

David G. Amaral, Ph.D.

Journal Articles

- 2014 Hunsaker MR, Scott JA, Bauman MD, Schumann CM, **Amaral DG**. Postnatal development of the hippocampus in the Rhesus macaque (*Macaca mulatta*): A longitudinal magnetic resonance imaging study. *Hippocampus*. Jul;24(7):794-807. doi: 10.1002/hipo.22271. Epub 2014 Apr 1. PMCID: PMC4065201.
- 2014 Bernier R, Golzio C, Xiong B, Stessman HA, Coe BP, Penn O, Witherspoon K, Gerds J, Baker C, Vulto-van Silfhout AT, Schuurs-Hoeijmakers JH, Fichera M, Bosco P, Buono S, Alberti A, Failla P, Peeters H, Steyaert J, Vissers LE, Francescatto L, Mefford HC, Rosenfeld JA, Bakken T, O'Roak BJ, Pawlus M, Moon R, Shendure J, **Amaral DG**, Lein E, Rankin J, Romano C, de Vries BB, Katsanis N, Eichler EE. Disruptive CHD8 Mutations Define a Subtype of Autism Early in Development. *Cell*. Jul 17;158(2):263-76. doi: 10.1016/j.cell.2014.06.017. Epub 2014 Jul 3. PubMed Central PMCID: PMC4136921.
- 2014 Morgan JT, Barger N, **Amaral DG**, Schumann CM. Stereological study of amygdala glial populations in adolescents and adults with autism spectrum disorder. *PLoS One*. Oct 17;9(10):e110356. PMCID: PMC4201518.
- 2014 West PR, **Amaral DG**, Bais P, Smith AM, Egnash LA, Ross ME, Palmer JA, Fontaine BR, Conard KR, Corbett BA, Cezar GG, Donley EL, Burrier RE. Metabolomics as a tool for discovery of biomarkers of autism spectrum disorder in the blood plasma of children. *PLoS One*. Nov 7;9(11):e112445. PMCID: PMC4224480.
- 2014 Coe BP, Witherspoon K, Rosenfeld JA, van Bon BW, Vulto-van Silfhout AT, Bosco P, Friend KL, Baker C, Buono S, Vissers LE, Schuurs-Hoeijmakers JH, Hoischen A, Pfundt R, Krumm N, Carvill GL, Li D, **Amaral DG**, Brown N, Lockhart PJ, Scheffer IE, Alberti A, Shaw M, Pettinato R, Tervo R, de Leeuw N, Reijnders MR, Torchia BS, Peeters H, O'Roak BJ, Fichera M, Hehir-Kwa JY, Shendure J, Mefford HC, Haan E, Gécz J, de Vries BB, Romano C, Eichler EE. Refining analyses of copy number variation identifies specific genes associated with developmental delay. *Nat Genet*. Oct;46(10):1063-71. PMCID: PMC4177294.
- 2015 Bauman MD, Iosif AM, Smith SE, Bregere C, **Amaral DG**, Patterson PH. Activation of the maternal immune system during pregnancy alters behavioral development of rhesus monkey offspring. *Biol Psychiatry*. Feb 15;75(4):332-41. doi: 10.1016/j.biopsych.2013.06.025. Epub 2013 Sep 5. PubMed PMID: 24011823.
- 2015 Deng Y, Goodrich-Hunsaker NJ, Cabaral M, **Amaral DG**, Buonocore MH, Harvey D, Kalish K, Carmichael OT, Schumann CM, Lee A, Dougherty RF, Perry LM, Wandell BA, Simon TJ. Disrupted fornix integrity in children with chromosome 22q11.2 deletion syndrome. *Psychiatry Res*. Apr 30;232(1):106-14. Epub 2015 Feb 11. PMCID: PMC4404209.

