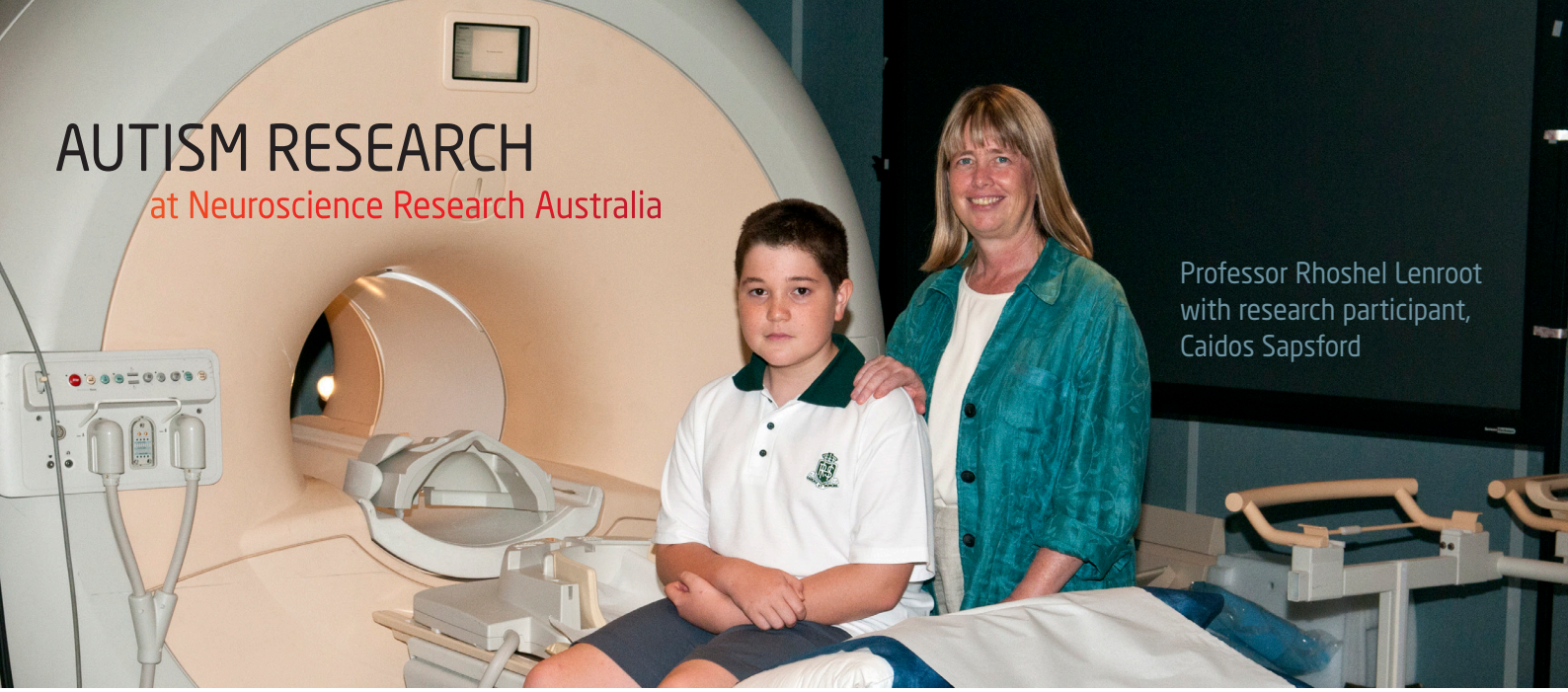
AUTISM RESEARCH

at Neuroscience Research Australia



Professor Rhoshel Lenroot with research participant, Caidos Sapsford

NeuRA

Discover. Conquer. Cure.

NeuRA (Neuroscience Research Australia) is one of the largest independent medical and clinical research institutes in Australia and an international leader in neurological research.

Diseases of the brain and nervous system pose the greatest health, economic and social burden of any disease group because they are chronic, debilitating and have no known cures.

Medical research is the cornerstone of efforts to advance the health and wellbeing of families and the community. Our dedicated scientists are focussed on transforming their research into significant and practical benefits for all patients.

WHAT IS AUTISM? Autism is a common developmental disability that appears by the time a child is 3 years old. Individuals with autism have problems in social interactions and communication. They may also show tendency towards doing things repetitively, becoming distressed by change, or having a narrow range of things that they are interested in. Although many individuals with autism have intellectual disability, between 1/3 and 2/3 have normal cognitive function. Autism and Asperger's Disorder are both members of a group of similar conditions called the Autism Spectrum Disorders. Asperger's Disorder is similar to autism, except that individuals with Asperger's disorder do not have delayed language or cognitive development.

WHAT DO WE KNOW ABOUT AUTISM? Although there is still a lot to learn about what causes autism, genes likely play an important role. There are several different known genetic disorders that increase the likelihood that a person will have autism, as does having a twin with autism. While it is possible that environmental factors are also important, which environmental factors these may be aren't yet known. Many individuals with autism have other symptoms in addition to the ones described above, such as anxiety, poor attention, and sensory abnormalities like being upset by noise. Autism is a lifelong disorder, but the ability to interact socially and to communicate improves for many children as they get older, and there is growing evidence that starting behavioral treatments early may help to decrease the severity of symptoms.

