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Editorial

Special issue resulting from the 22nd Annual Meeting of the Society for Behavioral Neuroendocrinology highlights society strengths

Every four years the Society for Behavioral Neuroendocrinology (SBN) holds its annual meeting in conjunction with the International Congress of Neuroendocrinology. In 2018, the joint SBN/ICN meeting occurred in July in Toronto, Canada. Having served as Program Chair for the SBN portion of the program as well as on the larger program committee for the full meeting, I had the opportunity to help assemble the program and to see it come to fruition. The meeting as a whole was stimulating and featured symposia and keynote speakers presenting a variety of topics that are dear to the hearts of “SBNers”. The SBN contributions highlighted the diversity of subjects that are studied by our members as well as the wide variety of approaches that we use. The peer-reviewed articles, including reviews and original research articles, that are included in this special issue give an idea of this variety but also illustrate some of the unifying themes in the field of behavioral neuroendocrinology.

One of the overarching themes that emerged in the presentations as well as the resulting papers is the importance of examining neuroendocrine mechanisms across developmental stages. The papers address factors such as environmental endocrine disruptors, early life adversity, and adult social experiences that alter brain and behavioral development prenatally, in adulthood, through old age, and potentially across generations. The models presented herein also reflect the broad, comparative approach that has been embraced by behavioral neuroendocrinologists. Thus, presentations at the meeting and articles included in the special issue describe research using organisms varying from fish, frogs and birds, to a range of rodent species (mice, rats, voles and nutria) to humans. In addition, a variety of scientific approaches from cutting-edge intersectional genetics to sophisticated analysis of behavior are used. We believe that this broad, multi-level, comparative approach is more likely to help identify organizing principles in the field and to enhance the rigor as well as the potential translational relevance of the work. Another theme that emerges in many of the papers is the importance of identifying and understanding the underlying mechanisms of sex differences in brain and behavior. At a time when the consideration of sex as a biological variable has emerged as an emphasis for biomedical and neuroscience research, it is particularly informative to hear from experts, some of whom have focused on this topic for decades, about critical factors that must be considered.

The first contribution in this issue is a commentary from the winner of the Daniel S. Lehrman Lifetime Achievement Award, which honors a senior researcher in the field for a career of eminent scholarship in behavioral neuroendocrinology and a record of outstanding mentorship of future scientists. Our 2018 Lehrman Award winner, Dr. Jeff Blaustein, shares his perspective on what traits and choices lead to a successful career as an academic scientist (Blaustein, 2018). Next, Dr.

Andrea Gore, selected as the Elsevier plenary, spoke on the developmental sequelae of exposure to environmental endocrine-disrupting chemicals. The dependent measures ranged from birth outcomes to alterations in adult brain and behavior. Ominously, the effects of these endocrine-disrupting chemicals even appear to be transmitted to future generations *via* germline epigenetic changes. Dr. Gore's (Gore et al., 2018) review article describes some of the common sources of endocrine-disrupting chemicals in our environment as well as how they disrupt neuroendocrine signaling. She describes the effects of these chemicals at different developmental stages and presents data on a range of social, communicative, and sociosexual behaviors that can be altered by exposure to these chemicals even in future generations. Dr. Ashlyn Swift-Gallant, who also delivered a plenary address, was the 2017 W. C. Young Recent Graduate Award winner. Her work examines the expression of androgen receptors in neural and non-neural tissues and the role that they play in sexual differentiation of the brain and in individual differences in behavior. Her sole-authored review article (Swift-Gallant, 2018) explores the putative biological basis of androphilia in mice and men. She hypothesizes that there is an inverted U-shaped relationship between androgens and sexual preference with both very low and very high androgens being associated with androphilia.