- 2015 Noble KG, Houston SM, Brito NH, Bartsch H, Kan E, Kuperman JM, Akshoomoff N, **Amaral DG**, Bloss CS, Libiger O, Schork NJ, Murray SS, Casey BJ, Chang L, Ernst TM, Frazier JA, Gruen JR, Kennedy DN, Van Zijl P, Mostofsky S, Kaufmann WE, Kenet T, Dale AM, Jernigan TL, Sowell ER. Family income, parental education and brain structure in children and adolescents. *Nat Neurosci*. May;18(5):773-8. doi: 10.1038/nn.3983. Epub 2015 Mar 30. PMCID: PMC4414816.
- 2015 Jernigan TL, Brown TT, Hagler DJ Jr, Akshoomoff N, Bartsch H, Newman E, Thompson WK, Bloss CS, Murray SS, Schork N, Kennedy DN, Kuperman JM, McCabe C, Chung Y, Libiger O, Maddox M, Casey BJ, Chang L, Ernst TM, Frazier JA, Gruen JR, Sowell ER, Kenet T, Kaufmann WE, Mostofsky S, **Amaral DG**, Dale AM; Pediatric Imaging, Neurocognition and Genetics Study. The Pediatric Imaging, Neurocognition, and Genetics (PING) Data Repository. *Neuroimage*. May 1. pii: S1053-8119(15)00357-2. doi: 10.1016/j.neuroimage.2015.04.057. [Epub ahead of print] PubMed PMID: 25937488.
- 2015 Eicher JD, Montgomery AM, Akshoomoff N, **Amaral DG**, Bloss CS, Libiger O, Schork NJ, Darst BF, Casey BJ, Chang L, Ernst T, Frazier J, Kaufmann WE, Keating B, Kenet T, Kennedy D, Mostofsky S, Murray SS, Sowell ER, Bartsch H, Kuperman JM, Brown TT, Hagler DJ Jr, Dale AM, Jernigan TL, Gruen JR; Pediatric Imaging Neurocognition Genetics study. Dyslexia and language impairment associated genetic markers influence cortical thickness and white matter in typically developing children. *Brain Imaging Behav*. May 9. [Epub ahead of print] PubMed PMID: 25953057.
- 2015 Bakken TE, Miller JA, Luo R, Bernard A, Bennett JL, Lee CK, Bertagnolli D, Parikshak NN, Smith KA, Sunkin SM, **Amaral DG**, Geschwind DH, Lein ES. Spatiotemporal dynamics of the postnatal developing primate brain transcriptome. *Hum Mol Genet*. Aug 1;24(15):4327-39. doi: 10.1093/hmg/ddv166. Epub 2015 May 7. PubMed PMID: 25954031; PubMed Central PMCID: PMC4492396.
- 2015 Nordahl CW, Iosif AM, Young GS, Perry LM, Dougherty R, Lee A, Li D, Buonocore MH, Simon T, Rogers S, Wandell B, **Amaral DG**. Erratum: Sex differences in the corpus callosum in preschool-aged children with autism spectrum disorder. *Mol Autism*. Jun 20;6:39. doi: 10.1186/s13229-015-0030-3. eCollection 2015. PubMed PMID: 26097676; PubMed Central PMCID: PMC4475327.
- 2015 van Bon BW, Coe BP, Bernier R, Green C, Gerdtts J, Witherspoon K, Kleefstra T, Willemsen MH, Kumar R, Bosco P, Fichera M, Li D, **Amaral DG**, Cristofoli F, Peeters H, Haan E, Romano C, Mefford HC, Scheffer I, Gecz J, de Vries BB, Eichler EE. Disruptive de novo mutations of DYRK1A lead to a syndromic form of autism and ID. *Mol Psychiatry*. Feb 24. doi: 10.1038/mp.2015.5. [Epub ahead of print] PubMed PMID: 25707398; PubMed Central PMCID: PMC4547916.
- 2015 Nordahl CW, Iosif AM, Young GS, Perry LM, Dougherty R, Lee A, Li D, Buonocore MH, Simon T, Rogers S, Wandell B, **Amaral DG**. Sex differences in the corpus callosum in preschool-aged children with autism spectrum disorder. *Mol Autism*. May 13;6:26. doi: 10.1186/s13229-015-0005-4. eCollection 2015. Erratum in: *Mol Autism*. 2015;6:39. PubMed PMID: 25973163; PubMed Central PMCID: PMC4429319.