ABOUT OUR RESEARCH Professor Rhoshel Lenroot is a Research Fellow at NeuRA, the Chair of Infant, Child, and Adolescent Psychiatry and Director for Child and Adolescent Mental Health Services for the Southeastern Sydney Local Health District. She and her team are using brain imaging techniques to better understand brain structure and function in children, adolescents, and adults with autism spectrum disorders. Their research is focusing on identifying groups of individuals within the autism spectrum who may be more likely to benefit from particular kinds of behavioral or pharmacologic treatment, and on understanding the relationship between autism and other developmental disorders.

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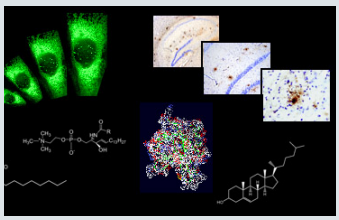


CURRENT PROJECTS

EYE CONTACT AND EMPATHY

AN IMPORTANT PART OF HEALTHY SOCIAL INTERACTION is the capacity for empathy, meaning the abilities to understand and to share what other people are feeling. Children with autism often have impaired development of empathy, as do some children who do not have autism but do have a type of chronic callous and emotional aggressive behavior.

In both these groups, problems in understanding other people's feelings has been linked to not paying attention to the eyes, which are one of the main clues for interpreting facial expressions. This has led to questions of whether similar treatments to increase eye contact may be helpful for both groups. However, it is likely that poor eye contact may arise from different causes, which may affect optimal treatments. For example, there is evidence that at least some children with autism may become distressed by eye contact because of anxiety, while others may not pay attention to the eyes because of lacking the normal developmental tendencies to find pleasure in eye contact with caregivers.

This study combines functional magnetic resonance imaging (fMRI) with clinical measures to determine whether there are different underlying reasons for poor eye contact in children with autism or aggressive behavior, with the goal of determining whether this information can be used to eventually design optimal treatment for individuals.

HYPERSENSITIVITY TO SOUND IN AUTISM

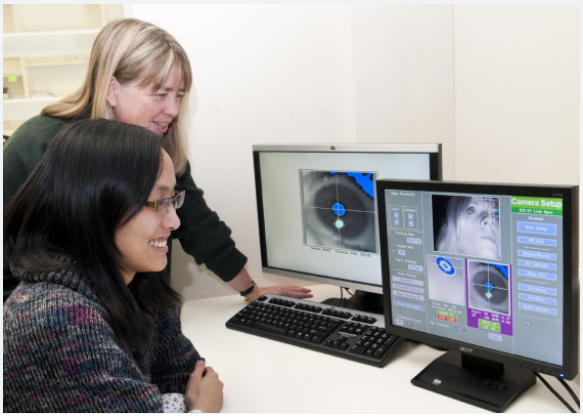
A SIGNIFICANT PROBLEM FOR MANY INDIVIDUALS WITH AUTISM is heightened sensitivity to sound, also called hyperacusis, which can cause severe distress. The cause of hyperacusis in autism is not known, but there is evidence to suggest at least some individuals with autism have processing of sound in the brain. Many individuals with autism also have heightened levels of anxiety, which is typically associated with an increased stress response that may also lead to differences in sensory function.

The goal of this study is to identify which of these factors is most important as a cause of hyperacusis. We will compare measures of central auditory processing obtained using electroencephalography (EEG), anxiety, and physiological stress between young people with autism and hyperacusis, those with autism who do not have hyperacusis, and typically developing controls. Identification of the sources of hyperacusis will help to identify potential treatments.

NEUROTRANSMITTER LEVELS AND BRAIN ACTIVITY IN AUTISM

BRAIN ACTIVITY DEPENDS ON LARGE NUMBERS OF BRAIN CELLS, or neurons, interacting efficiently in complex networks. One way in which neurons communicate with each other is through substances called neurotransmitters. This study seeks to determine whether abnormal function of neurotransmitters called glutamate and GABA results in inefficient interactions of neurons, and if this is responsible for symptoms in some people with autism.

We are measuring neurotransmitter levels using MRI. We are collaborating with researchers at Macquarie University to map brain activity with magnetoencephalography (MEG). The coordinated activity of large numbers of neurons creates a weak magnetic field around the brain. MEG uses a device that looks like an enormous hairdryer to measure changes in this magnetic field. Demonstrating that glutamate and GABA are linked to brain activity and symptoms in autism will be an important step towards development of medications affecting these neurotransmitters as a treatment for autism.



Professor Rhoshel Lenroot and PhD student Pui Ka Yeung are studying how people look at faces

While we hope you find this information sheet useful, it is always important to discuss any questions about autism or its treatment with your doctor or other health care provider.

HOW YOUR SUPPORT HELPS

We are able to make significant advances due to the dedication and generosity of countless people who come to NeuRA every day - research participants, families, carers and supporters. Your donation or bequest will play a key role in allowing us to continue to work towards transforming the lives of all Australians through medical breakthroughs. For further information on how you can support our research phone 1300 888 019 or make a secure donation at neura.edu.au/donate.

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