

Sunday, February 04, 2001

Michael Courlander
Public Affairs Officer
US Sentencing Commission

Dear Mr. Courlander,

As invited by your commission, I am writing in response to proposed legislation (Under the Ecstasy Anti-Proliferation Act of 2000 (section 3664 of Pub. L. 106-310)) that would make the punishment (federal sentencing) for MDMA (Ecstasy) offenses to be the same as that of heroin.

I am an Assistant Professor at the University of South Florida and I conduct both basic and clinical research in the area of neuropsychopharmacology. Please note that my scientific opinion with regard to the sentencing of MDMA in no way reflects the views or opinions of the University of South Florida or any of its affiliates. Moreover, I do not advocate the recreational use of MDMA or any other controlled substance for that matter and my primary reason for writing this letter is to support "harm reduction."

In my view, any legislation that will ultimately affect the lives of millions of adolescents and young adults must come about after thoughtful and objective consideration of the scientific evidence supporting the need for such legislation as well as the probable consequences of such legislation.

With regard to the scientific evidence, I am not aware of any evidence (other than chemical homology) suggesting that Ecstasy has psychological effects on the user similar to the hallucinogenic effects of mescaline. Over the past 15 years, it has become a well-established scientific fact that MDMA fits into a completely different therapeutic class, known as entactogens (Nichols 1986). Most human reports suggest that MDMA produces feelings of empathy towards others, but without the changes in perception in time and space that accompany most other hallucinogenic drugs. In fact, a recent scientific study by a well-respected laboratory reported that MDMA improved measures of sensory gating in humans, an effect essentially the opposite one sees with other classic hallucinogens (Vollenweider et al. 1999).

It is true that MDMA has some stimulant properties that resemble amphetamine, though it is unclear what this means in terms of comparable health risks. Moreover, the risk of addiction, either physical or psychological, appears less than that seen with other psychostimulants such as nicotine, cocaine, or amphetamine and considerably less than that seen with heroin. In fact, MDMA's lower abuse potential relative to other psychostimulants may be one of the few characteristics that it shares with classical hallucinogens.

In summary, it seems premature to conclude based on the available evidence that MDMA represents a societal or individual health risk equivalent to that of heroin. Thus, there is little or no scientific basis for the need of the proposed legislation.

What is more alarming to me is the apparent lack of consideration of probable consequences that the proposed legislation would have on the future manufacture, importation, and trafficking of Ecstasy. Based on the history of similar legislation aimed at reducing the proliferation of cocaine, heroin, and amphetamine, it is clear that such legislation will only make matters far worse (Ray and Ksir, 1999). That is, the consolidation of Ecstasy manufacturing, importation, and trafficking by larger more powerful organizations using methods already established for smuggling heroin, cocaine, and amphetamine will

surely follow if the proposed legislation is passed. Need I remind the sentencing committee of its own report regarding the adverse impact of strict legislation on crack cocaine?

Based on my assessment of the literature, I would suggest that the penalty should be less than or comparable to that for mescaline (which would result in a marihuana equivalency for Ecstasy of 10 gm). It seems reasonable, that the Drug Quantity Table in §2D1.1 could be revised to provide additional incremental penalties (even exponential quantity increases) so as to punish more severely those offenders who traffic in large quantities (e.g. > than kg quantities) and market to children and adolescents.

The most important recommendation that I can make at this time is not to make a hasty decision based on emotion rather than logic and scientific fact.

Sincerely,

Doug Shytle, Ph.D.

References:

- Nichols DE (1986) Differences between the mechanism of action of MDMA, MBDB, and the classic hallucinogens. Identification of a new therapeutic class: entactogens. *J Psychoactive Drugs* 18: 305-13.
- Ray and Ksir (1999) *Drugs, Society, and Human Behavior*. 8th edition, McGraw-Hill, Inc.
- Vollenweider FX, Remensberger S, Hell D, Geyer MA (1999) Opposite effects of 3,4-methylenedioxymethamphetamine (MDMA) on sensorimotor gating in rats versus healthy humans. *Psychopharmacology (Berl)* 143: 365-72.

CURRICULUM VITAE

Roland Douglas Shytle, Ph.D.

