

Running head: GUT AND PSYCHOLOGY SYNDROME

A New Framework for Diagnosing and Treating Developmental Disorders:

Gut and Psychology Syndrome (GAPS)

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Abstract

Gut and Psychology Syndrome (GAPS) offers diagnosticians an alternative to the DSM-IV-TR Axis II symptoms-driven diagnosis. GAPS offers clinical signs for diagnosis of cognitive, emotional, and behavioral developmental disorders based on a biological medical markers. It also offers treatment protocols known to cure two out of three patients using natural methods. Developed by Natascha Campbell-McBride, MD, Ph.D., after pioneering research by Andrew Wakefield, MD, the treatments eradicate neurotoxins by balancing intestinal flora using “industrial strength” therapeutic doses of soil probiotics not found in retail health food stores. These treatments offer medication-free cures in longitudinal case studies of 10 years, for persons with autism, ADD, ADHD, LD, OCD, anxiety, and other Axis II disorders.

NOSOLOGY

The diagnosis and treatment of GAPS began with studying autism. This section presents definitions of autism, related Axis II disorders, and GAPS.

Autism

Autism is a brain development disorder that impairs social interaction and communication, and causes restricted and repetitive behavior, all starting before a child is three years old (Wikipedia, 2008). Autism is no longer considered a specific illness by specialists; it is part of an overlapping spectrum of learning and behavioral and social problems, conditions and disorders that are classified like DSM-IV Axis II based purely on symptomatology, because no known cause could be tested for as a determining factor. Because this condition is so pervasive and manifesting in more unique cases difficult to classify, there is a proliferation of new diagnostic labels like “pervasive learning disorder,” etc. Unfortunately, research is has not led to cures or treatment, and that is because it has not focused on the whole body (Campbell-McBride, 2007).

Autistic children are born with normal functioning brain and sensory perception. They are alert and learning. It is posited by GAPS that toxins in the gut turn on toddlers around age two when the toxic load grows high enough, breast feeding (a preventive) stops, and just when the toddler is developing their communicative functions, fine and gross motor skills, etc. All of these developments are stopped in autism (Campbell-McBride, 2007). These children have normal eyes, normal ears, normal tactile sensitivity, but their brains cannot process the information. The result is the children cannot hear, see, or feel the same way others do. The sensory input is jumbled in their brains. They do not develop speech because they cannot hear

properly, or make sense of the sounds. Even the highly functioning autistic child often sees only parts of a page and cannot see other parts; they can hear certain vowel sounds or frequencies and not others (CAM, 2003).

Comorbidity

Autism and other developmental disabilities on the continuum are comorbid with specific pathologies. These include allergies, intolerances, sensitivities; asthma and lung problems; skin problems such as rashes and eczema; gastrointestinal “gut” problems such as indigestion, constipation, diarrhea, leaky gut syndrome; malnutrition (in spite of healthy diets); and toxicity. These children are often treated for “unrelated” pathologic variables through neurology, psychology, gastroenterology, dermatology, respiratory therapy, and nutrition. While it is true that in Chinese medicine, these seemingly disparate pathologies actually belong to a single pattern (Metal imbalance) which would treat the whole body, western research was not focused on the whole body until Dr Natasha Campbell-McBride put it all together.

Dr Campbell-McBride is the director of a clinic treating autism. She says, “How many autistic children that I see have digestive abnormalities! All parents talk about it. They have diarrhea, constipation, flatulence, pain, bloating, the whole picture. They do not have the communication skills to convey this. The occasional child who makes it to the gastroenterologist and whose gut has been x-rayed invariably shows fecal compaction. Old compacted rotten feces glued to the walls of their gut” (CAM, 2003). Digestion and elimination depend on normal healthy gut flora. When it is imbalanced (gut dysbiosis), the children develop increasing paralysis of peristaltic movement along with multiple nutritional deficiencies. Furthermore, pathogenic gut flora takes over and converts foods into a whole host of toxic

substances which are well-studied and can be tested for. They are found routinely in autistic and hyperactive children (CAM, 2003).

