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Biological Basis of Autism and PDD

by
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Introductions by Lynn Murphy president and Pat Palmer public relations of FAUS: Dr. Shaw had found a group of people in which seizures were triggered by adiphic acid. He knew it was in certain products but could never find the ingredient on food labels. And FAUS had found over the years that some people's seizures went away when they were on the Feingold diet. The FDA allows adiphic acid to be listed as "flavoring," and FAUS was able to supply its list of foods without these hidden antifungal ingredients. So began the working relationship between Dr. Shaw and FAUS.

Metabolism can be thought of as analogous to the LA freeway system. It's very complex, and there are lots of ways to get from one point to another. A freeway slowed or blocked in Santa Monica, might effect traffic in downtown Los Angeles, the effect depending on the severity of the blockage. But even if a freeway is totally blocked, traffic will find alternate routes. The same interplay occurs in metabolism. Sometimes the blockages are caused by genetics. Sometimes the blockages are caused by foods or medicines we eat, or sometimes by the michroorganisms in our intestinal tract and the chemicals they secrete. The more severe the blockage, the more alternative "traffic" there is going to be for a particular pathway. My goal was to be able to determine which pathway is being adversely effected when something is not working right and what can be done to make correct it. So my career has been basically to learn how to tow away stalled cars and get them off of the road so that the freeway can run well again - a glorified traffic manager.

Urine contains the sum of everything that has gone on in the body and so is the best sample for measuring what is going on in metabolism. So one goal was to be able to identify every single chemical in urine. I start with mass spectrometry, today's most sensitive technique for isolating and separating chemical compounds by weight. The peaks in the traces show the amount of the compound present. The profiles of normal urine samples show hundreds of compounds but with most of them in very small amounts.

A data base of urine profiles for children with autism, though, shows many more compounds that hardly register in normal samples, some of these new ones in large quantities. What really caught my attention initially and started the course of my investigations was that the mass spectrographic profiles of two autistic brothers. The profiles were strikingly similar in their differences from norm. And in addition to autism these boys also had severe muscular deficiency and renal leakage, symptoms sometimes associated with autism. It turned out that virtually all the abnormal mass spectrometer peaks present in the urine samples of these boys are derived from michroorganisms in the intestinal tract. And the quantities were astounding. About 80 % of the compounds present in the urine of these boys was due to the presence of yeasts and bacteria in the intestine. (Results published in Clinical Chemistry, 1995.)

Identifying the compounds shown to be present by the mass spectrographic results is a separate task. One abnormal compound prevalent in these autistic brothers and in many but not all

autistic and ADD children is tartaric acid. One little boy with autism every day produced almost the twelve grams of tartaric acid reported to be lethal to humans. I also found it later in patients having a disorder called fibril myalgia with symptoms of chronic fatigue and extreme muscle weakness. But no one could tell me where the tartaric acid came from in these children. It is not manufactured in the human body, and there is no evidence that any mammals produce it.

Malic acid, a very similar compound, is produced and used in the body in key chemical processes. Tartaric acid is almost identical but has an extra OH radical on it. When in the body it performs as what is called an "analog." It is so similar to malic acid that the body attempts to use it metabolically. But then the pathways that normally utilize malic acid become blocked and dysfunctional because of the presence of tartaric acid and its abnormal chemical reactivity.

Commercially tartaric acid is a byproduct of the wine industry. It is a sediment that accumulates during the yeast fermentation process. It's found naturally in grapes, grape juice and grape jelly and plain grapes and is also a food additive in a lot of the carbonated drinks and any grape or lime flavored beverages. It is in some brands of baking soda. The FDA calls it an acidulate and lists it as GRAS (generally recognized as safe), so food ingredient may just list it as flavoring. The household product cream of tarter is pure tartaric acid.

Tartaric acid is not produced by Candida, the main yeast that has been of concern in the gut, but its abnormal presence in so many of these autistic patients suggested that anti-fungal medication might be a good thing to try. Nystatin was used because it is retained in the gut rather than being absorbed systematically like Dyflucan or Nizoral. The tartaric acid level in the urine of the first autistic child's treated this way dropped to about half after a month, to normal a little later and after two months to nearly zero. It often turns out that the antifungal medication has to be continued for a while to prevent relapse. The patients apparently have weakened immune systems.

The species of intestinal yeast involved is probably sacryomycies seravisci, the same yeast you bake with in your kitchen. There are two strains of it, one used in baking and one in wine and beer making, but they are essentially the same thing, and under the right conditions both can produce tartaric acid. Some aids patients have been found to have it systematically, that is throughout their body, and some cases of vaginal infection are from sacryomycies seravisci.

There are an estimated 500 kinds and a 10 to 100 million total count of one-celled microorganisms in the normal human gut. In some people the number of bacterial cells is nearly the same as the number of human cells in their body. The bacterial cells are smaller but none-the-less metabolically quite active and producing lots of unusual things. Taking oral antibiotics can wipe out 80 % of them, this leaving the resistant bacteria and all the yeasts. In one study on animals oral penicillin was found to reduce the bacterial count by a factor of 1000, especially the beneficial lactobacilli bacteria. The presence of harmful bacteria on the other hand was found to increase by a factor of 1000 above the normal balance and in these test animals and in many cases actually to move out of the gut into the lymph nodes in response to the penicillin treatment.

