JB: Welcome to the section of Functional Medicine Update ™ I know you all look forward to. We have been alternating the last several months between clinicians and researchers. This month, we are fortunate to have a true clinician, Dr. Mary Norfleet Megson, who is a pediatrician by training, having done her medical doctor work at the University of Virginia and her residency and internship at Boston Floating Hospital at Tufts in Boston. For the last nine years, she has been the Director of Developmental Pediatrics at Children's Hospital in Richmond, Virginia, but recently started a private developmental pediatric practice. I had the pleasure of meeting Dr. Megson at a recent meeting of the American College for the Advancement of Medicine. Although our conversation was short in duration, I was fascinated by the work she is doing and a model she has developed relating to autism and potentially other childhood brain-related dysfunction. It was a "goose-bump" experience for me and I thought it would be useful for the audience of Functional Medicine Update™ to hear what Dr. Megson has to say.

Mary, I would like to introduce you to our audience at FMU and thank you for making some time available for us today. Would you tell us a little bit about how you wound up in the field of autism and brain chemistry?

MM: I trained in Developmental Pediatrics for three years after residency and worked only with children with developmental disabilities, such as learning disabilities. When I saw the show on television about secretin, I thought that most people would be thinking about secretin and how it affects the brain as a neurotransmitter- like we found in substance P. I went in a different direction and asked myself what secretin would do in the gastrointestinal tract. It stimulates CCK (cholecystokinin), which stimulates bile production, and if patients are not making any bile or are in liver failure, it's very important to supplement these people with the fat-soluble vitamins. I began to ask questions related to deficiency of fat-soluble vitamins. My practice deals largely with autism, or communication disorders. I found that in 54 out of 60 families (90%) I've studied, night blindness was present in one parent, and four more had retinitis pigmentosa in the mother. I heard this again and again. Then, within one week, I had no history of nightblindness in three families in a row but in all cases one parent had been recently treated for a pituitary adenoma.

JB: This is fascinating, and I think it speaks nicely to the question we were left with after interviewing Dr. Jeffrey Kopelson who talked about the experience he's had with the use of secretin in autistic children. Then, we had Dr. Michael Lyon speak about ADHD and some of the things he's observed with brain chemistry and behavior. It sounds like we're taking the next step with you. Tell us something about this interrelationship between a signaling molecule like a retinol or retinoid, like vitamin A, and how that could interrelate to what is observed with these brain chemistry problems in autism.

MM: Several years ago, Margaret Bauman at Massachusetts General did research looking at cellular differentiation in the hippocampus. She had autopsy studies from children at 11 or 12 months of age, and the cells were small. There were problems of connections. But they were not so differentiated. Then she looked at a population of children who had abnormal language development and the cells appeared the same at age three. In children with normal language development, there was a dropout of connections and more branching of synapses. I started to think about vitamin A and cell growth and differentiation—this is all ectodermal tissue. I started to get more thorough family histories that reflected again and again the same sorts of medical problems – hyperthyroidism, night blindness, rheumatoid arthritis, and even gold nephropathy. Most of these diseases are associated with major histocompatibility complex tissue type DR3, DR4, DR5. Direct repeat sequences are known to have high affinity for retinoid receptors.

JB: I am reading the abstract from a paper you recently submitted in which you report in 36 families a parent of the autistic child, usually the mother, gave history of night blindness and difficulty driving in dim light at dusk, in the rain, at night, or in fog, and that this clearly indicates a potential for vitamin A insufficiency. However, if you do diet-recall studies on these individuals, I presume that you would find

that they were "adequate in vitamin A from their diet." So, there is something else genetically related to either the absorption or utilization of vitamin A, I presume, that you're describing.

