models for our research, including rat, mouse, hamster, and sheep. Dr. Coolen's research has been continuously funded by NIH, DOD, and NSF. During her time at the University of Western Ontario, she was awarded a Canada Research Chair and successfully competed for funding from the Canadian Institutes of Health Research (CIHR) and Natural Science and Engineering Research Council of Canada (NSERC). Her research is currently funded by DOD and NIH. Dr. Coolen has a long and successful track record of mentoring and currently mentors and has mentored numerous graduate students (9 PhD, 4 MD/PhD, 11 MSc), postdoctoral fellows (6), junior faculty (3), and medical (2) and undergraduate students (>60) as research mentor in her laboratory. She has a strong commitment to graduate and postdoctoral training in general and has served as graduate program director (University of Michigan), and currently serves as Associate Dean for Postdoctoral Studies. She serves on national committees for graduate and postdoctoral education and organizes professional and career development programs for UMMC and professional societies, including the Society for Neuroscience.

B. Positions and Honors

Positions and Employment

1998-2000 Adjunct Assistant Professor, Dept. of Cell Biology, Neurobiology and Anatomy, University of Cincinnati

2000-2003 Assistant Professor (Tenure Track), Dept. of Cell Biology, Neurobiology and Anatomy, University of Cincinnati

2003-2005 Associate Professor, Dept. of Cell Biology, Neurobiology and Anatomy, University of Cincinnati
2005-2008 Associate Professor, Dept. of Physiology & Pharmacology and Dept. of Anatomy & Cell Biology, University of Western Ontario, Schulich School of Medicine & Dentistry, Canada
2008-2010 Professor, Dept. of Physiology & Pharmacology and Dept. of Anatomy & Cell Biology, University of Western Ontario, Schulich School of Medicine & Dentistry, Canada
2010-2012 Professor, Dept. Molecular & Integrative Physiology, University of Michigan
2010-2012 Professor, Dept. Psychology, University of Michigan
2010-2012 Professor, Dept. Obstetrics & Gynecology, University Michigan
2012- Professor, Dept. Physiology & Biophysics, University of Mississippi Medical Center (UMMC)
2012- Associate Dean, School for Graduate Studies in the Health Sciences, Director of Office for Postdoctoral Studies (10% effort).
2013- Professor, Dept. Neurobiology & Anatomical Sciences, UMMC

Other Experience and Professional Memberships
2000 Ad Hoc Reviewer Special Emphasis Panel NIDA
2001 - 2006 Ad Hoc Reviewer Nederlands Wetenschappelijk Onderzoek, the Netherlands
2002 - 2010 Ad Hoc Reviewer National Science Foundation
2002 Ad Hoc Reviewer Special Emphasis Panel Urology NICHD
2000 - current Member Editorial Board Physiology and Behavior
2003 - 2012 Member Editorial Board Neuroscience and Biobehavioral Reviews
2004 - current Member Editorial Board Behavioral Neuroscience
2005, 2006 Ad Hoc Reviewer Special Emphasis Panel NICHD
2007 - 2011 Ad Hoc Reviewer Natural Sciences and Engineering Research Council of Canada
2008 - 2013 Member Behavioural Sciences A Review Panel Canada Institutes Health Research
2009 - 2010 Ad Hoc Reviewer Gender, Sex, and Health Review Panel Canada Institutes Health Research
2008 - 2010 Member Early Researcher Award Research Panel, Ministry of Research and Innovation Ontario
2011 - 2012 Associate and Interim Director Neuroscience Graduate Program, University of Michigan
2014 Ad Hoc Reviewer Special Emphasis Panel /Scientific Review Group 2014/05 ZRG1 F06-P (20) L (for F30, 31, 32 Fellowship applications)
2014 – 2017 Elected Member Postdoctoral Leaders Section AAMC GREAT steering committee
2016 - 2017 Reviewer National Science Foundation Modulation Panel
2017 – current Member Professional Development Committee, Society for Neuroscience
Society for Neuroscience; Society for Behavioral Neuroendocrinology; American Association of Anatomists; Women in Neuroscience; Association for Women in Science