- 2015 Moadab G, Bliss-Moreau E, **Amaral DG**. Adult social behavior with familiar partners following neonatal amygdala or hippocampus damage. *Behav Neurosci*. Jun;129(3):339-50. doi: 10.1037/bne0000062. PubMed PMID: 26030432; PubMed Central PMCID: PMC4452996.
- 2015 Scott JA, Grayson D, Fletcher E, Lee A, Bauman MD, Schumann CM, Buonocore MH, **Amaral DG**. Longitudinal analysis of the developing rhesus monkey brain using magnetic resonance imaging: birth to adulthood. *Brain Struct Funct*. [Epub ahead of print] PubMed PMID: 26159774.
- 2015 Newman E, Thompson WK, Bartsch H, Hagler DJ Jr, Chen CH, Brown TT, Kuperman JM, McCabe C, Chung Y, Libiger O, Akshoomoff N, Bloss CS, Casey BJ, Chang L, Ernst TM, Frazier JA, Gruen JR, Kennedy DN, Murray SS, Sowell ER, Schork N, Kenet T, Kaufmann WE, Mostofsky S, **Amaral DG**, Dale AM, Jernigan TL. Anxiety is related to indices of cortical maturation in typically developing children and adolescents. *Brain Struct Funct*. Jul 17. [Epub ahead of print] PubMed PMID: 26183468.

Abstracts

- 2014 Bliss-Moreau E, Moadab G, **Amaral DG**. *Damage to the macaque anterior cingulate cortex impedes decision-making and eliminates social preference*. Neuroscience 2014, Society for Neuroscience, Washington, DC. November.
- 2014 Bauman MD, Phillips RC, Rowland DJ, Kukis DL, Sutcliffe JL, Cherry SR, **Amaral DG**, Patterson PH, McAllister AK, Carter CS. *Cortical inflammation and increased pre-synaptic striatal dopamine in a nonhuman primate model of maternal immune activation*. Neuroscience 2014, Society for Neuroscience, Washington, DC. November.
- 2014 Bakkan T, Miller J, Ding S-L, Sunkin S, Smith K, Ng L, Szafer A, Goldy J, Lee C, Ebbert A, Dalley R, Dee N, Royall J, Parker PD, Riley Z, Molnar Z, Hevner R, **Amaral DG**, Hawrylycz M, Jones A, Phillips J, Wahnoutka P, Dang C, Bernard A, Hohmann J, Lein E. *Spatiotemporal expression atlas of brain development in non-human primate*. Neuroscience 2014, Society for Neuroscience, Washington, DC. November.
- 2014 Grayson D, Buonocore M, Bennett J, **Amaral DG**. *Large-scale plasticity following neonatal amygdala lesions in the rhesus macaque*. Neuroscience 2014, Society for Neuroscience, Washington, DC. November.
- 2015 Stamova B, Tian Y, Nordahl CW, Shen MD, Rogers SJ, **Amaral DG**, Sharp FR. *Use of Blood Transcriptomes to Characterize ASD Phenotypes*. International Meeting for Autism Research, Salt Lake City, UT. May.
- 2015 Libero L, Nordahl CW, Li DD, Rogers SJ, **Amaral DG**. *Persistence of Megalencephaly in Early Childhood in a Subset of Children with Autism Spectrum Disorder*. International Meeting for Autism Research, Salt Lake City, UT. May.