MM: Yes, you're exactly right. I looked at vitamin A metabolism to try to figure out how these children were absorbing it, because they did not consistently present with a malabsorption picture—fatty stools, etc. And the children appeared to be growing normally. So I asked myself how these well-nourished children offered a variety of foods could have a vitamin A deficiency emerging before 30 months of age. What I found in my research was that if you have gut mucosal damage, the enzyme that helps split vitamin A palmitate is in the microvilli of the gut, and if the child has a single adenoviral or rhinoviral infection before fifteen months of age, the mucosal cells are sloughed off so that enzyme might not be available for use. Vitamin A palmitate has to be in the presence of bile, and the right pH for absorption. Gut mucosal integrity is damaged. At 15 months they get a MMR vaccine. The measles antigen crossreacts with intermediate filaments which are important in gap junctions and tight junctions. Mucosal cell integrity is also important for absorption of CoA, which is the critical enzyme when choline is converted to acetylcholine. The precursor for this reaction is s-adenosyl methionine (SAMe), now touted as the "cure all" nutrient. If the CoA pathway is blocked, choline is diverted to production of homocysteine. Are we effectively blocking G-alpha inhibitor of G stimulatory alpha pathways increasing cAMP cells causing lipolysis, and blocking production of acetylcholine? Many of these patients have elevated cholesterol and VLDL/LDL. These are two-year-old children eating three fruits and two vegetables, and chicken nuggets with serum cholesterols over 200 mg/dl.

JB: Would you expect that this vitamin A malabsorption would also come concomitantly with malabsorption of some of the other fat solubles such as D, E, or K, or do you think that we are looking at selective transport insufficiencies for vitamin A?

MM: They have low levels of other fat-soluble vitamins.

JB: With vitamin A, because we see it as a little bit different than the other vitamin fat-soluble members because of its cell signaling capabilities as a progenitor of the retinoids, I suspect that your model would have it interwoven with some of the other signaling trans-membrane messenger molecules. I know you've talked a little bit about G proteins. Would you tell us how the vitamin A insufficiency might interrelate to altered cell signaling?

MM: Yes. The second problem I noticed in these families was sluggish gut and light-colored stools in many of the parents. Then I looked at vitamin A metabolism and saw that the form of vitamin A they could absorb without the presence of retinylester-hydrolase bile salt dependent in the presence of gut inflammation in the *cis* form of the molecule. Most of us are ingesting vitamin A palmitate, which is not the naturally occurring form. The naturally occurring form is found in milk, liver, kidney, and cod liver oil. There is a history of hypercholesterolemia in a lot of these families, and at two years of age, these children are being taken off whole milk and put on lowfat milk. Formula has vitamin A palmitate added.

JB: When we look at vitamin A, as it is malabsorbed in these children who may have a predisposition, is there a series of screening tests that one can use to pick up the potential, or do we rely on plasma vitamin A levels?

TESTS

MM: Plasma vitamin A levels are not extremely reliable, though they can vary somewhat. Levels less that 20 μg/dl, if that's consistent, mean the child is at risk for eye damage. Eighty-five percent of the children have a level less than 30 μg/dl, which is where subclinical vitamin A deficiency occurs, down to 15 μg/dl. After I knew about the vitamin A, I postulated that perhaps there are vitamin A receptors in the

hippocampus that have to be turned on for pathways from the left side of the brain (where language is processed), to the right (where image of the object is picked up), to the frontal lobe (where the social meaning and attention is connected to interpretation of the communication), to connect. A month later, I was told about an article published in December 1998 by Ron Evans et al., at Cornell Medical Center. He isolated RAR beta and RXR receptors in the hippocampus of mice. It's fascinating. He had three sets of mice. The normal wild mice go through a maze; he changes it; they learn it. The second set are blind mice. They go through the maze slower than the regular ones, but they do learn it. The third set had RARB and RXRX receptors blocked, and they never sped up going through the maze once it was changed. They acted as if they couldn't learn and didn't remember once the change occurred in spite of multiple trials and they also acted like they showed significant "visual perceptual deficits."

From my research, I also figured out that these children had minimal rod function. There are three articles that have been published in the Ophthalmology literature where ERGs were obtained on autistic children and first-degree relatives. In those studies, these children had relatively flat B waves which reflect decreased rod function, but normal A waves, which reflect normal cone function. This research wasn't taken any further. These retinoid receptors are members of the super hormone receptor system and, in many cases, they attach to G proteins which up- or down-modulate the signal. These are the calcitonin, secretin, thyroid and retinoid receptors.