Some of these toxins are well-known to complementary and alternative (CAM) practitioners, such as the acetaldehyde produced by yeasts acting on sugars, and the ethanol which results from candida species proliferation. Candida causes children to crave carbohydrates; the carbohydrates are fermented by the yeast and produce alcohol as a waste product. There are over 200 species of candida known, and they are the most common pathogen found in the gut. Other pathogens are less familiar but can be found in medical literature.

Clastridium, for example, is one of the opportunistic pathogens unleashed by antibiotic use. Clastridium is known to have over 100 species. It is known to produce a potent tetanus neurotoxin (clastridium tetany) which has been identified as a possible cause of autism in some cases. This neurotoxin can be transported along the vagus nerve from the intestinal tract to the brain, disrupting the release of neurotransmitters. Another form of clastridium produces a botulinic neurotoxin according to Dr Campbell-McBride. The clastridium bacteria is highly anerobic, reproduces via spores, difficult to test for and nearly impossible to eradicate by medical means. Anti-clastridium medications do exist and have been shown to overcome autism in many cases for as long as they are administered; however, they damage the liver and kidney so severely that they cannot be used longterm, and once the medication is stopped, the autism returns (CAM, 2003; Campbell-McBride, 2007; Bingham, 2002).

At the University of Sunderland's Autism Research Unit, Dr Paul Shattock and colleagues conducted research that found children with autism had many abnormal peptides in their urine such as casomorphine and gliadomorphine. These morphines are the breakdown products of casein (cow's milk protein) and gluten that come from a gut unable to properly digest

them due to dysbiosis, and they are transmitted into the bloodstream through a leaky gut. Other morphines found in the urine of autistic children include dermorphin and deltorphin, which previously had only been known to exist in the secretions of poison dart frogs, probably from a fungus; they cause hallucinations and have been used by tribal people in their hunting weaponry to stun prey (Bingham, 2002). The opiates absorb very well, cross the blood-brain barrier, and then block the brain in selective areas. This became known as the “opioid theory” of autism and led to dietary interventions first investigated in Norway (CAM, 2003). Many parents continue to follow these dietary restrictions to help mitigate cognitive, social, emotional, and behavioral developmental disorders in their children.

Normal healthy gut flora manufactures vitamins---especially B vitamins that help mitigate stress. Nature designed humans to produce a constant supply of this water-soluble vitamin in the gut because adequate levels cannot be sustained round the clock from diet alone. Children with ADD are low in B vitamins because the production of B vitamins is halted. When abnormal microbes are present in the gut, the gut is no longer manufacturing vitamins. Receptors for vitamin B6 get blocked with acetaldehyde toxins. It is pathogenic gut flora that is making alcohols, blocking receptors, and manufacturing neurotoxins. Many neurotoxins target specific areas of the brain---hence dyslexia, dyspraxia, and different kinds of autism, etc (Campbell-McBride, 2007). Some yeast metabolites are toxic to the muscles and can inhibit the Krebs cycle with implications detrimental to autistic function (Bingham, 2002).

One last comorbid pathology that deserves mention is schizophrenia. GAPS kids are very vulnerable to schizophrenia in their teenage years, and a GAPS treatment protocol has been used to cure GAPS-related schizophrenia. The reason GAPS kids are vulnerable to schizophrenia is described thusly. These children grow up unable to run with the crowd and make friends easily

because of their asthma, bowel problems, eczema or skin problems. Additionally, because their bowels are toxic, they do not have the probiotics needed to control other bacteria in the “lower burner” such as the genitourinary system. They suffer from bedwetting due to bladder infections, yeast infections or thrush on their reproductive organs, and pain due to interstitial cystitis. The cystitis is there because the gut leaks toxins into the blood, and the kidneys clear the blood, resulting in a toxic overload passing through the bladder. The children are preoccupied with many doctor appointments for various medical problems. Their social needs are so lacking that by the time they are teenagers, they are willing to do anything to self-medicate or fit in---and that usually means using marijuana. Unfortunately, because their bodies are so vulnerable to toxicity and because cannabis today is often very strong, even simple uses of the drug can trigger a schizophrenic break in these already neurotoxic-vulnerable adolescents. This is a more and more common problem in this population today (Campbell-McBride, 2007).