Offices:

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Lutz, Florida 33549
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Career

Objective:

Research and Teaching in Basic and Clinical Neuropsychopharmacology

Education:

Ph.D. 1994, Experimental Psychology (Interdisciplinary Specialization in Neuroscience)
University of Wyoming, Laramie WY

B.A. 1990, Psychology
University of North Carolina, Wilmington, NC

Professional

Experience:

June 1996 - Present

Assistant Professor

Departments of Neurosurgery, Psychiatry and Behavioral Medicine,
Psychology and Neuroscience Program
University of South Florida, College of Medicine, Tampa, FL

July 1994 - May 1996

Post-doctoral Research Fellow

Division of Neurosurgery, Department of Surgery,
Department of Psychiatry and Behavioral Medicine &
University of South Florida, College of Medicine, Tampa, FL

August 1990 - June 1994

Graduate Research and Teaching Assistant

Departments of Psychology and Neuroscience Program

University of Wyoming, Laramie, Wyoming

January 1989 - May 1990

Research Assistant

Department of Psychology

University of North Carolina at Wilmington

Grant

History:

October 2000 - October 2001 (Active)

Total Direct Cost: \$150,000

Principal Investigator & Grant Writer

Archie A. Silver (Co-PI)

Layton BioScience, Inc.

Behavioral and Neuropharmacological Profiles of Novel Nicotine Antagonists for Neuropsychiatric Disorders

December 1999 - January 2001 (Active)

Total Direct Cost: \$40,000

Principal Investigator

Roger Papke (Co-PI) at the University of Florida

Layton BioScience, Inc.

Analysis of Mecamylamine Congeners on Human Nicotinic Receptor Subtypes

May 2000 - May 2001

Total Direct Costs: \$7,500

Principal Investigator

Stan Nazian (Co-PI)

USF Creative Young Faculty Award

Role of Nicotinic Receptors in the Hypothalamic CRH Response to Acetylcholine

August 2001 - November 2003 (under review)

Total Direct Cost: \$150,000

Principal Investigator

David Sheehan (Co-PI) & Archie A. Silver (Co-PI)

The Stanley Foundation

Phase II Trial of Mecamylamine for Bipolar Disorder

December 2001 - November 2004 (under review)

Total Direct Cost: \$375,000

Principal Investigator

David Sheehan (Co-PI) & Archie A. Silver (Co-PI)

NIH: National Institutes of Mental Health

Phase II Trial of Mecamylamine for Bipolar Disorder

February 1998 - 1999

Total Direct Costs: \$7,000

Principal Investigator

USF College of Medicine Equipment Grant

May 1994 - May 1998 (completed)

Total Direct Cost: \$337,592

Co-Investigator

Paul R. Sanberg (PI) & Archie A. Silver (Co-PI)

NIH: National Institutes of Neurological Disorders and Stroke NS32067-02

Nicotine/Haloperidol Therapy in Tourette Syndrome

May 1996 - May 1998 (completed)

Total Direct Cost: \$24,300

Grant Writer

Paul R. Sanberg (PI) & Brian McConville (Co-PI)

Tourette Syndrome Association

Transdermal Nicotine and Haldol for Treatment of Tourette Syndrome

July 1996 - May 1998 (completed)

Total Direct Cost: \$18,000

Co-Investigator & Grant Writer

Paul R. Sanberg (Co-recipient of the 1996 Ove Ferno Grant Prize)

Collegium Internationale Neuro-Psychopharmacologicum

Transdermal Nicotine for the treatment of Attention-Deficit Hyperactivity Disorder

May 1996 - May 1997 (completed) Total Direct Cost: \$12,420
Co-Investigator & Grant Writer
Paul R. Sanberg (PI) & Archie A. Silver (Co-PI)
NIH: National Institutes of Neurological Disorders and Stroke NS32067
Minority Supplement Grant for NS32067

July 1997 - June 1998 (Approved but not funded) Total Direct Cost: \$40,000
Grant Writer
Paul R. Sanberg (PI) & Archie Silver (Co-PI)
Tourette Syndrome Association
Transdermal Nicotine Alone for Treatment of Tourette Syndrome

May 1995 - May 1997 (Approved but not funded) Total Direct Cost: \$39,801
Principal Investigator (Post-doctoral Fellowship)
Paul R. Sanberg (Supervisor)
Tourette Syndrome Association
Nicotine Potentiation of Haloperidol: Preclinical Relevance to Tourette's Syndrome

May 1989 - May 1990 (Completed) Total Direct Cost: \$250
Principal Investigator
North Carolina Academy of Science
Effects of Dopamine Antagonists on Avoidance Behavior

**Current
Focus:**

Basic Research

Supervising pre-clinical investigations of a new medication for the possible treatment several neuropsychiatric disorders. Investigations involve evaluation of the racemic as well as the stereoisomers of medication in behavioral and neurochemical experiments conducted in rats.