I tried initially to see if perhaps giving a normal daily dose of natural vitamin A to autistic children would help. This was given in the form in cod liver oil. Many of these children started to talk, were more appropriate socially, and improved dramatically on just a normal daily dose of vitamin A in cod liver oil. Since that time, on April 1, 1999, there was an article published on the G proteins in the *New England Journal of Medicine*

in which it was visually shown that the defect for night blindness is very close to where the pertussis toxin is inserted into the G protein in the alpha section next to its binding site to the retinoid receptor in the cell membrane. The G proteins act like switches. They up-modulate a signal or down-modulate it. For example, to see at night – with night blindness, you have a one-protein substitution in that G protein. People with night blindness eventually see at night, but they don't see as well. There are certain characteristics they have. They don't accommodate as well. They have flash photophobia. From when the impulse enters the cell to when it leaves, it's supposedly amplified 10,000,000 times when you accommodate for night vision. Light is the signal, which activates rods by setting off a cascade of reactions, one of which is G protein modulated. Adding a second defect in G alpha further inhibits the signal, depressing rod function. Not only is night vision more impaired, these children lose light-to-dark shading in daylight.

I started to look at the profile these children present with. First of all, these pathways modulate sensory input and these children have abnormal sensory skills. We often send them to an occupational therapist to do "sensory integration therapy." We know that sensory input is a problem. I noticed in these children that they look away from parents at an angle when they are trying to talk to them, which has been interpreted as avoiding eye contact and socialization. I think they're trying to get the light through the pupil onto the fovea, which is off-center in the retina where they have the clearest three-dimensional vision. This lateral gaze almost disappears on the natural vitamin A in cod liver oil. As I look through what I'm seeing in the labwork in these children, there are very consistent patterns. I've now studied 60 families and 26% have a history of adeno- carcinoma of the colon in parents or grandparents. Are we stimulating the G protein modulated ras oncogene? G2 alpha defect in transgenic mice is associated with ulcerative colitis and adenocarcinoma of the colon. These children, 22 out of 25 tested, had positive antigliadin IgG antibodies. The problem is the antigliadin IgA is negative and it's hard to get a young child to cooperate with getting a sample for secretory IgA evaluation with saliva. Serum IgA is low normal but one wonders: if they are vitamin A deficient are they producing secretory IgA? Many of these

children have had recurrent gastrointestinal and/or respiratory infections, and otitis media beginning at 15 – 18 months. Adequate vitamin A is needed to produce secretory IgA and to heal ciliated membranes, including those that secrete IgA.

I then began to think about their development. Are they fed formula from birth to six months? Then, do they get a cracker at nine months, which sets up an inflammatory process in the gut secondary to gliadin allergy, which probably makes vitamin A palmitate difficult to absorb? I asked myself what happens to these children with low vitamin A levels and problems with the immune system, who then receive a measles/mumps/rubella (MMR) vaccine. They need normal vitamin A levels in order to turn on T cells and B cells. Is this the immunosupression we see as autism?

Another thing is the leaky gut that everyone talks about. There are RAR and RXR receptors that are responsive to natural vitamin A, which is responsible for the production of intermediate filaments important in the gap junction and tight junctions between cells. It's all related to G-alpha proteins. Loss of intermediate filaments could lead to leaky gut.

Other consistent findings I've noticed in studying these families are rheumatoid arthritis (that's been reported before – it's 31 percent of the sample), coeliac disease, IgA deficiency, lupus, gold nephropathy in 5 percent of the families, MS in 3 percent, irritable bowel syndrome, and juvenile onset diabetes. Twenty-seven percent have a history of either irritable bowel syndrome or coeliac disease.

What I also found on the profile was that these children would come to me at close to 20 months – many, many of them had normal cognition and receptive and expressive language until 15 to 18 months – and that's where they leveled off. That would tend to lead one to assume, unless there's a neurodegenerative process going on, that the hard-wiring is there, but that these children, for some reason, are at greater risk for having autism.

There's a nutritionist in Britain, Jacqueline Stordy, Ph.D, who examined dyslexics and realized that they were night blind, and when she treated them with fish oil, the night blindness went away. I think what we're dealing with is a whole spectrum, which is closely connected with night blindness in one parent or another G alpha defect, which appears to result in a language disorder, such as dyslexia and ADHD, or autism, where attention for verbal social interaction is severely impaired.

We do know for the RAR/RXR receptors in the middle brain, that the strongest gene activation occurs with the DR3, 4, and 5 tissue types and that the family histories are positive for many diseases associated with those three tissue types. These retinoid receptors are members of the superhormone family of receptors, sensitive to vitamin D and thyroid calcitonin, secretin, and retinoids – we call them the nuclear receptor super family. RAR beta, as a vitamin A retinoid receptor, is hooked at one end and the message goes through that receptor and then attaches to the G-protein inside the cell. The G protein itself is divided into three major parts – alpha, beta, and gamma. The changes that I've been talking about occur in close proximity to where the retinoid receptors attach to the G proteins. I have seen these children respond so quickly to vitamin A supplementation. I've tried to figure out why. Apparently, the RAR beta-receptors are highly responsive to retinoic acid induction.