Honors
2017 UMMC Nelson Order Award for Excellence in Teaching; Nominated for UMMC TEACH Award
2015 UMMC Nelson Order Award for Excellence in Teaching
2012 Neuroscience Scholar University of Michigan
2006-2011 Canada Research Chair in Neurobiology of Motivation and Reward (Tier 2)
2003 CJ Herrick Award American Association of Anatomists
1999 Frank Beach Award Society Behavioral Neuroendocrinology

C. Contribution to Science
(Selected from >110 peer-reviewed journal publications; Former and current PhD students are underlined)

1. **Discovery of Spinal Ejaculation Generator**:
During my early career my laboratory discovered a spinal generator for ejaculatory function in male rats and delineated a spinothalamic pathway for relay and processing of ejaculation-related sensory information. Since then, my laboratory has further characterized the spinal ejaculation generator and identified the input and output connections of the generator and the neurotransmitters essential for the function of the generator, using electrophysiological, pharmacological, and neuroanatomical approaches. More recently, we have demonstrated mechanisms by which chronic spinal injury impacts the spinal ejaculation generator. These

findings have impacted treatment for sexual dysfunction and may aid in development of treatment for spinal cord injury.

- Truitt WA, **Coolen LM**. (2002) Identification of a potential ejaculation generator in the spinal cord. Science.297(5586):1566-9. PMID: 12202834
- Staudt MD, Truitt WA, McKenna KE, de Oliveira CV, Lehman MN, **Coolen LM**. (2012) A pivotal role of lumbar spinothalamic cells in the regulation of ejaculation via intraspinal connections. J Sex Med. 9(9):2256-65. PMID: 22189051
- Kozyrev N, **Coolen LM** (2015) Activation of mu or delta opioid receptors in the lumbosacral spinal cord is essential for ejaculatory reflexes in male rats. PLoS One. 10(3):e0121130. PMID: 25826331
- Kozyrev N, Staudt MD, Brown A, **Coolen LM**. (2016) Chronic contusion spinal cord injury impairs ejaculatory reflexes in male rats: Partial recovery by systemic infusions of dopamine D3 receptor agonist 7OHDPAT. *J Neurotrauma*. May 15;33(10):943-53. PMID: 2643757726437577

2. **Drugs act on neural plasticity mechanisms for natural reward learning**:
During the past 7 years, my laboratory has demonstrated that experience with the social reward behavior, sexual behavior, causes neural alterations that contribute to the learning and memory of reward associations. In addition, we demonstrated that loss of sexual reward results in vulnerability for drug abuse and increased drug seeking behaviors. Finally, we have shown that drugs of abuse act on common neural mediators and neural plasticity mechanisms involved in natural reward memory; which in turn contribute to the development of addiction. These findings have provided novel insights into the neural control of reward learning and the factors that influence the development of drug addiction.

- Pitchers KK, Balfour ME, Lehman MN, Richtand NM, Yu L, **Coolen LM**. (2010) Neuroplasticiy in the mesolimbic system induced by natural reward and subsequent reward abstinence. Biol Psychiatry. 67(9):872-879. PMC2854191. *NIHMS165632*
- Pitchers KK, Vialou V, Nestler EJ, Laviolette SR, Lehman MN, and **Coolen LM** (2013) Natural and drug rewards act on common neural plasticity mechanisms with deltaFosB as a key mediator. *J Neurosci,* 33(8): 3434–3442
- Pitchers KK, Coppens CM, Beloate LN, Fuller J, Van S, Frohmader KS**,** Laviolette SR, Lehman MN, and **Coolen LM** (2014) Endogenous Opioid-Induced Neuroplasticity of Dopaminergic Neurons in the Ventral Tegmental Area Influences Natural and Opiate Reward. *J. Neurosci.* Jun 25;34(26):8825-36
- Beloate LN, Omrani A, Adan RA, Webb IC, and **Coolen LM** (2016) Ventral tegmental area dopamine cell activation during male rat sexual behavior regulates neuroplasticity and d-Amphetamine cross-sensitization following sex abstinence. *J. Neurosci.* 2016 Sep 21;36(38):9949-61. PMID: 27656032

3. **Interactions between Methamphetamine and sex behavior cause compulsive behavior**:
My laboratory has demonstrated that vulnerability for methamphetamine addiction is increased by the concurrent experience of methamphetamine use and sexual behavior in male rats. Moreover, this concurrent drug/sex exposure causes compulsive sex and drug seeking behaviors. These findings formed the basis for the current grant proposal.