Diagnostic Signs

The preeminent sign of GAPS children is a gastrointestinal dysbiosis, or imbalance in the gut flora. All GAPS children have this condition (Campbell-McBride, 2007).

For example, 95% of autistic children have low serum sulphate---about 15% of that found in controls (Waring, 2001). Researchers believe this is caused by a sulphate-reducing bacteria found in disturbed gut flora. Reduced sulphination increases gut permeability and inflammation, and may also inactivate neurotransmitters involved in the modulation of mood and behavior. Pioneering research has been conducted by Dr Rosemary Waring of Birmingham University (UK) and supported by the UK self-help group Allergy Induced Autism (AIA). Her research has demonstrated that autistic children have problems with detoxification, so that certain foods and

used neurotransmitters are not processed effectively (Pirrone, 1999). Neurotransmitters are broken down and reassembled for reuse in the liver, which depends on sulphur to complete the task.

GAPS is a signs-driven diagnosis, not a syndrome based on symptomatology (as is in the DSM-IV). It relies on bloodwork, serum levels, and labwork on gut flora. Specific tests that can be conducted include the Organic Acid Test (OAT) urinalysis and Great Smokies Stool Test. The OAT is non-invasive, and measures around 70 different biochemical compounds to pick up abnormal urinary metabolites that are the “signatures” of specific pathological microorganisms in overgrowth a child may have (CAM, 2003). The urine is assumed to contain gut cells and flora discharged into the blood and cleared via the kidneys (Campbell-McBride, 2007). This test was developed by Dr William Shaw of the Great Plains Laboratory. The Great Smokies Stool Test is used after initial baseline treatment has failed to produce adequate results; it identifies the presence of microorganisms that need special targeting. Both these tests are costly but non-invasive (CAM, 2003). These tests are only administered when standard treatment protocols (which are inexpensive) fail to produce desired results. This is an uncommon occurrence.

GAPS is based on a signs-driven diagnosis of a single condition that has an effective treatment strategy and cure with a 66% success rate. It replaces a symptoms-driven diagnosis without clinical testing and measurement that merely leads to identifying multiple syndromes with controversial drug treatments, none of which are curative. GAPS was conceived of by Dr Natasha Campbell-McBride. She holds a Degree in Medicine (with Honors) and a Postgraduate Degree in Neurology. She also holds a second Postgraduate Degree in Human Nutrition from Sheffield University. In her Cambridge Clinic she specializes in Nutrition for Children with Learning Disabilities, and Adults with Digestive and Immune System Disorders. She is the mother of a normal 15-year old son who once had autism but has remained free of all symptoms

and signs thanks to her pioneering research and treatment. She has recently published a book called *Gut and Psychology Syndrome: Natural Treatment of Autism, ADHD, Dyslexia, Dyspraxia, Depression, and Schizophrenia* where she explores the connection between the patient's physical state and brain function.

EPIDEMIOLOGY

Ten years ago autism affected 1:1000 children. Recently it has been considered an epidemic affecting 1:250 and now 1:150 children, as reported in the UK, the U.S., Canada, and Europe equally. It has been argued falsely by the government and the medical establishment that autism is not an epidemic, but rather that we diagnose it better now and hence there is a rise in reported cases. Dr Campbell-McBride argues, "But what that would mean is that 10 years ago doctors were so bad at diagnosing our children that they were missing one child in 250. But autism is not a disability that goes away as the child grows up. If they had missed one child in 250 ten years ago, then we would still only have one in 250 teenagers with autism now, which we don't" (CAM, 2003). Teenagers do not have autism rates as high as young children because the epidemic is striking younger children. It is a condition that increases with each generation.