- 2015 Rose D, Careaga M, Yang H, McAllister AK, Carter CS, **Amaral DG**, Bauman MD, Ashwood P. *Increased Proinflammatory Cytokines Associated with Increased Abnormal Behaviors in a Non-Human Primate Model of Maternal Immune Activation*. International Meeting for Autism Research, Salt Lake City, UT. May.
- 2015 Burrier R, **Amaral DG**, Smith AM, West PR, Li DD, Fontaine B, Donley E, Rogers SJ. *A Metabolic Profile of Autism Spectrum Disorder from Autism Phenome Project Patient Plasma*. International Meeting for Autism Research, Salt Lake City, UT. May.
- 2015 Feng Y, Ota H, Rogers SJ, **Amaral DG**, Hoeft F, Nordahl CW, *Different Patterns of Cortical Brain Alterations in Preschool-Aged Boys with Autism Spectrum Disorder with and without Intellectual Disability*. International Meeting for Autism Research, Salt Lake City, UT. May.
- 2015 Johnson RT, Li DD, **Amaral DG**, Rogers SJ, Ozonoff S, Nordahl CW. *Sex Differences in Social Impairment in Preschool-Aged Children with Autism Spectrum Disorder*. International Meeting for Autism Research, Salt Lake City, UT. May.
- 2015 Barber A, Ladd-Acosta C, Lindquist M, Caffo B, Akshoomoff N, **Amaral DG**, Casey BJ, Chang L, Ernst T, Frazier J, Gruen J, Kaufmann W, Kenet T, Kennedy D, Sowell E, Dale A, Bloss C, Murray S, Jernigan T, Pekar J, Fallin D, Mostofsky S. *Genetic Variants Associated with Network Connectivity and Behavior*. 21st Annual Meeting of the Organization for Human Brain Mapping. Honolulu, HI. June.
- 2015 Fetcho R, Drysdale A, Glatt C, Lee F, Powers F, Dellarco D, Akshoomoff N, **Amaral DG**, Bloss C, Chang L, Ernst T, Frazier J, Gruen J, Kaufmann W, Keating B, Kenet T, Kuperman J, Kennedy D, Mostofsky S, Sowell E, Murray S, Dale A, Jernigan T, Casey BJ. *FAAH genotypic differences in frontolimbic circuitry emerge in adolescence*. 21st Annual Meeting of the Organization for Human Brain Mapping. Honolulu, HI. June.
- 2015 Li D, Young G, Lee A, **Amaral DG**, Nordahl CW. *Longitudinal Human Brain Development from 2-5 Years of Age*. 21st Annual Meeting of the Organization for Human Brain Mapping. Honolulu, HI. June.
- 2015 Grayson D, Shen K, **Amaral DG**. *A novel graph theory approach detects connectome reorganization due to neonatal amygdala lesions*. 21st Annual Meeting of the Organization for Human Brain Mapping. Honolulu, HI. June.

Presentations

- 2014 Interagency Autism Coordinating Committee, Full Committee Meeting, Rockville, MD. *Neuroimaging the Full Spectrum of Autism*. July.
- 2014 Interagency Autism Coordinating Committee, Full Committee Meeting, Rockville, MD. *Autism BrainNet*. July.
- 2014 Summit Educational Resources, Buffalo, NY. *What Neuroimaging has Taught Us About the Brain in Autism*. October.

- 2014 Summit Educational Resources, Buffalo, NY. *Mysteries of Autism: Anxiety and the Brain*. October.
- 2014 Autism Collaborative Summit, University of Missouri, Columbia, MO. *Neuroimaging the Full Spectrum of Autism*. October.
- 2015 Conferencia Mas Casadevall, Mas Casadevall, Barcelona, Spain. *Biological approaches on early detection of ASD*. April.
- 2015 Golden Gate Regional Center, San Mateo, CA. *Recent updates on autism research: from the MIND and beyond*. June.
- 2015 Cold Springs Harbor Laboratory, *Workshop on Autism Spectrum Disorders*, Cold Spring Harbor, NY. June.

Research Funding

T32 MH073124: Interdisciplinary Training for Autism Researchers. NIMH. 8/01/09 – 7/31/20. (**Amaral D**: Co-Director; Rogers S: PI). This program is designed to provide postdoctoral training in the behavioral and biological aspects of clinical development neuroscience, with a focus on autism.

5 R01 NS16980-31: Functional Organization of The Hippocampal Formation. NINDS. 02/01/2011 – 01/31/2016. (**Amaral D**: PI). These studies will provide fundamental neuroanatomical information regarding the postnatal maturation of the primate hippocampal formation. These data will provide a foundation for interpreting studies of the structural and functional maturation of the human hippocampal formation, with implications for studies of normal memory processes, such as infantile amnesia, as well as neurodevelopmental and genetic disorders, such as autism, epilepsy and schizophrenia.

