Biographical Information
Dr. Crawley is chief of the Laboratory of Behavioral Neuroscience of the Intramural Research Program, National Institute of Mental Health, National Institutes of Health in Bethesda, Maryland. She received a B.A. in Biology from the University of Pennsylvania in 1971, and a Ph.D. in Zoology from the University of Maryland in 1976. Her postdoctoral research in neuropsychopharmacology was conducted at Yale University School of Medicine. Dr. Crawley is the recipient of many honors and awards, including President of the International Behavioral Neuroscience Society, Mathilde Solowey Lecture Award in Neuroscience, Howard Hughes Medical Research Institute Preceptor Award, Society for Neuroscience Membership Committee Chairmanship Award, Fleur Strand Summer Neuropeptide Conference Award, International Behavioral Neuroscience Society Marjorie A. Myers Lifetime Achievement Award, the Autism Awareness Day Keynote Award and President of the International Behavioural and Neural Genetics Society. She is the Editor-in-Chief of the journal Neuropeptides and serves on the editorial boards of twelve scientific journals. She is the author of the widely used book, “What's Wrong With My Mouse? Behavioral Phenotyping of Transgenic and Knockout Mice”. Dr. Crawley’s laboratory generates new rodent behavioral tasks and applies emerging technologies to investigate genes regulating complex behavioral traits. Employing a comprehensive range of behavioral tests and control parameters, Dr. Crawley’s research team developed a three-tiered strategy for mouse behavioral phenotyping that is now routinely applied to investigations of mutant mice by the international biomedical research community. Mutant mouse models of human genetic diseases, including autism, have been characterized for behavioral phenotypes with conceptual analogies to the human symptoms. Transgenic knockout, and knockin mice with targeted mutations in candidate neurodevelopmental genes for autism, including neulorgins and shanks, are also being analyzed to investigate the biological mechanisms underlying autism spectrum disorders. Dr. Crawley’s research employs robust behavioral phenotypes in optimized mouse models as translational tools to evaluate the therapeutic efficacy of novel treatments for autism spectrum disorders.

Presentation Abstract (4:30 pm)
Mouse Models of Autism to Discover Causes and Develop Treatments
Autism is a neurodevelopmental disorder with a strong genetic component. As candidate genes for autism spectrum disorders are identified, mice with targeted mutations in these genes are increasingly available. Model organisms offer useful translational tools to test hypotheses about single gene mutations, copy number variants including chromosomal duplications and deletions, DNA methylation and other epigenetic regulators, neuroanatomical and neurophysiological abnormalities, immune dysfunctions, environmental contaminants, diets, and other proposed causes of autism. Dr. Crawley’s laboratory and others are developing mouse behavioral paradigms with conceptual analogies to the three diagnostic symptoms of autism. This presentation will focus on behavioral tests for mice that maximize face validity to the defining symptoms of autism: deficits in reciprocal social interactions, deficits in communication, and motor stereotypies/repetitive behaviors. Behavioral assays relevant to the associated symptoms of autism, including anxiety, seizures, sleep disruption, mental retardation, and hyperreactivity to sensory stimuli, may provide further insights into the phenotypes of a mouse model of autism spectrum disorders. Various types of mouse genetics are employed in our laboratory to understand the genetic basis of social interaction, communication, and repetitive behaviors. An inbred strain that displays traits relevant to all three diagnostic criteria for autism will be used to illustrate characteristics of a strong mouse model of autism. Representative results in mice with targeted mutations in candidate genes for autism will be described. Mouse models offer ideal translational systems to discover therapeutic targets and evaluate treatment efficacy. Our mouse models are being applied to the search for pharmacological therapeutics. Early preclinical results will be presented on drug treatments and behavioral interventions that reverse components of the autism-relevant behavioral phenotypes in the BTBR mouse model of autism.