Clinical Research

Clinical studies evaluating the therapeutic potential of a new medications for Tourette's syndrome, ADHD, and Bipolar Disorder.

Both projects involve collaboration with seven USF employed investigators.

**Teaching
Experience:**

Psychobiology
Drugs and Human Behavior
General Psychology
Physiological Psychology

**Peer
Reviewer:**

Pharmacology, Biochemistry and Behavior
Psychopharmacology
General Pharmacology
Psychological Medicine
Neuropsychopharmacology

CNS Drugs

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Academic

Committees: 2000 -2001 USF College of Medicine Research Committee

2000 -2001 USF College of Medicine Space Committee

2000 -2001 USF College of Medicine Academic Computer Committee

1999 NIH Brain Disorders & Clinical Neuroscience Review Committee

1997-Present Basic and Clinical Research Review Committee
USF Department of Psychiatry and Behavioral Medicine

1995 USF Institute on Aging

Non Academic

Committees: 2001-2002 Medical Advisory Board for the Florida Chapter of the
Tourette Syndrome Association

Professional

Affiliations: Society for Neuroscience
International Behavioral Neuroscience Society
Tourette's Syndrome Association

Awards:

2000
USF Creative Young Faculty Research Award

1997 & 1996
Young Psychopharmacologist Award (Nominee)
American Psychological Association, Section 28

1995
New Investigator Award (Nominee)
NIH: New Clinical Drug Evaluation Unit Program (NCDEU)

1990 - 1994
University of Wyoming's Graduate Research and Teaching Fellowship

1993
University of Wyoming's Graduate Travel Assistance Award

1993
Lillian Porteneir Scholarship

1990
First Place Poster Award at the North Carolina Psychological Association

1989
Communication Workers Association Academic Scholarship

1985

Beta Sigma Phi Academic Scholarship

Patents

Issued:

Sanberg PR; **Shytle RD**; & Silver, AA: Nicotine antagonists for nicotine-responsive neuropsychiatric disorders. United States Patent Office, Patent #6,034,079. Issued 3/7/00.

Patents

Applied:

Shytle RD; Sanberg, PR; Newman M, & Silver AA: WO035279A1: Exo-S-Mecamylamine Formulation And Use In Treatment Of Neuropsychiatric Disorders. Issued/Filed Dates: June 22, 2000 / Dec. 16, 1999

Shytle RD; Sanberg, PR; Newman M, & Silver AA: WO035280A1: Exo-R-Mecamylamine Formulation And Use In Treatment Of Neuropsychiatric Disorders. Issued/Filed Dates: June 22, 2000 / Dec. 16, 1999

Shytle RD; Sanberg, PR; & Silver AA: Method of treating cocaine addiction. United States Patent Office (Filed in 2000).

Shytle RD; Sanberg PR, & Silver AA: Method of treating cognitive deficits in learning and memory. United States Patent Office (Filed in 2000).

Speaking

Engagements:

(1994) SCH23390 and Mecamylamine Prevent the Development of the Sensitized Locomotor Response to Nicotine. Graduate Seminar, Department of Pharmacology, Bowman Gray School of Medicine, Wake Forest, NC.

(1995) Nicotine Therapeutics for Neuropsychiatric Disorders. Presented at the USF Department of Biology Seminars in Neuroscience.

(1995) Nicotine and Tourette's Syndrome. Presented at the First Annual Duke Nicotine Research Conference, Duke University

(1996) Evidence of the Neuroprotective Actions of Nicotine. Presented at the International Behavioral Neuroscience Society Conference, Cancun, Mexico

(1996) Nicotine and Tourette's Syndrome. GRAND ROUNDS, USF Department of Psychiatry and Behavioral Medicine.

(1999) Mecamylamine for Neuropsychiatric Disorders. Board of Directors, Layton BioScience, Inc.

(1999) Mecamylamine for Neuropsychiatric Disorders. Preclinical and Clinical Divisions, Cephalon Pharmaceutical Company, Inc.

(1999) Nicotinic Antagonists for Neuropsychiatric Disorders. Preclinical and Clinical Divisions, Forest Labs, Inc.

