

Folate Receptor Antibody Test (FRAT™) Offering Hope in the Detection of Autism and other Neurodevelopment Diseases



Dr. Boas Gonen
President & Chief Executive Officer

Iliad Neurosciences, Inc.
www.iliadneuro.com

Contact:
Dr. Boas Gonen
610-441-9050
bgonen@iliadneuro.com

Interview conducted by:
Lynn Fosse, Senior Editor
CEOCFO Magazine

“I think that in many ways our tests are a breakthrough in the treatment of autism... when the antibodies are present in a pregnant woman they increase several fold the risk of birth defects of the nervous system.”
- Dr. Boas Gonen

CEOCFO: *Dr. Gonen, what is the idea behind Iliad Neurosciences?*

Dr. Gonen: Iliad is a company that develops lab tests to help diagnose and manage diseases of the brain. We started out with diseases in young children, what we call neuro-developmental diseases, like autism, epilepsy and schizophrenia. However, our hope is to expand into other diseases in the future. For example, certain birth defects can also be categorized as neuro-developmental disorders.

CEOCFO: *What are the challenges in being able to diagnose a disease of the brain? How are they different from other disease areas?*

Dr. Gonen: Challenges may not be the same for each disease. One of the differences between brain disorders and other diseases is that there typically are no markers in the blood for these diseases. You do not have a blood test for Alzheimer's or Parkinson's or Autism. They just do not exist because the diseases are localized to the brain and very often they are only in a small part of the brain. The disease has no circulating marker for the presence of the disease, so the diagnosis is really based on clinical information; examination of the patient, imaging techniques and so on. That is what makes it different than many other diseases.

CEOCFO: *What have you developed so far?*

Dr. Gonen: Right now we have two lab tests that measure a metabolic defect that is common in patients with autism. Specifically the metabolic defect is the presence of antibodies to the folate receptor alpha in the brain. The presence of these antibodies in the blood suggests that the transport for folic acid (or folate) to the brain is impaired. Now, folate is critical to many functions in the brain. If you do not have enough folate in the brain bad things can happen. This includes the fact that DNA synthesis is affected, the synthesis of neurotransmitters is affected, methylation of DNA and so on. There is evidence that symptoms of autism or at least some of them are the result of a relative deficiency of folate in brain cells. So, there is evidence – from direct measurement of folate in the fluid that surrounds the brain-that in autism there is a deficiency of folate in the brain. What is important is that even if you eat enough folate and your diet is good it will not help, because that has nothing to do with the fact that you may not have enough folate in the brain. The reason for that is that these antibodies to the folate receptor block the receptor to folate.

CEOCFO: *How are you able to measure it?*

Dr. Gonen: The test itself is not a breakthrough test but the idea behind it is. It is a fairly standard lab test procedure but is quite tricky and technically demanding. Our tests were originally developed at SUNY (Downstate) and we licensed it from

them. It is called the Folate Receptor Antibody Test (FRAT™), and involves measuring two types of antibodies: binding and blocking.

CEOCFO: *If it is not all that hard to test for, have people not made the connection to the potential disease?*

Dr. Gonen: It is a good question. Like anything else you need to come up with the idea. Somebody has to think about the possibility that there are antibodies to the receptor and then develop the test. By the way, when I am saying the test is straightforward, I guess that is true in the general sense. However, to do the test accurately, this requires some knowledge and some good technique and there are some hurdles in doing the test for anyone. Therefore, not everybody can just get up in the morning and say I am going to do the test today. By the way, each test takes 2-3 days to perform.

CEOCFO: *How is the Folate Receptor Antibody Test (FRAT™) administered?*

Dr. Gonen: The doctor collects a blood sample from a patient and the sample gets to the lab. A small amount of the sample is put in the right tubes and plates, and we use the folate receptor as one of the antigens in the test. We can measure the competition between the serums of the patients and known standards for binding to the folate receptor. Therefore, the more antibodies the serum of the patient has the more it is going to displace our standards from the receptor.

CEOCFO: *Where are you in the commercialization of your test? Do you need FDA approval?*

Dr. Gonen: This is a Laboratory Developed Test (LDT), which does not require an approval by FDA; it requires a certification by CLIA. We applied for the CLIA certification of compliance and we just got it in the last couple of weeks. Basically, up until now we have done samples here and there for research purposes, but now that we passed the requirements we are ready to commercialize it.