R01 MH097236-01: Typical and Pathological Cellular Development of the Human Amygdala. NIH. 07/01/2011 – 06/30/2016. (Schumann C: PI; **Amaral D**: Co-Investigator). The goal of this research program is to provide a comprehensive map to cellular properties of human amygdala development from early childhood to adulthood in typically developing individuals and those with autism.

1R21MH105734-01: Detecting the Transfer of Maternal Antibodies into the Fetal Rhesus Monkey Brain. NIH. 09/01/14 – 08/31/16. (**Amaral D**: PI). The goal of the proposed research is to use positron emission tomography to track exogenously administered maternal antibodies across the placenta and into the fetal brain.

R01 MH103284: Predictors of Cognitive Development in Autism Spectrum Disorder. NIH. 09/2014 – 08/31/19. (Solomon M: PI; **Amaral D**: Co-Investigator). The goal of this study is to evaluate early neural predictors for middle childhood cognitive outcomes in a longitudinal study of children with ASD.

201502676: Collaborative Research on the Brain of H.M. Dana Foundation. 02/10/15 – 02/09/17. This project involves the postmortem histological analysis of the brain of the

famous amnesic patient, H.M. Our laboratory will manage the overall project and will ensure that tissue is distributed to selected investigators for further processing and analysis.

1R01MH103371: Neurophenotypic Trajectories and Behavioral Outcomes in Autism Spectrum Disorder. NIH. 04/01/15 – 03/31/20. (**Amaral D:** PI). The goal of the proposed research is to determine whether identified neural phenotypes persist into middle childhood and are associated with the quality and severity of core and co-morbid behavioral impairments related to ASD.

P50 MH106438-01: Multimodal Neuroimaging of Altered Brain Development in MIA Models and SZ. NIH. 04/01/15 – 03/31/20. (Carter C: PI, **Amaral D:** Co-Investigator Project 3). This is Project 3 of the Conte Center application Neuroimmune Mechanisms of Psychiatric Disorders. The goal of this proposed research is to provide information on alterations in brain development cause by MIA (maternal immune system activation) that may precede psychosis and to establish a common developmental neuropathology across mice, monkeys and humans to lead to clinically useful biomarkers for detecting individuals at high risk for Schizophrenia and promote earlier prevention and more effective treatment.

1 P50MH106438-01: UC Davis Conte Center Neuroimmune Mechanisms of Psychiatric Disorders. NIH/NIMH. 04/01/15 – 03/03/20. (Carter C: PI; **Amaral D:** Co-Investigator). The goal of the Conte Center is to test the hypothesis that maternal immune activation contributes to schizophrenia by altering immune molecules in the brains of offspring, which, in turn, alters cortical connectivity, function, and behavior during development.

P51 OD011107: California National Primate Research Center. NIH/OD. 05/01/15 – 04/30/18. (Lewin: PI, **Amaral D.** Core scientist of the Brain, Mind, and Behavior Research unit). California National Primate Research Center base grant.

Community Service

Chair, Ontario Genomics Institute Research Oversight Committee
Chair, Pre-IMFAR Early Career Workshop
Director, Autism BrainNet
Editor, *Autism Research*
Member, Hartwell Foundation Awards Selection Committee
Member, H.M. Steering Committee
Member, IDDRC Executive Committee, MIND Institute
Member, Interagency Autism Coordinating Committee (IACC)
Member, Program Committee, International Meeting for Autism Research (IMFAR)
Member, National Mental Health Advisory Committee (Council, NIMH)
Member, Recruitment Advisory Committee for Director, California National Primate Research Center
Member-at-Large, American Association for the Advancement of Science Section on Neuroscience
Member, Editorial Board, *Molecular Autism*
Member, Editorial Board, *Translational Neuroscience*
Member, Editorial Board, *Autism Research*
Member, Editorial Board, *Brain Structure and Function*

Member, Editorial Board, *Behavioral and Brain Functions*
Member, Editorial Board, *Hippocampus*