(1999) Nicotinic Antagonists for Neuropsychiatric Disorders. Graduate Seminar, USF Department of Pharmacology.

(2000) Nicotinic Medications and Tourette Syndrome. Tourette Syndrome Association (Florida State Chapter).

(2000) Mecamylamine and Tourette Disorder. Departments of Pharmacology and Psychiatry, University of Florida, Gainesville, FL

(2000) Update: Nicotinic Medications and Tourette Syndrome. Tourette Syndrome Association (Pinellas County Chapter, Florida).

**Peer
Reviewed**

Publications:

Borlongan CV, Martinez R, **Shytle RD**, Cahill DW, Sanberg PR (1995). Striatal Dopamine-Mediated Motor Behavior Is Altered Following Occlusion Of The Middle Cerebral Artery. Pharmacology, Biochemistry and Behavior. 52(1):225-229.

Shytle RD, Borlongan CV, Sanberg PR (1995). Nicotine blocks kainic acid induced wet dog shakes in rats. Neuropsychopharmacology. 13(3):261-264.

Borlongan CV, **Shytle RD**, Shajmil DR, Shimizu S, Freeman TB, Cahill DW, Sanberg PR (1995). (-)-Nicotine Protects against Systemic Kainic Acid-Induced Excitotoxic Effects. Experimental Neurology. 136: 261-265.

Shytle RD, Borlongan CV, Cahill DW, Sanberg PR. (1996). Evidence for the neuroprotective actions of nicotine in an in vivo model of excitotoxicity. Medical Chemistry Research. 6/7-8:555-561.

Silver AA, **Shytle RD**, Philipp MK, Sanberg PR (1996). Long-term potentiation of neuroleptics with transdermal nicotine in Tourette's syndrome. Journal of the American Academy of Child & Adolescent Psychiatry 35(12):1631-1636.

Polgar S, McGartland M, Borlongan CV, **Shytle RD**, Sanberg PR (1996). Smoking Cessation Programs are Neglecting the Needs of Persons with Neuropsychiatric Disorders [letter]. Australian and New Zealand Journal of Medicine. 26: 572-573.

Shytle RD, Silver AA, and Sanberg PR (1996). Nicotine, Tobacco, and Addiction [letter]. Nature. 384(6604):18-19.

Sanberg PR, Silver AA, & **Shytle RD** (1998) Treatment of Tourette's Syndrome with Mecamylamine. Lancet. 352:705-706.

Newman, MN, **Shytle RD**, & Sanberg PR (1999) Locomotor behavioral effects of prenatal and postnatal nicotine exposure in rat offspring. Behavioral Pharmacology 10:699-706.

Silver AA, **Shytle RD**, & Sanberg PR (1999) Clinical experience with transdermal nicotine patch in Tourette's syndrome. CNS Spectrums 4:68-76.

Goldman J, **Shytle RD**, & Sanberg PR (1999) Adding behavioral therapy to medication for smoking cessation. JAMA 281:1984.

- Silver AA, Penny E, **Shytle RD**, Sanberg PR & George TP (2000) Clinical relevance of the nicotine receptor antagonist mecamylamine in treating neuropsychiatric disorders. Today's Therapeutic Trends 18-3 255-273.
- Shytle RD**, Silver A, & Sanberg PR (2000) Comorbid bipolar disorder in Tourette syndrome responds to nicotinic receptor antagonist, mecamylamine (Inversine®). Biological Psychiatry 48:1028-1031.
- Silver AA, **Shytle RD**, & Sanberg PR (2000) Mecamylamine in Tourette's Syndrome: A two year retrospective case study. Journal of Child and Adolescent Psychopharmacology 10:59-68.
- Newman MB, Nazian S, & Sanberg PR, Diamond D, & **Shytle RD** (2000) Corticosterone-attenuating and anxiolytic properties of mecamylamine in the rat. Progress in Neuro-Psychopharmacology & Biological Psychiatry (in press)
- Papke R, Sanberg PR, & **Shytle RD** (2000) Analysis on Mecamylamine stereoisomers on human nicotinic receptor subtypes. Journal of Experimental Pharmacology and Therapeutics (in press)
- Silver AA, **Shytle RD**, Sheehan D, Sheehan K, Ramos A, & Sanberg PR (2000) Multi-Center Double Blind Placebo Controlled Study of Mecamylamine (Inversine®) Monotherapy for Tourette Disorder. Journal of the American Academy of Child and Adolescent Psychiatry (submitted)
- Silver A, **Shytle RD**, Wilkinson B, Katherine-Philipp M, McConville B, Fogelson H, & Sanberg PR (2000) Transdermal Nicotine and Haloperidol in Tourette's Syndrome: A double-blind placebo-controlled study. Journal of Clinical Psychiatry (submitted)
- Shytle RD**, Penny E, Goldman J & Sanberg PR: Mecamylamine (Inversine®): An old hypertensive medication with new research direction? (2000) Journal of human hypertension (submitted)
- Shytle R, Newman M, Alvarez F, Potts S, Manresa J, Sanberg P: Mecamylamine Prolongs the Duration of Haloperidol-Induced Catalepsy In Rats. International Journal of Neuroscience (submitted)
- Shytle RD**, Silver AA, Newman MB, & Sanberg PR (2000) Nicotinic receptor function and depression among adolescent smokers. Pediatrics (submitted)
- Shytle RD**, Newman M & Sanberg PR (2000) Mecamylamine and its stereoisomers prevent the development of the sensitized locomotor response to nicotine. Drug Development Research (submitted)
- Shytle RD**, Silver AA, Sheehan K, Sheehan D, & Sanberg PR (2001) Potential mood stabilizing properties of Mecamylamine (Inversine) in children and adolescents with Tourette disorder. Journal of the American Academy of Child and Adolescent Psychiatry (submitted)