Most of my work has been done with autistic patients, but exactly the same kinds anomalies are involved in ADD/ADHD. The median values of abnormal compounds in the

mass spectrographic urine analysis of ADD/ ADHD patients is usually up by a factor of two to three. For tartaric acid the median factor is three. High yeast compounds show up in 80-90 % of ADD/ADHD children sometimes with individual compound factors twenty times normal. Those negative for yeast typically show other factors like adiphic acid. Nine major studies have now shown that children with ADD/ADHD have a statistically high correlation with frequent use of oral antibiotics in their early infant years. (The authors of those reports were unaware of the yeast connection and typically concluded that the causal factor was something like a hearing deficiency change due to many ear infections.)

ADD, ADHD, PDD and autism are a spectrum of disorders beginning with mild exposure to adverse chemicals causing mild learning disabilities as in ADD and progressing as the biochemical abnormalities become more severe to autism and even occasionally psychosis. An analogy is carbon monoxide poisoning. A small amount in the blood is easily tolerated. We all have some because we drive cars. But with carboxi-hemoglobin reaching 0.15 % nausea, head aches, blurry vision and depression begin to set in. Michroorganisms confined to the gut produce byproducts and toxins that circulate in the blood and are an integral part of our body's biochemistry. What's important is the amount. Just as with carbon monoxide, everyone has a little tolerance for poison. Everyone has a little bit of the harmful compounds from intestinal michroorganisms, but ill health creeps in if the quantity passes a tolerable level. One of the known mechanisms for weakening of the immune system, for instance, is fragmentation by gleo toxins of the DNA in white blood cells. These are one of the compounds produced by yeasts and most species of Candida. By this kind of mechanism infection treated with oral antibiotics begets likelihood of further infection in the future.

It appears to me that oral antibiotics are probably the leading cause of child developmental disorders. Injectable antibiotics were used initially during and after World War II. They have minimal effect on michroorganisms in the gut. In 1950 the use of oral antibiotics was minuscule. Widespread use started in 1957 and then sky rocketed. And over the same time frame there has been explosive use of oral antibiotics in animals as well. The FDA requires removal of antibiotics prior to slaughter of animals used for meat, but residues from the abnormal michroorganisms persists in our food supply.

Statistics of many types are given in my book to appear this fall. In one practice only 1 % of treated children under 3 had autism during 1965-69 , but the number rose to 17 % during 1994-95. Some of this must be due to increase in education and awareness, but some of this is undoubtedly a real increase. Ear infections and the use of antibiotics for treatment have also increased dramatically, apparently with interlocking synergistic feedback. Many of the autistic children in my clinic have had fifty incidents of ear infection before the age of five.

The currently accepted medical view concerning metabolites from michroorganisms is 1) that these compounds are not produced in the metabolism of humans, 2) that they are inert, and 3) that they are not important. I think that this view will change in a big way stimulating a huge vested-interest commercial war by the year 2000. My working premise now is that normal development and function requires the appropriate interaction of both human and microbial biochemical systems. Dysfunction in either leads to abnormal development of human

potential. We need to be concerned about far more than immediate disease-causing agents.

For the Feingold Association and the dietary control of ADD/ADHD I recommend the addition of an anti-yeast diet including low use of refined carbohydrates, especially sugar, and few yeast products as described in the book by Dr. William Crook. A few months of prescription anti-fungicide may also be needed. A systemic drug like Dyflucan may sometimes be needed instead of or in addition to Nystatin which treats the intestine. Retesting can meter the progress. There are at least a dozen non-prescription anti-fungal products as well such as aprilic acid, deodorized garlic, pau darco and others. Before and after testing of urine samples in my laboratory show that they work. They can't be advertised as such so just ask at a health-food store.

Reviewer's Notes:

A more technically complete talk was given by Shaw a year later at the autism conference in England. His book is titled "Biological Treatments for Autism and PDD," 1998, available at The Great Planes Laboratory, 9335 West 75th St., Overland Park, Kansas 66204, 913-341-8949.

The type of chemical analyses reports provided with chemical testing at Dr. Shaw's laboratory include: bacterial compounds, yeast and fungal compounds, Krebs cycle, adiphic acid and several of the food additive compounds, hydroxi hypuric sylicelate byproduct…

Books on the intestinal yeast problem include: *"Candida-Related Complex,"* by Christine Winderlin (Taylor Pub., 1996); and the older standards *"The Yeast Syndrome,"* by F. P. Trobridge & M. Walker (Bantam Books, 1986 $3.95); *"The Yeast Connection"* by W. G. Crook (Vintage, 1983); and the original *"The Missing Diagnosis,"* by C. Orian Truss (The Missing Diagnosis Inc, 1982). Truss and the older books describe asceldehyde syndrome and "pickeling" of neurotransmitters, immune system components, tissues including nerve fibers, etc.), but predate Dyflucan and awareness of additional factors like leaky gut syndrome, the opiate effects of partially digested proteins, enzyme damage or adverse synaptic function with altered pH.

Initial awareness of a wide range of symptoms associated with food allergy (and addiction), chemical sensitvities that are now often atributed to side effects from intestinal yeasts, comes from the clinical ecologists of the 1940's and late 30's. There are many books from this era such as *"Human Ecology and Susceptibility to the Chemical Environment,"* by Theron G. Randolph (Charles C. Thornes Publishers, 1952, hdbk, medical) and *"An Alternative Approach to Allergies,"* T. G. Randolph and R. W. Ross, (Bantam Books, 1986, easy reading). What is now called ADD/ADHD, manic-depressive and the like can be seen as tabulated in a spectrum of cerebral and other disorders on a rating scale from -4 to +4 on page 38 of these observations from the '40s.

(The stool by dry weight is 60 % michroorganisms.)