Keynote Speech

Speaker Photo

Environmental Endocrine Disruption of Brain and Behavior

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Dr. Andrea Gore is Professor and Vacek Chair in Pharmacology at the University of Texas at Austin. Her research team is investigating fundamental mechanisms of how environmental endocrine-disrupting chemicals (EDCs) perturb the developing brain; sex differences in EDC actions; and transgenerational epigenetic effects. Dr. Gore's research has been funded continuously by the NIH, NSF, and foundations since 1992. She has published 4 books and nearly 200 scientific papers on her research. She was Editor-in-Chief of *Endocrinology* from 2013-2017 and was lead author of the Endocrine Society's two Scientific Statements on EDCs. Among her most notable research, teaching, and service awards are her election as Fellow of the American Association for the Advancement of Science; the University of Texas Cooperative Society's Research Excellence Award; the Endocrine Society Laureate Award for Outstanding Public Service; and the Edith Clarke Woman of Excellence Award. Dr. Gore is very active in advocacy for, mentorship of, and education of trainees. 150+ undergraduate and graduate students of diverse interests and backgrounds have conducted independent research in her laboratory at the University of Texas at Austin.

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Environmental endocrine-disrupting chemicals (EDCs) are exogenous chemicals that perturb hormones and their actions. In our laboratory, we are studying how early life exposures to EDCs affect the developing brain and lead to behavioral dysfunctions in exposed individuals and their descendants across generations. To do this, pregnant rats are fed one of three treatments: the weakly estrogenic commercial polychlorinated biphenyl (PCB) mixture, Aroclor 1221 (A1221, 1 mg/kg); vinclozolin (VIN, 1 mg/kg), a fungicide with anti-androgenic properties; or the vehicle (3% DMSO in sesame oil). We monitor birth outcomes and postnatal development in female and male offspring. In adulthood, animals are run through a battery of behavioral tests to assess functional neurobiological changes. The brains of these rats are subsequently used to identify molecular and cellular changes underlying the behavioral phenotype. For multigenerational work, rats are bred to the F3 generation, which have no direct exposure to EDCs, in order to assess transgenerational epigenetic inheritance. Results show that directly exposed (F1 generation) rats exhibit sex-specific alterations in social, sociosexual, and anxiety-like behaviors. Gene-expression profiling of brains from these animals has identified suites of genes differentially affected by the EDCs compared to vehicle rats. From the transgenerational studies we find that social and anxiety-like behaviors are altered in a sex-specific manner, and that the lineage from which the F3 rats descend (paternal or maternal) plays a key role in outcomes, potentially due to differences in epigenetic programming of the germline between males and females. Current research seeks to determine how epigenetic marks may be retained across generations and lead to a behavioral phenotype. As a whole, this body of work indicates that gestational exposure to EDCs has life-long effects on the developing brain, neuroendocrine systems, and reproductive and social behaviors of exposed individuals, and their descendants. (Supported by NIH ES029464).