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Education and Training

University of Colorado, Boulder, Colorado, B.S. 1982 Psychology

University of Maryland, Baltimore, Maryland, Ph.D. 1990 Pharmacology

National Institute Drug Abuse/NIH, Baltimore, MD. Post-doc 1990-1993 Behavioral Pharmacology and Genetics

Biosketch

My research has been a wonderful confluence of my personal interests and a natural extension of our research findings. My career began with a series of experiments designed to investigate the genetic underpinnings in drug addiction. The work led to a long-standing investigation into genetic factors that contribute to pain, opioid potency, tolerance and addiction liability using large-scale transcriptomics and behavior genetics. The work expanded following my move from the NIDA Intramural Research Program to the Maryland Psychiatric Research Center. The large-scale data-mining approach was transferred to a psychopharmacological setting with the development of our novel 'Pattern Array' strategy for identifying therapeutic application for novel and orphan drug compounds. In addition, extensive formal and informal discussions with practicing research psychiatrists directed the focus of our work on addiction and schizophrenia toward the neural circuitry of reward (approach motivation) and its opposite pole, anhedonia. As part of work conducted in a translational grant focused on reward (Gold, Shepard et al.,), we identified the habenula as a brain region ideally situated to influence reward processing. In a circuitry oriented manuscript, lesion and discretely timed electrical stimulation of the habenula circuit was used to discover, for the first time, that the habenula is intimately involved in governing the attribution of incentive value to previously neutral cues. Our current work investigates the role of habenula-associated circuitry in depression.

The habenula-associated circuitry work led us to our most recent area of research focus- the consequences of adolescent trauma on neurocircuitry (Hb-RMTg in particular) and its dramatic effect on adult mental illness. The series of Adverse Childhood Experience (ACE) studies dramatically documents the nearly linear increased risk for psychiatric illness associated with each traumatic experience during childhood. The goal of the our work is to accelerate the development of a novel childhood trauma model and explore a novel hypotheses related to altered neurocircuitry in the consequences of early-life trauma on adult psychopathology.

Research/Clinical Keywords

Trauma, Depression, Habenula, PTSD, Addiction, Psychopharmacology

Highlighted Publications

Neurocircuitry

- Brown PL, Palacorolla H, Brady D, Riegger K, Elmer GI, Shepard PD (2017) Habenula-Induced Inhibition of Midbrain Dopamine Neurons Is Diminished by Lesions of the Rostromedial Tegmental Nucleus. J Neurosci 37:217-225.
- Elmer GI, Brown PL, Shepard PD (2016) Engaging Research Domain Criteria (RDoC): Neurocircuitry in Search of Meaning. Schizophr Bull 42:1090-1095.
- Danna CL, Shepard PD, Elmer GI (2013) The habenula governs the attribution of incentive salience to reward predictive cues. Front Hum Neurosci 7:781.

Drug Discovery/Psychopharmacology

- Kafkafi N, Mayo CL, Elmer GI (2014) Mining mouse behavior for patterns predicting psychiatric drug classification. Psychopharmacology (Berl) 231:231-242.
- Danna CL, Elmer GI (2010) Disruption of conditioned reward association by typical and atypical antipsychotics. Pharmacol Biochem Behav 96:40-47.
- Elmer GI, Kafkafi N (2009) Drug discovery in psychiatric illness: mining for gold. Schizophr Bull 35:287-292.

Addiction

- Tapocik JD, Ceniccola K, Mayo CL, Schwandt ML, Solomon M, Wang BD, Luu TV, Olender J, Harrigan T, Maynard TM, Elmer GI, Lee NH (2016) MicroRNAs Are Involved in the Development of Morphine-Induced Analgesic Tolerance and Regulate Functionally Relevant Changes in Serpini1. Front Mol Neurosci 9:20.
- Tapocik JD, Luu TV, Mayo CL, Wang BD, Doyle E, Lee AD, Lee NH, Elmer GI (2013) Neuroplasticity, axonal guidance and micro-RNA genes are associated with morphine self-administration behavior. Addict Biol 18:480-495.
- Elmer GI, Pieper JO, Hamilton LR, Wise RA (2010) Qualitative differences between C57BL/6J and DBA/2J mice in morphine potentiation of brain stimulation reward and intravenous self-administration. Psychopharmacology (Berl) 208:309-321.
- Elmer GI, Pieper JO, Levy J, Rubinstein M, Low MJ, Grandy DK, Wise RA (2005) Brain stimulation and morphine reward deficits in dopamine D2 receptor-deficient mice. Psychopharmacology (Berl) 182:33-44.

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