ADHD affects 1:3 children. (Statistics for ADD are included in ADHD and pertain more to girls than boys.) Dyslexia and dyspraxia (extreme clumsiness, lack of fine and gross motor skills and coordination) are also on the rise in epidemic proportions (CAM, 2003; Campbell-McBride, 2007).

ETIOLOGY OF GAPS

Vaccines

The theory of vaccines causing autism has been refuted by researchers including Dr Campbell-McBride and Dr Andrew Wakefield, whose research once implicated vaccines.

Dr Wakefield is the internationally respected gastroenterologist who was researching Crohn's disease and ulcerative colitis when he found a type of inflammatory bowel disease in autistic children who had received the MMR vaccine. He also found the kind of inflammation in some cases similar to Crohn's disease, in other cases similar to ulcerative colitis, and in other cases unique to autism in children which included ulcers, fecal impaction, abscesses filled with pus, erosions, and inflammation along the entire length of the colon (CAM, 2003). The endoscopies he performed on autistic children found the lymphatic system of their gut to be very swollen. The lymph nodes along the intestines are supposed to be bean-sized, but these kids had such swollen nodes that the entire lumen was obstructed and causing constipation and diarrhea. He termed this finding "Autistic Enterocolitis." When he sampled the lymph to see what was in it, he found the same strain of the measles virus that is in the MMR vaccine (Campbell-McBride, 2007). When he published his findings in *The Lancet*, he was sacked (CAM, 2003). The backlash against his research included such slander and libel that he ultimately gave up his practice in the UK (Campbell-McBride, 2007). He now continues to research and treat children with autism in the U.S. and Canada.

Since Wakefield's research, it has been clarified that there was a correlation between MMR vaccines and autistic enterocolitis, but it was not causative. Rather, it was as though the vaccine was the proverbial straw that broke the camel's back. Only children with vulnerable guts get autism following vaccination; it is an indirect cause. Children with healthy gut floras are getting vaccinated and not developing autism. Children with unhealthy gut floras get vaccinated and develop autism. However, children with unhealthy gut floras who do NOT get vaccinated are also developing autism. The critical determining factor appears to be the condition of the gut flora (Campbell-McBride, 2007).

Antibiotics

Broad-spectrum antibiotics may alter and reduce bowel flora and thus switch off the immunological signals that these gut flora send to the developing immune system, associated with increased risk of atopy and asthma, according to a study published by Professor Julian Crane of Otago University in *Thorax* (Farooqi, 1998; Wickens, 1999). The increased use of antibiotics coincides with the time trends for the increasing prevalence of asthma and autism, as well as compromised gut flora, throughout the 1960s, '70s, and '80s. This is particularly true for people on long courses of antibiotics, such as when people with acne are put on tetracycline for a number of years (Campbell-McBride, 2007). Likewise, this applies to antivirals such as those prescribed lifelong to patients with herpes. While this may not apply directly to children with autism, as this paper will show it does apply indirectly because children receive their gut flora from their parents directly, generation after generation.

Gut Dysbiosis

Gut dysbiosis damages the gut lining, stretches the lumen thin with gas, inflames, and ultimately creates ruptures that leak undigested food particles and substances into the bloodstream prematurely. The gas and bloating that cause flatulence is caused by yeasts. Yeasts make ethanol, which in turn taxes the liver, harms the brain, and makes people feel hungover after a large meal. If you have yeast, you have a veritable alcohol factory in your gut insuring some level of intoxication at all times (Campbell-McBride, 2007). The improper breakdown of food leaking through the gut into the bloodstream causes food allergies. Because casein and gluten are large molecules that take time to digest, they are the most likely to be leaked in undigested form into the blood, causing the most common food allergies: dairy and wheat.

What's in Gut Flora?

