

Untangling autism

ISRAELI RESEARCHER LOOKS TO IDENTIFY BRAIN MECHANISMS UNDERLYING DIFFERENT FORMS OF THE DISORDER

by **NANCY SOLOKER STEINER**

There's a popular saying in the autism community: If you've seen one person with autism, you've seen one person with autism. That is, each child manifests the condition uniquely. In fact, autism — also referred to as autism spectrum disorder — encompasses a group of complex conditions.

Ilan Dinstein, an autism researcher at Ben-Gurion University of the Negev (BGU), believes that just as there are different ways of expressing autism, there are different biological mechanisms behind these variations. Identifying these mechanisms, he hopes, could facilitate development of treatments targeted to specific variations.

In BGU's newly established neurophysiological autism lab, Dinstein and his colleagues are looking at brain function and brain structure to identify differences associated with autism, and to rule out those that don't play a role. Their data come from functional magnetic resonance imaging, which measures brain activity; electroencephalograms (EEG), which track brain wave patterns; tracking eye movements; and motion capture to study motor control. They are correlating these results with other patient information, such as genetic profile and behavior, looking at a multiplicity of variables rather than a single one.

"I'm totally convinced that autism is multiple disorders with different types of biology," Dinstein said, speaking in Los Angeles in February at a program for the American Associates of BGU. "The idea is to use MRI and EEG to enable us to identify specific subgroups with the goal of having different treatments for each subgroup."

Autism disorders are character-



Ben-Gurion University researcher Ilan Dinstein looks for differences in brain function as a way to identify different types of autism.

Photo by Dani Machlis/BGU.

ized by difficulties with social communication and interaction, as well as the presence of repetitive behaviors. About 1 in 68 American children are identified as being on the autism spectrum, according to the U.S. Centers for Disease Control and Prevention. Children may be diagnosed with au-

tism as young as 18 to 24 months, although many are identified later. The diagnosis is based on behavior and development — there is no medical test for autism.

"Our goal is to understand what happens in the brain early on in development — during the first four or five

years of life," said Dinstein, who has a bachelor's degree in biology from Tel Aviv University and a doctorate in neuroscience from New York University.

Such knowledge, he said, could

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eventually lead to the development of ways to identify autism, perhaps even before behavioral symptoms start. He believes that using brain changes rather than behavior to diagnose autism would enable earlier diagnosis and more targeted interventions.

Eric Courchesne, co-director of the UC San Diego Autism Center of Excellence, said Dinstein's team — as well as his own — are “among the small pioneering group doing research on the early biomarkers of autism.”

“There are lots of people doing research on older children, adolescents and adults with autism, and that's important,” Courchesne told the Journal. “But it's a challenge to see during the first one to two years of life, what's

Dinstein said most autism research focuses on a single factor rather than identifying a constellation of factors. “There's very little work that looks at relationships across variables,” he said. “You need data for a large number of children to do this.”

To gather that data, he has joined six colleagues — a pediatric psychiatrist, epidemiologist, geneticist, computer scientist, molecular biologist and a physician. The team has begun creating a regional autism database for the Middle East to collect and eventually correlate multiple types of information for each child. It includes as much information as possible about each patient's genetic profile, medical history and behavior measures, as well as biological measures such as MRI, EEG and eye-tracking data. The effort, which

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— Ilan Dinstein, autism researcher

going on in the brain that causes the symptoms of autism.”

Courchesne and his wife, center co-director Karen Pierce, invited Dinstein to join their lab, but Dinstein chose to start his own at BGU. Still, he and the couple have shared data and experiments and have published papers together.

So far, their research has not identified meaningful differences in brain anatomy between children who have autism and those who don't, Dinstein said. But it does point to differences in brain function.

Toddlers with autism show less synchronization, or symmetry, in brain activity between the two hemispheres of the brain. They also seem to have “noisier” or more variable brain signals in response to visual, auditory and touch stimuli. In babies with autism, eye movements appear to be jerkier and less accurate.

started in January 2015, collected data from about 150 children last year.

Gathering such a diverse constellation of information is a formidable task, but Dinstein and his colleagues have unique advantages because of BGU's proximity to and relationship with the Negev's Soroka Medical Center. Not only does the medical center sit across the street from the university, it also is the only hospital in Southern Israel. Ninety percent of children diagnosed with autism at Soroka also were born there.

This makes it possible for the team to collect data that would otherwise be difficult to obtain. For example, BGU researchers have access to information such as birth weight, gestational age and mother's age at delivery. Because the majority of children will receive clinical care

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Chi-town

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ies every two weeks on a whim. “I buy my tickets last minute,” Levey said.

The world of downward dogs is a dog-eat-dog business, but Y7 appears to be more than persevering. The studio’s clothing line featuring its slogans flies off the shelves, its classes (\$25 each) are filled, and celebrities like model Gigi Hadid and actress Jessica Alba are among its patrons.


A typical class has three sequences, each performed in three different flows. The first flow is slow, the second one is faster and the third is free-flow, up to the practitioner to move at his or her own pace, adding or removing steps at her own leisure.

At this particular class, a medley of Beyoncé singles assisted the yogis in their practice, a repertoire that spanned the superstar’s whole career, from Destiny’s Child jams to Sasha Fierce alter egos to Black Lives Matter anthems. Other Y7-worthy artists who get a class dedicated to them include the likes of Drake and Ri-

hanna, holla!

Despite such heart-pumping energy, the class doesn’t forget what yoga’s all about. During the final moments of the class, the yogis slow down, stretch and prepare for savasana, or corpse pose. Beyoncé sings “Halo” in the background and it’s kind of perfect as yogis settle into their mats, letting their hourlong practice soak in.

“Everyone is super happy and we’re on this rollercoaster,” Levey said, reveling in the unexpected success of a booming yoga studio chain. “We want to go to every major city, so we’re just getting started.”

Minutes after the completion of the recent L.A. class, students filtered out as another class of yogis patiently waited to enter the single-room studio. With drenched shirts stuck to their backs, a group congregated on Melrose, energized from their practice, discussing where to grab drinks — “because we deserve it, dammit” — sauntering down the crowded street, their yoga mats strapped to their backs. 

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at Soroka over a long period, their development can be tracked over time. Israel’s centralized health care system — there are only four

very similar genetics, so it’s a lot easier to identify genetic abnormalities in their children,” he said.

Dinstein acknowledged that building the database will take time.


“It will take several years to get this going,” he said. “But we don’t

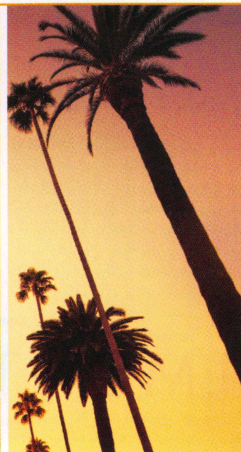
“It will take several years to get this going, but we don’t have to wait. We are starting with the pieces of information we have.” — Ilan Dinstein

health plans in the country — also makes it easier to obtain data.

In addition, the Negev is home to the nation’s Bedouin population, which engages in interfamilial marriage. Twelve of the children in the database are children of first cousins. “First cousins have

have to wait. We are starting with the pieces of information we have now to ... look for correlations and see whether there are specific subgroups of kids with autism.

“This is a work in progress,” he continued. “I’m in this for the long haul.” 



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