- Frohmader KS, Wiskerke J, Wise RA, Lehman MN, and **Coolen LM** (2010) Methamphetamine acts on neurons regulating sexual behavior in male rats. *Neurosci*. 166(3):771-84. PMID: 20045448
- Frohmader KS, Bateman KL, Lehman MN, **Coolen LM**. (2010) Effects of methamphetamine on sexual performance and compulsive sex behavior in male rats. Psychopharmacology (Berl). 212(1):93-104. PMID: 20623108. *NIHMS334910*
- Frohmader KS*, Pitchers KK*, Balfour ME, and **Coolen LM** (2010) Mixing Pleasures: Review of the effects of drugs on sex behavior in humans and animal models. *Horm Behav*. Jun;58(1):149-62. Invited Review. PMID: 20004662
- Frohmader KS, Lehman MN, Laviolette SR, and **Coolen LM** (2011) Concurrent exposure to methamphetamine and sexual behavior enhances subsequent drug reward and causes compulsive sexual behavior in male rats. *J Neurosci*. Nov 9;31(45):16473-82. PMID: 22072697

4. **Prenatal remodeling of neuroendocrine systems for reproductive function and behavior**:
Along with my collaborators, Drs. Michael Lehman and Vasantha Padmanabhan, we have demonstrated neural alterations caused by prenatally exposure to excess androgens. Using a sheep model that shows all attributes of the common endocrine disorder Polycystic Ovary Syndrome, we have demonstrated alterations in neural circuits of neuroendocrine control as well as motivated behaviors. These findings have implications

for the treatment of Polycystic Ovary Syndrome and shed lights on the developmental programming of endocrine function.

- Cheng, G., **Coolen L.M.**, Padmanabhan, V., Goodman, R.L. and M.N. Lehman. (2010). The kisspeptin/neurokinin B/dynorphin (KNDY) cell population of the arcuate nucleus: sex differences and effects of prenatal testosterone in the sheep. Endocrinology, 151(1): 301–311.
- Ahn T, Fergani C, **Coolen LM**, Padmanabhan V, Lehman MN. (2015) Prenatal testosterone excess decreases neurokinin 3 receptor immunoreactivity within the arcuate nucleus KNDy cell population. J Neuroendocrinol. 27(2):100-10. PMID: 25496429
- Cernea M, Padmanabhan V, Goodman RL, **Coolen LM**, Lehman MN. (2015) Prenatal testosterone treatment leads to changes in the morphology of KNDy neurons, their inputs, and projections to GnRH cells in female sheep. Endocrinology. en20141609. PMID: 26061725
- Brown EC, Steadman CJ, Lee TM, Padmanabhan V, Lehman MN, **Coolen LM**. (2015) Sex differences and effects of prenatal exposure to excess testosterone on ventral tegmental area dopamine neurons in adult sheep. *Eur J Neurosci* May;41(9):1157-66. PMID: 25784297

For a full list of my publications see:
https://www.ncbi.nlm.nih.gov/sites/myncbi/1bMpqI6Yg26ke/bibliography/50617681/public/?sort=date&direction=descending

D. Research Support

Ongoing Research Support

DOD SCI150225 Coolen (PI) 09/01/16-08/31/19
Department of Defense
Title: Determining Sensory Plasticity and Developing Recovery for Sexual Dysfunction in Chronic Spinal Cord Injured Male Rats
The proposal aims to determine alterations in sensory processing related to sexual function after chronic spinal cord injury and develop strategies for recovery of sexual function.
Role: PI

NIH R01 HD082135-01 R. Goodman, M. Lehman (MPI) 4/01/16-3/30/21
National Institutes of Health
Role of NKB in the control of GnRH secretion by ovarian steroids
The proposal aims to further our understanding of the physiological roles of neurokinin B, which has recently been shown to be essential for fertility in humans, in control of GnRH secretion.
Role: Co-PI