

WUNDER Lab Newsletter

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Letter from Investigators

Thank you to all families for participating in our research studies looking at how early brain development is related to thinking and behavioral skills in children! We wanted to send you some updates about the Washington University Neonatal and Developmental Research (WUNDER) Team.

At this time, we have nearly finished seeing our oldest group of 5-year-old children, which is a big achievement! Thank you for helping us reach this very important milestone. The WUNDER Team presented some of the study findings at the Pediatric Academic Societies Meeting in Baltimore this spring. For those of you who are parents or caregivers of some of our youngest study participants, we are really looking forward to seeing you again soon when your child turns 2 and 5 years old!

As always, it has been a joy to have your children come back and see us for their follow-up visits. We really enjoy seeing how much they have grown and learned between their visits, and we are also excited to see those of you who have appointments coming up! We are incredibly grateful to each of you for your continued participation in our research studies. We could not do all of this without you.

Best,
Drs. Cynthia Rogers and Chris Smyser

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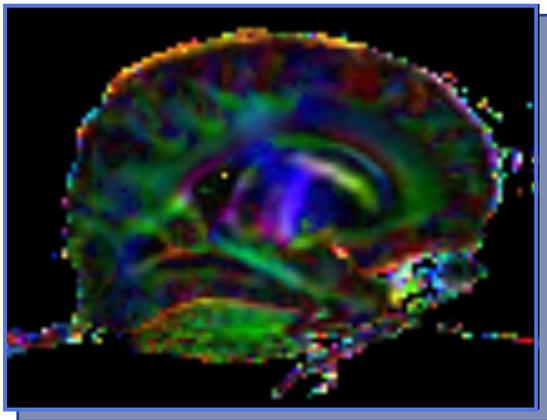


White Matter in the Brain and Behavioral Development

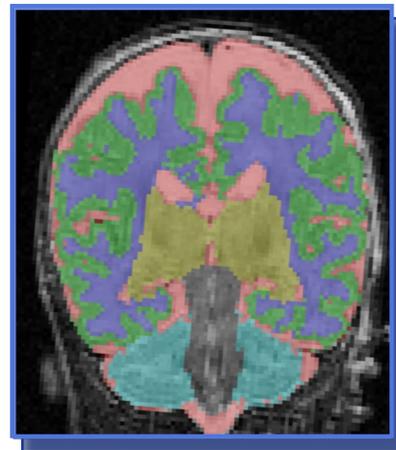
Members of the WUNDER Team have been investigating the impact of premature birth on brain structure and behavioral development. One aspect of brain development that we have been looking at includes white matter, which is the ‘cabling’ or ‘wiring’ of the brain that helps different brain areas communicate with each other. We investigated how water movement in the white matter fibers of the brain might be impacted by preterm birth, and how white matter might also be related to social, movement and thinking skills in preterm children at age 2 years. Our findings showed that changes in the structure of white matter in some areas of the brain were related to developmental outcomes, specifically social-emotional and movement performance at age 2 years. This study suggests that MRI brain imaging during infancy can be useful to identify children born preterm who may need extra help and support with their social-emotional and behavioral development.

Cynthia Rogers, Tara Smyser, Christopher Smyser, Joshua Shimony, Terrie Inder, Jeffrey Neil. “Regional white matter development in very preterm infants: perinatal predictors and early developmental outcomes” (2015) *Pediatric Research*.

“Brain imaging during infancy can be used for early identification of behavioral outcome”



This image comes from a diffusion tensor imaging scan. The red, green and blue colors show the directions of the white matter fibers in the brain.



This image shows different tissue types in the brain. White matter tissue is colored in purple.

Development of Brain Regions in Preterm and Term Infants

Another study by the WUNDER Team investigated brain maturation in infants born prematurely. We looked at how different areas of the brain grow or mature over time, and specifically looked at differences in brain growth between preterm children who were born with and without brain injury. This means that the WUNDER team was able to look at the effects of both prematurity and brain injury on brain growth soon after the time of birth. Specific areas of the brain were studied because previous research has shown that different areas of the brain grow more quickly than other areas early in development. Study findings showed that the brain areas associated with movement and sensory functions were developing at a faster rate than other brain areas in both preterm and term infants. This means that MRI is a useful tool to examine how areas of the brain mature at different rates in both high-risk and low-risk groups of infants.

Tara Smyser, Chris Smyser, Cynthia Rogers, Sarah Gillespie, Terrie Inder, Jeffrey Neil. “Cortical Gray and Adjacent White Matter Demonstrate Synchronous Maturation in Very Preterm Infants.” (2015) *Cerebral Cortex*.

Parent Stress and Interactions with their Children

Having a preterm infant in the Neonatal Intensive Care Unit (NICU) can be a very stressful experience for lots of parents. To describe the links between parent's mental health while their infant is in the NICU and the quality of the parent-child relationship, we first asked parents about their feelings of stress and depression during their infant's stay in the NICU. At the 2 year follow-up, we then asked parents to play with their child using a range of books and puzzles.

Findings showed that parents who reported lower levels of depression during their infant's NICU stay were more sensitive in responding to their child's needs at the 2 year follow-up. These caregivers were more engaged and supported children's early learning experiences during the play session. These positive parenting behaviors were also linked to better thinking and attention skills for preterm children at age 2 years. Supporting parent's mental health and coping during the NICU stay is therefore important and may have a long-lasting and positive impact both on the parent-child relationship and children's developmental outcomes.

Emily Gerstein, William Dement, Rachel Paul, Cynthia Rogers. "Early Influences on Parenting, Child Cognition and Behavior: Findings from a Diverse Sample of Infants Born Preterm. (2016) International Conference of Infant Studies.



Families of the Full-Term Comparison Children

A very important group also involved in the WUNDER preterm birth study are the families of the children born at term. The only difference between full-term children and preterm children is that the full-term children were born closer to their expected due date, somewhere between 38 and 41 weeks gestational age. These children and their families also come from the local St. Louis area and complete all of the same MRI and developmental assessments as the preterm children, providing valuable information which is compared to results from children born prematurely.

Thank you for being such an important and valued part of the WUNDER study!



Jessica's Corner

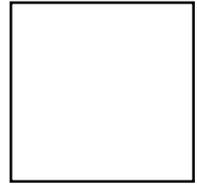
Next year we plan to schedule return visits for our study children who are 9-10 years old.

At this visit, the children will participate in developmental assessments & receive an MRI scan of their brain!

Be sure to update your contact information with Jessica (phone 314-454-7287) so she can contact you to schedule the visit!



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*Have you moved recently?
Do you have a new phone number?
A new pediatrician?*

To update your contact information, you can go to our secure website: <http://j.mp/1pNHEU9>

The contact information link, as well as information related to prematurity and child development, is also available on our community Facebook page:
Washington University Neonatal & Developmental Research Team

