Brain Development Imaging Laboratory (BDIL)

Spring 2016 Newsletter

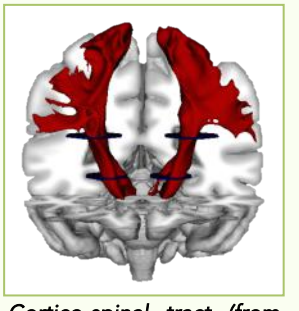
*Lab members at our BDIL booth at the **2016 NFAR Race for Autism.***

New Project: *Early "Brain Signature" of ASD*

Dr. Inna Fishman, a Research Professor at BDIL, whom many of you have met during the assessment interview, has recently received a large, ~$2.5M grant from the National Institutes of Health to study the early "brain signature" of ASD. Dr. Fishman's team will apply the most advanced and novel neuroimaging techniques to track brain network development and organization in children diagnosed with autism as their symptoms first appear, around age 18-24 months, through full manifestation of the disorder, when ASD symptoms reach their peak at the age of 4-5 years. Click here for media coverage of this project. If you know a family with a toddler (with, or without ASD) please tell them about this study!

Research Update

The motor system is different in ASD. Many previous studies have observed that children (and adults) with ASD move in slightly unusual ways. For example, infants that are later diagnosed with autism often show delayed motor milestones. However, our understanding of the brain bases of these motor abnormalities is still limited. In a recent study led by Dr. Ruth Carper (a Research Assistant Professor at BDIL), we found that the cortico-spinal tract, a bundle of nerve fibers connecting motor cortex and spinal cord (see Figure on the right), was bigger in the left brain hemisphere than in the right hemisphere in typically developing children. That makes sense because all of these children were right-handed, and it is the left half of the brain that controls the right side of the body. In children with ASD this difference between left and right brain was completely absent, which is surprising because these children were also right-handed. **There are two important messages in this study:** First, it shows that even a very basic motor system (the one that allows us to voluntarily move our arms, hands, or feet etc.) is differently organized in ASD. And second, the study underscores earlier findings from our lab (described in our 2014 New Year's Newsletter) indicating that the typical left hemisphere dominance seen in almost all right-handed people is reduced or reversed in ASD – not just for language, but also for other functions, such as motor control. The study, which was recently published in the *Journal of the American Academy of Child & Adolescent Psychiatry*, can be found here.



Cortico-spinal tract (from diffusion tensor imaging). The tract descends from primary motor cortex towards the spinal cord (seen at the very bottom of the figure).

APRIL IS NATIONAL AUTISM AWARENESS MONTH

National Autism Awareness Month represents an excellent opportunity to promote autism awareness, autism acceptance and to draw attention to children and families with autism.

Now recruiting!

BDIL is looking for research participants in the following age ranges:

- **18-26 months** toddlers
- School-age children ages 7-17 years
- **40-65 year** old adults.

We are recruiting children and adults **who have an ASD diagnosis** (or may have ASD), as well as **typically developing** participants (without ASD or other disorders). Please call or email us (see below) for specific criteria and time commitment for each of these projects. All participants will be reimbursed for their time and effort.

New research collaborations:

Is your child with autism also anxious? In collaboration with SDSU colleagues specializing in anxiety disorders and their treatment (Drs. Nader Amir, Robin Weersing, and Jillian Wiggins), we are starting a new study aiming to examine anxiety (e.g., feeling nervous, worried, or scared) in children with autism. We plan to identify brain activation patterns of anxiety in autism, and also offer novel ***behavioral treatment*** for anxiety in autism. If you are interested in hearing more about the anxiety treatment, please contact us directly at BDIL@sdsu.edu.

Autism genes. As announced in our last Newsletter, we are collaborating with an autism genetics expert at UCSD, Dr. Jonathan Sebat, and his group. Our plan is to 'sequence' the DNA of all children who have participated in our imaging studies. Very little is known today about how genetic risk for ASD affects the developing brain, but such knowledge is the first step towards developing treatments that may prevent brain disturbances during development. If you and your child have participated in our imaging studies, please consider helping us with this part of the study!

Research update

Hearing in the visual cortex? A recent study led by Dr. Joanne Jao Keehn, a postdoctoral fellow at BDIL, and former graduate student Sandra Sanchez examined brain activations during simple auditory and visual tasks. When typically developing children had to decide whether a beep they heard was high or low, their auditory cortex in the temporal lobes was activated, but their visual cortex at the back of the brain (occipital lobe) showed reduced activity. This is expected when participants know that only auditory information will be important in a task. Children with ASD also activated auditory cortex during the hearing task. However, rather than showing reduced activity in visual cortex, they **also** showed *activation* for the auditory stimuli in *visual cortex*. Intriguingly, this unusual visual activity was related to the severity of their autistic symptoms. Our study adds to the growing evidence of unusual use of visual brain regions in many tasks that do not actually require vision. This could suggest that visual functions make up for problems in other sensory or cognitive domains. The study was recently published in the journal *Autism Research*.

Help spread the word!

We are ***always*** looking for families who are willing to take part in our ongoing studies. Please be our Ambassadors and assist us with finding more families – whether they have a child with autism spectrum disorder or not – involved in our studies, and in advancing science towards a better understanding and better treatments of ASD.

If you and your child (or your friends, neighbors, relatives) are interested in learning more, or getting involved in our research, please call us at **(619) 594-0176** or email **BDIL@sdsu.edu**.