An improved understanding of the mechanisms, neuroendocrine and otherwise, that regulate resiliency or adaptation to early life adversity is critical for us to improve outcomes of humans exposed to a variety of stressors early in development. The first SBN symposium encouraged us to “mind the gap” between basic and applied research in order to move this area of research forward. Dr. Susanne Brummelte (Kott and Brummelte, 2019) reviews what is known and what needs to be discovered about the impact of maternal depression and selective serotonin reuptake inhibitors on infants so that women and their physicians can make more informed choices about depression treatment before, during, and after pregnancy. Dr. Amanda Kentner, who spoke about the potential therapeutic value of environmental enrichment both in pediatric settings as well as in animal models of early life inflammation, has contributed an original research article (Strzelewicz et al., 2019) examining whether environmental enrichment can compensate for a low security setting and poor diet in early development. Dr. Larry Young spoke on the mechanisms whereby oxytocin signaling in the nucleus accumbens can promote resiliency to neonatal neglect. Relatedly, Young and colleagues have contributed an original research article describing the first generation of oxytocin receptor mutant prairie voles using the CRISPR/Cas9 system (Horie et al., 2018). The ability to efficiently generate targeted mutations in so-called “non-model” organisms will improve the rigor of behavioral neuroscience

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research because traditional “model” organisms, such as mice, are not always the best, and certainly shouldn't be the only, species used to answer our questions.

Because SBN members have traditionally been educated in the importance of understanding the proximate and ultimate causes of behavior, our members tend to be highly cognizant of the multitude of factors that can alter brain and behavior, even when these factors are not the direct focus of our work. These important considerations include circadian and seasonal effects, which depend on the interplay of ambient lighting conditions and physiology. The review paper contributed by Dr. Annaliese Beery (Goodwin et al., 2018) presents data generated using prairie and meadow vole species examining the neurobiological concomitants of peer and mate social relationships. Using this comparative approach and two different types of social bonds, their research has shown that peer relationships are only weakly reinforcing or non-reinforcing, suggesting that different pathways underlie the different types of relationships even within species. The review paper by Dr. Lily Yan (Yan et al., 2018) explores the neural mechanisms whereby light intensity impacts mood and cognition. They posit that one of the reasons that these mechanisms are so poorly understood right now is that most of the research has used common laboratory species that are nocturnal. They review more recent data using a diurnal rodent wherein exposure to dim daylight results in higher depression- and anxiety-like behavior as well as impaired spatial learning and memory.

The next set of papers address sex hormones and sex differences. Dr. Farida Sohrabji studies human and preclinical stroke models to understand sex differences in ischemic injury and neuroprotection. Her review (Sohrabji et al., 2018) dissects the role of hormones of the hypothalamic-pituitary-gonadal axis in stroke risk and outcomes in women. Dr. Karyn Frick spoke on sex differences in and sex hormone effects on memory consolidation. Here, she contributes an original research article (Koss and Frick, 2019) exploring how 17-estradiol, androgens, and androgen receptors affect memory consolidation in male mice. Finally, an original research article contributed by Fishman et al. (2019) uses a naturalistic model to examine how androgens impact sexual differentiation and development *in utero* in nutria, a feral rodent species that is deemed an agricultural pest in Israel.

The final series of papers were contributed by the presenters in the Young Investigators Award Symposium, which features work done by young scientists in the late stages of graduate school or in post-doctoral positions. Dr. Margaret Mohr contributed original research testing the hypothesis that pubertal development of hypothalamic estradiol-facilitated progesterone synthesis is one of the neural “switches” facilitating reproductive maturation (Mohr et al., 2018). Dr. Kristina Smiley contributed a review paper exploring the role of prolactin in the control of parental behavior in birds (Smiley, 2019). Dr. Joanna Spencer-Segal's review paper (Spencer-Segal and Akil, 2018) examines neural pathways that promote resilience to stress and describes the putative role that glucocorticoid signaling plays within these pathways.

I thank the members of the SBN Program Committee and the SBN Awards Committee for their work in selecting the speakers for the 2018 annual meeting – the science was stimulating! I would like to close with

an observation that is merely a coincidence and is not relevant to the high quality of the research presented but that may be encouraging to us in these days of women's and science marches. That is that vast majority of speakers chosen by the SBN Program Committee, which has an approximately equal sex distribution, happen to have been women. While it has nothing to do with the science, I think that it says very good things about the SBN.

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