- Newman, MB, Manresa JJ, Sanberg PR & **Shytle RD** (2001) Effects of low doses of mecamlamine in two animal models of anxiety. Experimental and Clinical Psychopharmacology (submitted)
- Newman, MB, Manresa JJ, S E. Potts, F Alvarez, P R. Sanberg PR & **Shytle RD** (2001): Nicotine Induced Seizures Blocked By ($\pm$)-Mecamlamine And Its Stereoisomers. Life Science: Pharmacology Letters (submitted)
- Shytle RD**, Newman MB, Alvarez F, Potts SE, Manresa JJ, Sanberg PR (2000) Mecamlamine (Inversine[®]) prolongs the duration of haloperidol-induced catalepsy. International Journal of Neuroscience (submitted)
- Shytle RD**, Silver AA, Sheehan KH, Wilkinson BJ, Newman M, Sanberg PR, & Sheehan, D (2000) The Tourette disorder scale (TODS): Development, reliability, and validity. American Journal of Psychiatry. (submitted)
- Wilkinson BJ, Newman MB, **Shytle RD**, Silver AA, Sheehan D, & Sanberg PR (2000) Family impact of Tourette's syndrome. Journal of Adolescent & Child Psychiatry (submitted)
- Newman MB, Arendash GW, **Shytle RD**, Sanberg PR Nicotine: Pro-Oxidant or Antioxidant? Free Radical Biology and Medicine (submitted)
- Shytle RD**, Newman M, others, & Sanberg PR (2000) CNS Receptor Screen on the Nicotinic Antagonist, Mecamlamine (Inversine[®]). Psychopharmacology (In preparation)
- Shytle RD**, Hart C, Newman M, & Sanberg PR (2000) Nicotinic Receptor Antagonists Novel Therapeutic Agents for Treating Drug Abuse Drug and Alcohol Review (In preparation)
- Shytle RD**, Silver A, Sanberg PR (2001). Controlled Pilot Study of Transdermal Nicotine in Attention Deficit Hyperactivity Disorder. American Journal of Psychiatry (In preparation)
- Papke R, Sanberg PR, & **Shytle RD** (2001) The Nicotinic Receptor Antagonist, Mecamlamine (Inversine[®]) is a Co-agonist for Glycine at the NMDA receptor. European Journal of Pharmacology (In preparation)

**Reviews &
Book Chpts:**

- Silver AA, **Shytle RD**, Philipp MK and Sanberg PR (1995). Transdermal Nicotine in Tourette's Syndrome. In: PBS Clarke, M Quik, K Thureau (eds.) The Effects of Nicotine on Biological Systems; Advances in Pharmacological Sciences, Birkhauser Publishers, pp. 293-299.
- Sanberg PR, Martinez R, **Shytle RD**, Cahill DW (1995). The Catalepsy Test: Is a Standardized Method Possible? In: Sanberg PR, Ossenkopp KP, and Kavaliers M (eds.) Motor Activity and Movement Disorders: Research Issues and Applications. Humana Press: New Jersey. pp 197-211.
- Shytle RD**, Silver AA, and Sanberg PR (1995). Clinical assessment of motor abnormalities in Tourette's syndrome. In: Sanberg PR, Ossenkopp KP, and Kavaliers M (eds.) Motor Activity and Movement Disorders: Research Issues and Applications. Humana Press: New Jersey. pp 343-364.