The profiles of some of these children suggest severe metabolic disorders. Many, many had type II A hyperlipidemia profiles with high cholesterol and high VLDL. Forty-eight of the 60 families gave a history of elevated cholesterol high enough to treat in either the parents or the grandparents – that's 80 percent. In the children, 14 out of 24 tested had cholesterol over 170, which is 58 percent. In a smaller sample, 7 out of 19 children had elevated VLDL. We need to ask if we are turning on lipoprotein lipase and can't turn it off, and as a result, these families are at risk for heart disease later on. It was interesting that of the cases where the autistic child had a normal VLDL and cholesterol, 4 out of the 7 had too low

HDLs. So, many, many of these children have abnormal lipid profiles.

The other thing I noticed was widely varying blood sugars—from 50 to 150. Some of the children were symptomatically becoming irritable and jittery if they weren't fed right away when they became hungry. If you look at glucose metabolism, what's happening is that the cells are being flooded with cAMP if you activate the "on" signal, (i.e. Gs alpha where you'd block inhibition of Gi alpha inhibiting the stimulation for the G protein). The cAMP floods into the cells and you have breakdown of glycogen and gluconeogenesis.

Seventy eight percent of the families have adult-onset Diabetes Mellitus (AODM) or juvenile-onset Diabetes Mellitus (JODM) in a parent or grandparent. Intracellular glucose transport, recently identified as a cause for insulin resistance in AODM, is a G protein modulated function. For a long time, I have felt that their peripheral sympathetic nervous systems are in an imbalanced state. Put quite simply, I think there is sympathetic overdrive. It's very interesting—in both the liver, skeletal muscle and adipose tissue—(that's just smooth muscle and bronchial smooth muscle)—you have an epinephrine effect by increasing intracellular cAMP so they are probably getting epinephrine poured into their system. Many of the mothers of these children have had their gall bladders removed and there is a history of diarrhea around 15 to 18 months. Intermittent and severely delayed toilet training out-of-proportion to delays in other adaptive skills occurs in autistic children. Children with dyslexia and ADHD often don't "get the signal" and have incontinence and/or encopresis. I tried to think of something we could use to increase parasympathetic stimulation without cardiac effects to help these children with their GI dysfunction.

So, I tried Urocholine, which is an alpha-muscarinic agonist, after weeks of vitamin A supplementation, with normal daily doses (all $\leq$ 5,000 IU vitamin A/D) and in some of these children, it has acted like a switch. One child in particular, who, last week on Friday, and every day at recess, had gone out and filtered sand between his fingers, and not interacted with any of the other children, on Monday at recess, after having started the Urocholine over the weekend, ran outside and said: "Hey guys, wait for me!" These children are waking up and it's been a blocked pathway! In other words, one ten-year-old I treated, when I walked in the room three weeks after starting him on treatment, this child, who never talked, was telling his mother not to help him because he could get up on the table by himself. So the early adolescents are waking up developmentally and with the understanding of what you'd expect of a ten-year-old who has developed normally.

There is also a high association in endocrine disorders in the family histories of these children—in 53 percent, in either a parent or grandparent; there was a history of adult onset diabetes. Could this be related to breaking down glycogen and gluconeogenesis, which is turned on and not turned off? Juvenile onset diabetes is associated with HLA DR3 tissue type. We found three in 60 children who had a sibling with juvenile onset diabetes, or 5 percent. Family history of thyroid problems reflected 7 out of 60, or 11 percent. In the autistic children, I actually diagnosed hypothyroidism in four children out of 29 tested, or 14 percent, although the sample is not very large. There is also a family history of Addison's disease in three out of the 60 families. Other associations such as autoimmune disorders are also connected here. For example, lupus occurred either in the parents or grandparents in 8 percent of the families, and rheumatoid arthritis in 31 percent of the families assessed.

We know that the G protein alpha sub-unit, either stimulatory or inhibitory, stimulates the growth of the endocrine cells, and mutations of this will prevent GTPase from stopping the action. In other words, the GIA inhibitory protein would stop the action on adenyl cyclase. This is what floods the cell with cAMP and you would have proliferation of those cells and increased secretion of the hormone.

