

NEWS

Brain-wave patterns flag sleep differences in dup15q syndrome

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Children with dup15q syndrome have **telltale patterns of brain activity** during sleep and get less non-REM sleep than neurotypical children do, according to new research.

These characteristics could serve as **biomarkers** and targets for treatments, say the researchers, who presented the unpublished findings virtually yesterday at the **2021 Society for Neuroscience Global Connectome**. (Links to abstracts may work only for registered conference attendees.)

Children with dup15q syndrome, a duplication of the 15q11-13 chromosomal region, often have autism, **epilepsy** and **intellectual disability**. Prior electroencephalography (EEG) research found that, compared with neurotypical children and other autistic children, those with dup15q syndrome also have **stronger beta oscillations** while they are awake.

These brain waves may be linked to increased signaling by the neurotransmitter gamma-aminobutyric acid (GABA), which is controlled in part by genes in 15q11-13. GABA signaling is also critical for sleep, which is **often disrupted** in autistic children.

“We started thinking, if we did EEG on these children [while sleeping], would the beta oscillations still persist?” says **Vidya Saravanapandian**, a graduate student in **Shafali Spurling Jeste's** lab at the University of California, Los Angeles. “We found that the abnormal patterns we see in the awake state are also present in sleep.”

Sleep signatures:

For the new work, Saravanapandian and her colleagues compared brain-wave patterns in overnight EEG recordings from 15 children with dup15q syndrome and 12 neurotypical children.

They found that, compared with the neurotypical children, those with dup15q syndrome have

stronger beta oscillations. They have fewer sleep spindles, or short bursts of brain activity that occur during non-REM sleep and may be involved in memory processing. And they also spend less time than neurotypical children in slow-wave sleep, which is linked to memory.

These unusual sleep characteristics could hamper cognitive development in children with dup15q, Saravanapandian says. And **sleep disruptions** can also aggravate their seizures and worsen their anxiety.

“Sleep is an essential function that helps us learn and consolidate,” Saravanapandian says. “In children with neurodevelopmental disorders, these sleep impairments may in fact be exacerbating other impairments that they already have.”

The next step, Saravanapandian says, is to study the relationship between brain activity during sleep and cognition in children with dup15q syndrome. Such findings might guide the development of treatments for the condition.

“Being able to understand how sleep patterns may vary — and how sleep deficits may in turn impact overall neurodevelopment — will improve our ability to treat dup15q and improve outcomes,” she says.

*Read more reports from the **2021 Society for Neuroscience Global Connectome**.*