CEOCFO: *What is the strategy to do so?*

Dr. Gonen: The autism community is a very tightly knit community, as you may know. The parents are very involved in their children's disease. They form communities and organizations. We will basically tap into these organizations. We have been talking to many mothers and also to many physicians who see children with autism. We are contacting these physicians and basically telling them our story and soliciting them to send us samples. We think there is a lot of interest in that, because, maybe I have not stressed it, that this is one of the few things, if any, in the field of autism, in which you can make a difference. In other words, just doing the test and finding the antibodies does not necessarily help anyone. You are just telling them, "You have antibodies". However, the thing is that you can give them something, which is an active folate. One of them is called folinic acid, the other is 5-MTHF. For both, if you give them to children with autism who have antibodies, many of them get better. There are publications, there are placebo controlled studies that recently came out and clearly show that if you have the antibodies your response to the folate is much, much greater than if you do not have it. In order to decide if you were to give them folinic acid you need to do the test. We have heard many anecdotes of extreme improvements in children; someone who couldn't say a word before and got our test and then was put on folinic acid, a week later he started talking. There are many, many examples like that. Therefore, I think that in many ways our tests are a breakthrough in the treatment of autism, because there is really nothing else out there. Today, the only thing that people do is give them behavioral instructions through a psychiatrist or a psychologist and that is about it. It works to a degree, but I think our tests could lead to really important improvements.

CEOCFO: *Are there any drawbacks to having the test?*

Dr. Gonen: It has some costs like for any other test. However, our challenge is to make people aware of it. It is not that people know about it and have an opinion. It is that ninety percent of them do not know it exists, it is that new. Therefore, that is really the challenge. As I said, there are many publications and we are basically in the process of spreading the word. By the way, we have started getting samples from all over the world. We get interest from China and Japan and India and Australia and South America. Everyone is beginning to get interested and they are beginning to send samples. Therefore, we are at an interesting point in the development of the company.

CEOCFO: *Is the test clear cut? Is there much interpretation of what you find when you do the test?*

Dr. Gonen: Sometimes it does. That is actually a good point. We sometimes get patients who had to go to their physician to tell them about the test. The physician did not really know about it, but the parent did. Sometimes, when you send the test results to them they do not really know what to make of it. Therefore, we send the literature and so on, so they can be educated.

CEOCFO: *Are you funded for the steps you would like to take? Are you seeking partnership or investment?*

Dr. Gonen: Yes, we are always seeking partnerships. We are always seeking investments. The company was initially funded by myself and my partner Steve Tsetsekos. We are also getting some low amounts of funding now from investors.

However, we think that the revenue stream, which we believe is going to grow fairly quickly in the next months and years, will probably be able to sustain us without getting very large investments. However, having said that, the more money we have the more expensive marketing campaign we can do and reach our sales targets faster. Therefore, we are always looking for money and for businesses. We have signed a distribution agreement in Japan and we are in discussions with a company in Europe about doing distribution there. We are working in all directions.

CEO CFO: *What else are you thinking about related to folate down the line?*

Dr. Gonen: One of the things that we want to do, since we have the test that tells the doctor which patients should be treated with active folates, is supply the folate treatment itself. We are looking into that. We are in discussions about licensing a patented formulation for active folates, which then we would offer also as treatment to the same children. Therefore, in a sense it will almost be like personalized medicine. We are measuring antibodies. If you have the antibodies we would also prescribe or give you the appropriate treatment. Therefore, we are looking into that very seriously.

CEO CFO: *Why pay attention to Iliad Neurosciences today?*

Dr. Gonen: Iliad Neurosciences has been working on potentially breakthrough biomarkers for children with autism and related disorders. By the way, the same antibodies have also been found in other diseases like schizophrenia, epilepsy and major depression, so the impact will be much greater. Finally, when the antibodies are present in a pregnant woman they increase several fold the risk of birth defects of the nervous system. Therefore, we also plan to look at the world of pregnancy and the pregnant woman, because we think that almost any woman who is pregnant should have the test. Our tests are almost like a platform technology that can be applied to many diseases and over time we will slowly try to expand and make it all happen.