The other thing I found was that many, many of these children are in negative nitrogen balance. Their BUN-to-creatinine ratios are very high. Perhaps we're turning on a pathway through the G protein that is

not being turned off. As I look at this more closely, this really is a developmental disability in that I think these children are genetically at risk and then they face a series of situations, the first of which is the inability to absorb and/or utilize vitamin A palmitate, which leads to a devastating neurobehavioral syndrome. Even if absorbed, can artificial vitamin A palmitate cross the blood brain barrier? Can this water-soluble substance insert itself in a lipid bilayer? Do you have any questions?

JB: I think anyone listening to this has to be overwhelmed. You have advanced the model and given both good historical explanation for the mechanism and then some clinical outcome from the test to the hypothesis that revolutionizes our thinking. Let me do a good and quick summary.

What you've said is that there is a genetic sensitivity that may be locked into the HLA DR3, 4, or 5 that makes these children and their family siblings more sensitive to things like gut infections, allergy, or even things like MMR vaccinations.

MM: Yes, in retinoid research there is the "1-2-3-4-5 Rule:" the strongest gene activation by RAR and RXR receptors occurs with HREs direct repeats of the core sequence AGGTCA with 1, 2, 3, 4, or 5 spacers. These receptors, DR3 DR4 DR5, are the preferred response elements for these vitamin D thyroid and retinoic acid receptors. I think the large biological response I am seeing in these children reflects activation of retinoid responsive genes involved in lipid, fatty acid, and carbohydrate metabolism because of auto regulation or small increase in Retinoic Acid increases the receptors and their activation creating a large biological response. These primitive retinoid receptors were recently identified as involved in thyroid disease in NEJM. I've diagnosed hyper and hypothyroidism in seven autistic children in the last two months. RAR receptors were originally discovered in hepatocarcinoma cells. The hepatitis genome inserts itself into the genes for retinoid receptors. This relationship needs to be studied. Is this another oncogene being turned on? Thirty to 50 percent of breast, lung, and GI cancers contain RAS protein, which is G alpha protein, modulated.

Yes, I think that many of them go into the MMR vaccine immunosuppressed. We treat severe measles with IV vitamin A. For years in Africa in countries where the measles mortality rate is >1%, the WHO has been giving not the MMR vaccine but 200,000 IU vitamin A per year because this is the best way to improve morbidity and mortality from measles. T cells, B cells and natural killer cells have retinoid switches and can't be turned on. With Vitamin A deficiency, the nonspecific branch of the immunization system is turned on and can't be down-regulated.

JB: From that then, it may explain why secretin was helpful in some of these autistic children because it improved some of the aspects of gut function related to the absorption of fat-soluble nutrients like vitamin A. The increased absorption of vitamin A then influences G protein signaling in various tissues, one of which is the hippocampus which has receptors for vitamin A, and that may explain why therapeutic administration in the form of cod liver oil has been successful, in your experience, with some of these children who have autism. Is that what you've said?

MM: Yes, and I'm giving a normal daily dose, the RDA. I'm not giving any extra. I'm very careful to explain effects and side effects of that, but just on a normal daily dose, they've done well.

JB: Is that somewhere around 1500 IUs in children. Is that the dosage you have been using?

MM: Depending on their weight.

JB: That may obviously then interrelate with other tissue specificities that explain some of the general endocrine abnormalities you've seen with thyroid and adrenal and some of the autoimmune disorders, as well.

MM: One interesting association I found was that in the families tested, 26 percent had a history of adenocarcinoma of the colon and there's a G protein that turns on a ras gene, which is an oncogene. We know that 30 to 50 percent of people with adenocarcinoma of the colon have this gene. Are we taking this high-risk population and giving a second defect in the G protein with the pertussis vaccine? Has it lost its off-switch and that's why we wind up with adenocarcinoma? In terms of cancers of the whole GI tract, and secretory organs, there were 62 cases in 60 families.

JB: Wow. And I noticed from your discussion that you've also implicated, because of this heightened sensitivity that things like gluten may be more problematic in these children, and I would presume maybe even casein, as co-variables that could activate this defective immune regulation system.

