2016 Summary of Advances Nominations: July – October 2016

Question 1 (Screening and Diagnosis)
No articles were nominated in July - October 2016 for Question 1
Question 2 (Underlying Biology)
Marchetto MC, Belinson H, Tian Y, Freitas BC, Fu C, Vadodaria KC, Beltrao-Braga PC, Trujillo CA, Mendes AP, Padmanabhan K, Nunez Y, Ou J, Ghosh H, Wright R, Brennand KJ, Pierce K, Eichenfield L, Pramparo T, Eyler LT, Barnes CC, Courchesne E, Geschwind DH, Gage FH, Wynshaw-Boris A, Muotri AR. **Altered proliferation and networks in neural cells derived from idiopathic autistic individuals**. Mol Psychiatry. 2016 Jul 5. [Epub ahead of print] [PMID: 27378147]
Using fibroblasts from ASD individuals with early brain overgrowth and non-ASD controls with normal brain development, the present study generated human cells models in the form of induced pluripotent stems cells (IPSCs), neural progenitor cells (NPCs) and neurons. Results demonstrated that ASD-derived NPCs showed increased cell proliferation, while ASD-derived neurons displayed abnormal neurogenesis and reduced synaptogenesis leading to functional defects in neuronal networks. Moreover, defects in neuronal networks could be rescued by insulin growth factor 1 (IGF-1), a drug that is currently in clinical trials for ASD. These findings point to potential new innovations to develop future human cell models of other ASD endophenotypes and further examine cellular mechanisms that underlie the etiology and pathophysiology of ASD.
Green SA, Hernandez L, Bookheimer SY, Dapretto M. **Salience Network Connectivity in Autism Is Related to Brain and Behavioral Markers of Sensory Overresponsivity**. J Am Acad Child Adolesc Psychiatry. 2016 Jul;55(7):618-626.e1. [PMID: 27343889]
Though sensory processing impairments are common among individuals with ASD, their underlying biological mechanisms are poorly understood and for which there is no evidence-based intervention. Using Functional Magnetic Resonance Imaging, this study demonstrates that specific patterns of resting-state connectivity are related to both brain and behavioral markers of sensory overresponsivity in ASD. These findings have important Implications for intervention.
Libertus K, Greif ML, Needham AW, Pelphrey K. **Infants' observation of tool-use events over the first year of life**. J Exp Child Psychol. 2016 Dec;152:123-135. [PMID: 27522041]
This study examined the eye-gaze patterns of infants while observing naturalistic tool-use by an adult caregiver or actor. The findings revealed that during infant development there were significant changes in infants' eye-gaze patterns, particularly from 7 to 10 months of age, from an initial attention solely on facial gaze, toward a more dynamic integrated focus on both the actor's face and the tool or object of use. These findings shed new light on normative developmental processes among infants, which can help inform how eye-gaze and attentional biases develop differentially among children at-risk for ASD.
Shen MD, Li DD, Keown CL, Lee A, Johnson RT, Angkustsiri K, Rogers SJ, Müller RA, Amaral DG, Nordahl CW. **Functional Connectivity of the Amygdala Is Disrupted in Preschool-Aged Children With Autism Spectrum Disorder**. J Am Acad Child Adolesc Psychiatry. 2016 Sep;55(9):817-24. [PMID: 27566123]
The present study examined the extent to which functional connectivity of the amygdala is altered in preschool-age children with ASD. The findings showed that among children with ASD, there was evidence of significantly weaker connectivity between the amygdala and brain regions critical for