Shytle RD, Silver AA, Philipp MK, McConville BJ, Sanberg PR (1996). Transdermal Nicotine for Tourette's Syndrome. Drug Development Research 38(3/4): 290-298.

Shytle RD, Silver AA, and Sanberg PR (1997). Researchers Explore Nicotine as a TS Treatment. Tourette Syndrome Association Newsletter 25(1): 1-3.

Sanberg PR, Silver AA, McConville BJ, Philipp MK, Gonzalez L, **Shytle RD**, Cahill DW. (1996) Nicotine as a Therapeutic Adjunct for Tourette's Syndrome. In: Nicotine as a Therapeutic Agent, Foundation for Immunity and the Environment, Frankfurt, Germany.

Sanberg PR, Silver AA, **Shytle RD**, Philipp MK, Cahill DW, Fogelson HM, McConville BJ (1997). Nicotine for the Treatment of Tourette's Syndrome. Pharmacology and Therapeutics 74(1): 21-25.

Shytle RD, Silver AA, Newman MB, & Sanberg, PR: Nicotinic Therapeutics for Tourette Syndrome and other Neuropsychiatric Disorders: From Lab To Clinic (2000) In: Central Nervous System Diseases: Innovative Animal Models from Lab to Clinic Humana Press (eds. DF Emerich RL Dean PR Sanberg) Chapter 22 431-440.

Shytle RD, Baker M, Silver AA, Soloman M, & Sanberg, PR (2000) Smoking, Nicotine and Movement Disorders. In: Nicotine in Psychiatry: Psychopathology and Emerging Therapeutics. Clinical Practice Series (Eds. M. Piasecki and P. Newhouse) APA Press: Halifax: Canada 183-202

Shytle RD, Silver AA, Newman M, Wilkinson BJ, & Sanberg, PR (2001) Nicotinic Medications and Tourette's Disorder. Animal Models in Nicotine Research CRC Press: Boca Raton (in press)

Abstracts:

Shytle RD (1990). The Effects of Specific And Nonspecific Dopamine Antagonists on Avoidance Responding in Rats. The Journal of the Elisha Scientific Society. 106(4): 142-143.

Galizio M, Gregg E, Kelly L, Shriner RL, **Shytle RD** (1990). Timeout From Avoidance: A Novel Test Of Drug Effects On Negatively Reinforced Behavior. Society of Neuroscience Abstracts. 16(2): 1102.

Shytle RD and Ksir C (1993). The effects of μ -opioid antagonists on nicotine-induced locomotor activity. Society of Neuroscience Abstracts. 19(1): 829.

Shytle RD, Borlongan CV, Freeman TB, Cahill DW, Sanberg PR. (1995) Nicotine blocks kainic acid induced wet dog shakes in rats. Society of Neuroscience Abstracts. 21(1):73.

Sanberg PR, **Shytle RD**, Borlongan CV, Silver AA, Philipp MK, Cahill DW, Freeman TB. (1995) Nicotine, Tourette's Syndrome, and Neuroprotection. International Behavioral Neuroscience Society (Nicotine Satellite Meeting) 1:A2.

Shytle RD. Evidence of the Neuroprotective Actions of Nicotine (1995) International Behavioral Neuroscience Society (Nicotine Satellite Meeting) 2:A5.