MM: Yes, and the G proteins are tied in there. I don't think these children have normal monocyte function. Andy Wakefield, who has done gut biopsies, sees monocytes surrounding antigen antibodies from measles. Pertussis toxin has been called the lymphocytosis-promoting factor. He published an article about that in the *Lancet* last year. What I think we're setting up is an autoimmune disorder that probably involves the intestinal tract. The measles antigen crossreacts with intermediate filaments important in tight junctions and gap junctions between cells. This might lead to gut inflammation and the "leaky gut" in these children at 12 – 15 months of age. So, on a chronic basis, once inflammation sets in, these children aren't absorbing the vitamin, as they should be.

JB: Let's talk to the doctor who is going to be giving counsel to the parent of a child, and the parent asks if his child should be vaccinated. If the child has been vaccinated, how do they know if the child is a candidate for this particular difficulty? What kind of recommendation would you make?

MM: That is such a hard question. I've got three families with multiple children involved. The oldest one is dyslexic with ADHD. The next one is autistic, and they have a toddler coming along. All this needs to be scrutinized, and retested and retested. However, I am recommending a vitamin A level and careful family history to look for G-alpha related illness before they receive MMR vaccines. If there's a sibling with autism, even with a normal serum vitamin A level, it's important to make sure that these children are getting the natural form of vitamin A daily.

JB: That would be a preloading to make sure that their plasma and tissue levels of vitamin A were adequate.

MM: Yes, but we also have to go back and look at DPT. This has been batted around for years and years, but it's so impressive that we're putting a second defect one space away from the defect that already exists in the G protein. Is this disconnecting them? In an article in the New *England Journal of Medicine* on April 1, the comment was made that these proteins have to be in an exact configuration "arranged precisely adjacent to neighboring amino acids of G alpha." Are we changing that precise arrangement just enough to either augment the stimulatory signal or not have an inhibitory signal? It's a very fascinating question. Al Gilman, who won the Nobel Prize for his discovery of G proteins, says "palmitoylation" of G alpha deactivates this protein by 90%. In treating these children by giving them natural forms of vitamin A (liquid at room temperature) and avoiding A palmitate, are we able to avoid the blocked pathway?

I see a lot of children who are slow learning language who show significant catch up with normal cognition by age 5, but eventually are diagnosed learning disabled with ADHD. My son is gifted and goes to a local high school for college-bound dyslexics. He asked his friends how many saw headlights like stars. Sixty-eight out of the 70 reported that. One family came to me recently with 2 adolescent children. Mother and both children are nightblind. The 13-year-old has juvenile onset diabetes mellitis, and is home-schooled because of chronic fatigue syndrome. The 11-year-old has dyslexia and ADHD.

Both have severe sun photophobia. This needs to be studied more thoroughly.

JB: From your experience, what percentage of parents giving vitamin A in cod liver oil to their children are reporting a positive response?

MM: I ran into one yesterday who didn't. I think that child has been on a placebo for a while. All the rest of them have improved.

JB: Do you think the combination of secretin along with vitamin A will give even better benefit, or do you think vitamin A itself will help with the morphological problems of the GI?

MM: The secretin pathway is one of over 100 metabolic pathways modulated by retinoid receptors attached to G protein. I have treated the children with two months of vitamin A in cod liver oil, normal RDA doses, followed by low doses of urocholine which has been used in children since the 1970s for other reasons, with known effects and side effects. Because this is not in the PDR for autistic children, I observe them in the office after the first dose. Care should be used in treating these children with multiple allergies, as they may get mild bronchospasm and increased mucous secretion. Atropine is the antiodote. Besides, its fun to watch them wake up – sometimes forty-five minutes after the first dose.

MM: Vitamin A helps tremendously. To replace your mucous secreting cells, you need vitamin A. To create secretory IgA, you need those cells healthy and I think these children need vitamin A to rebuild retinoid receptors associated with G protein all over the body. I think a low, normal daily supplement dose is safer than injecting a foreign substance into the body.

JB: You have stimulated some extraordinary thought. There can't be anyone who will listen to this tape whose attention you will not capture. For people who might want to follow up with you, they can write you at Pediatric and Adolescent Ability Center, 7229 Forest Avenue, Suite 211 in Richmond, Va. 23226, fax you at 804 673-9195, or e-mail you at pediatricaac@att.net. We will put all of these numbers on this month's summary cards.

Thank you for being a pioneer and opening up a whole new chapter in this emerging story of the origin and remediation of autism.