social communication, as well as those implicated in repetitive behaviors (bilateral medial prefrontal cortex, temporal lobes, and striatum). Weakened functional connectivity was also associated with severity of ASD symptoms. These findings signal an advance in our understanding of the neurobiological mechanisms of ASD and hold promise for future studies that can further our knowledge of the early developmental changes in neural connectivity that are associated with deficits in ASD.
Question 3 (Risk Factors)
Julvez J, Méndez M, Fernandez-Barres S, Romaguera D, Vioque J, Llop S, Ibarluzea J, Guxens M, Avella-Garcia C, Tardón A, Riaño I, Andiarena A, Robinson O, Arija V, Esnaola M, Ballester F, Sunyer J. **Maternal Consumption of Seafood in Pregnancy and Child Neuropsychological Development: A Longitudinal Study Based on a Population With High Consumption Levels**. Am J Epidemiol. 2016 Feb 1;183(3):169-82. [PMID: 26740026]
This is a large cohort study from a high-powered epidemiological institute in Spain, where seafood consumption is very high. Results suggest some protection from autism-spectrum traits by consumption of large fatty fish during pregnancy.
Bennett D, Bellinger DC, Birnbaum LS, Bradman A, Chen A, Cory-Slechta DA, Engel SM, Fallin MD, Halladay A, Hauser R, Hertz-Picciotto I, Kwiatkowski CF, Lanphear BP, Marquez E, Marty M, McPartland J, Newschaffer CJ, Payne-Sturges D, Patisaul HB, Perera FP, Ritz B, Sass J, Schantz SL, Webster TF, Whyatt RM, Woodruff TJ, Zoeller RT, Anderko L, Campbell C, Conry JA, DeNicola N, Gould RM, Hirtz D, Huffling K, Landrigan PJ, Lavin A, Miller M, Mitchell MA, Rubin L, Schettler T, Tran HL, Acosta A, Brody C, Miller E, Miller P, Swanson M, Witherspoon NO; American College of Obstetricians and Gynecologists (ACOG); Child Neurology Society; Endocrine Society; International Neurotoxicology Association; International Society for Children's Health and the Environment; International Society for Environmental Epidemiology; National Council of Asian Pacific Islander Physicians; National Hispanic Medical Association; National Medical Association. **Project TENDR: Targeting Environmental Neuro-Developmental Risks. The TENDR Consensus Statement.** Environ Health Perspect. 2016 Jul 1;124(7):A118-22. [PMID: 27479987]
This represents the consensus of many scientists and health professionals and should be read by IACC.
Avella-Garcia CB, Julvez J, Fortuny J, Rebordosa C, García-Esteban R, Galán IR, Tardón A, Rodríguez-Bernal CL, Iñiguez C, Andiarena A, Santa-Marina L, Sunyer J. **Acetaminophen use in pregnancy and neurodevelopment: attention function and autism spectrum symptoms**. Int J Epidemiol. 2016 Jun 28. pii: dyw115. [Epub ahead of print] [PMID: 27353198]
Highlights a potential preventable exposure.
Question 4 (Treatments and Interventions)
Srinivasan SM, Eigsti IM, Neelly L, Bhat AN. **The effects of embodied rhythm and robotic interventions on the spontaneous and responsive social attention patterns of children with Autism Spectrum Disorder (ASD): A pilot randomized controlled trial**. Res Autism Spectr Disord. 2016 Jul;27:54-72. [PMID: 27453721]
This pilot study examined a novel form of a robotic movement intervention, as well as a rhythm-based therapy, each designed to facilitate and improve social interaction and engagement between young children with ASD and their social partners. Children who participated in either the rhythm-based therapy or the robotic movement intervention showed greater improvements in social attention, relative to children in the standard-of-care comparison group. However, children in the rhythm group

showed greater attention to objects and social partners than those in the robotic movement group. And over the course of the 8-week intervention trial, children in the robotic movement group displayed increased inattention to the activities. These preliminary findings suggest the potential utility for larger prospective studies of rhythmic-based interventions that focus on whole-body imitation, and interpersonal synchrony-based activities that may enhance social attention in young children with ASD.
Almirall D, DiStefano C, Chang YC, Shire S, Kaiser A, Lu X, Nahum-Shani I, Landa R, Mathy P, Kasari C. **Longitudinal Effects of Adaptive Interventions With a Speech-Generating Device in Minimally Verbal Children With ASD**. J Clin Child Adolesc Psychol. 2016 Jul-Aug;45(4):442-56. [PMID: 26954267]
In the first of its kind study, this investigation compared growth in communications outcomes among (N=61) minimally-verbal school-age children with ASD (ages 5-8), who participated in three adaptive interventions using a multiple-assignment randomized trial (SMART) design. The three interventions consisted of joint attention, symbolic play, engagement and regulation (JASP), enhanced milieu teaching (EMT), and provision of a speech-generating device (SGD). The adaptive intervention design consisted of different combinations of the 3 interventions. The results showed that the combination of JASP+EMT+SGD led to the greatest gains in spontaneous communication utterances and joint attention among minimally-verbal children with ASD.
Anderson A, Locke J, Kretzmann M, Kasari C; AIR-B Network. **Social network analysis of children with autism spectrum disorder: Predictors of fragmentation and connectivity in elementary school classrooms**. Autism. 2016 Aug;20(6):700-9. [PMID: 26567264]
The study utilized an innovative social network analytic method to determine how the social networks of children with ASD in general education classrooms change, in comparison to the social connectivity of peers who do not have ASD. The study found that for girls with ASD, higher IQ was associated with stronger social connectedness with peers. However, for boys with ASD, increased social connectedness was associated with smaller classroom size. These relationships have important implications for how researchers and service providers design and implement interventions and services aimed at facilitating the social integration of children with ASD into general or mainstream classroom environments.
Question 5 (Services)
No articles were nominated in July - October 2016 for Question 5
Question 6 (Lifespan Issues)
No articles were nominated in July - October 2016 for Question 6
Question 7 (Infrastructure and Surveillance)
No articles were nominated in July - October 2016 for Question 7