- Shytle RD**, Silver AA , Philipp MK, Sanberg PR (1996) Long Term Therapeutic Response to Transdermal Nicotine in Tourette's Syndrome Patients. International Behavioral Neuroscience Society. 5:A201.
- Shytle RD**, Borlongan CV, Sanberg PR (1996) Kainic Acid Induced Behavioral Syndrome: Challenge With Nicotinic Receptor Ligands. Society of Neuroscience Abstracts.
- Sanberg PR, Silver AA, **Shytle RD** (1997) Treatment of Tourette's Syndrome with Nicotinic antagonist mecamylamine American College of Neuropsychopharmacology, 36th Annual Meeting, Waikoloa, Hawaii, pp 249
- Shytle RD**, Silver AA, Sanberg PR (1998) Nicotinic Antagonist Improves Tourette's Syndrome International Behavioral Neuroscience Society, Richmond, VA, pp 46
- Shytle RD**, Silver AA, Wilkinson BJ, Newman MB, Katherine-Phillipp M, Sanberg PR, McConville B, Fogelson H. (1999) Treatment of Tourette Disorder with Transdermal Nicotine and Haloperidol. IBC's 2nd International Symposium on Nicotinic Acetylcholine Receptors, Advances in Molecular Pharmacology and Drug Development. Annapolis, MD.
- Shytle RD**, Silver AA, Wilkinson BJ, Newman MB, Katherine-Phillipp M, Sanberg PR, McConville B, Fogelson H. (1999) Treatment of Tourette Disorder with Transdermal Nicotine and Haloperidol. 3rd International Scientific Symposium on Tourette Syndrome. New York City, NY.
- Shytle RD**, Newman MB, Amiri L, Wilkinson BJ, Diamond DM, Nazian SJ, Silver A., Sanberg PR. (1999) Low Doses of Mecamylamine Produce Anxiolytic and Antidepressant Effects in Rats. 3rd International Scientific Symposium on Tourette Syndrome. New York City, NY.
- Sheehan D, **Shytle RD**, Newman MB, Sanberg PR, Silver AA. (1999) Development of Tourette Disorder Scale (TODS). New Clinical Drug Evaluation Unit Program, 3rd annual Meeting. (Poster 182) Boca Raton, FL.
- Newman MB, **Shytle RD**, Kirstein CL, and Sanberg P.R. (1999) Prenatal and postnatal exposure of nicotine: locomotor effects in rat offspring. Society of Neuroscience Abstracts.
- Shytle RD**, Newman MB, Amiri L, Wilkinson BJ, Diamond DM, Nazian SJ, Silver AA, Sanberg PR. (1999) Low Doses of Mecamylamine Produce Anxiolytic and Antidepressant Effects in Rats. Society of Neuroscience Abstracts.
- Sanberg PR, **Shytle RD**, & Silver AA (2000) Nicotinic Drugs Improve Children with Tourette's syndrome and Behavioral Problems. American Association for the Advancement of Science Abstracts A56
- Jacobs A, Bowersox S, Kisicki JC, Sanberg PR, & **Shytle RD** (2000) Pharmacokinetic evaluation of mecamylamine (Inversine®) in Adults. 10th Neuropharmacology Conference: Neuronal Nicotinic Receptors (Abstract 195)

- Newman MB, Alvarez F, Potts SE, Manresa JJ, **Shytle RD**, & Sanberg, PR (2000) Mecamylamine Prolongs the Duration of Haloperidol-Induced Catalepsy in Rats. 10th Neuropharmacology Conference: Neuronal Nicotinic Receptors (Abstract 196)
- Silver AA, **Shytle RD**, Sheehan DV, Sheehan KH, Ramos A & Sanberg, PR (2000) Safety and Exploratory Study of Mecamylamine Monotherapy for Tourette's syndrome. 10th Neuropharmacology Conference: Neuronal Nicotinic Receptors (Abstract 212)
- Papke RL, Sanberg PR, & **Shytle RD** (2000) Analysis of Mecamylamine Stereoisomers on Human Nicotinic Receptor Subtypes. 10th Neuropharmacology Conference: Neuronal Nicotinic Receptors (Abstract 94)
- Newman MB, Manresa JJ, Potts SE, Alvarez F, Sanberg PR, & **Shytle RD** (2000) Nicotine Induced Seizures are Blocked by ($\pm$)-Mecamylamine and its Stereoisomers. Society for Neuroscience 338.16:901
- Shytle RD**, Newman MB, Potts SE, Manresa JJ, Silver AA, & Sanberg PR (2000) Stereoisomers of Mecamylamine Prevent Induction of Sensitized Locomotor Response to Nicotine. Society for Neuroscience 526.3:1403
- Shytle RD**, Silver AA, & Sanberg PR (2000) Mecamylamine (Inversine[®]) as Proof of Principle for Treating Neuropsychiatric Disorders with Nicotinic Antagonists. American College of Neuropsychopharmacology Meeting San Juan, Puerto Rico.
- Shytle RD**, Silver AA, Sheehan DV, Sheehan KH, & Sanberg PR Potential mood stabilizing properties of mecamylamine (Inversine[®]) in children and adolescents with Tourette disorder. Society for Biological Psychiatry New Orleans, LA