Bad flora includes yeasts, viruses, bacteria, amoebas, parasites, etc. Good flora, however, includes members of these same groups---yeasts, viruses, bacteria, amoebas, parasites, etc. It is simply a matter of using good flora to balance bad flora. The gut has to have the good ones to populate and occupy enough space so that bad flora cannot proliferate. Humans have had a symbiotic relationship with good flora throughout history up until recent times. Humans cannot live without this flora. The etiology of the proliferation of bad flora will be discussed in a separate section of this paper. For now, let us consider key elements of good flora.

Good flora. On average, everyone carries two kilograms (1.5 to 3 kg) of bacteria in their gut. There are more cells there than there are in an entire human body. Ninety percent (90%) of somatic cells are gut flora; 10% are the human body that surrounds the gut like a shell (CAM, 2003; Campbell-McBride, 2007). The good microbes are called probiotics, and they control upwards of 500 bad microbes competing for space in the gut. The probiotics have many functions in addition to staving off bad microbes.

Probiotics manufacture vitamins and enzymes. Many vitamins are water soluble so they do not last more than a few hours in the body. Humans would not be able to survive on adequate water soluble vitamins if they could not have them manufactured round the clock. The diet merely supplements these vitamins for a boost with meals. The gut flora give you that steady supply of B vitamins because that is what they excrete as metabolic waste. Their metabolic waste comes from eating bad microbes (Campbell-McBride, 2007).

Probiotics detoxify. In order for probiotics to survive as a species, when they encounter environmental threats to their existence (such as mercury), they quickly reproduce themselves, bind to the toxin via chelation, and die purposefully to save the rest of their species. Once they have chelated and died, they pass through the gut along with the feces, taking the toxin out of the

body with it. This leaves their offspring (and the human host) able to carry on in an internal environment free from environmental toxins. Toxins that can be carried out of the body in this manner include mercury, PCBs, carcinogens, and all environmental toxins from personal hygiene products, etc (Campbell-McBride, 2007).

Probiotics transport minerals into the blood supply. Inorganic minerals that the body needs do not cross the intestinal lumen into the bloodstream unless they are carried by probiotics. A person will suffer from anemia or mineral deficiencies of the blood or tissues without probiotics, because the body does not accept these minerals without the probiotic as a transporting agent. Mineral supplements cannot help a person who is mineral or iron deficient unless there are enough probiotics for absorption (Campbell-McBride, 2007).

Probiotics are the first line of defense in the immune system. Pathogens are most likely to enter the body internally via the digestive system (mouth) and the majority of the T-1 cells are in the gastrointestinal tract. T-1 cells do not identify what a foreign invading cell is; they just identify that it is foreign and kill it immediately. This buys time for T-2 cells to identify and target the specific foreign cell type and thus create immunity for later invasions. In terms of Chinese medicine, it takes *Jing* to make T-2 cells, and in terms of western medical knowledge, there is a limited amount of them available throughout a person's life to shape into antigens specific to foreign substances. A person would not have enough T-2 cells in life if they had to manufacture one specific to every foreign cell type invading the body in a lifetime. Therefore, the T-1 cells are necessary as a first line of defense, to kill without the sophisticated body chemistries required for matching protein-for-protein each invader. Some invaders only come once in a lifetime, so it would be too taxing to manufacture T-2 cells for each of these specifically. However, when the gut flora is imbalanced, the T-1 cells are low in number. This

causes the T-2 cells to overwork, producing cells that attack things that should never be attacked, like undigested food particles or inhaled pollens, etc (Campbell-McBride, 2007). Once a T-2 cell eradicates a foreign body, it leaves an immune system imprint so that any time that substance is encountered again by the body, the body will launch an attack against it. That is the origin of allergies. It is also the origin of a weak immune system, deficient from overwork, that eventually fails to identify cells properly and begins attacking the self. Autoimmune diseases can originate with gut dysbiosis, and in some cases can be alleviated with proper restoration of gut flora.

The immune system's relationship to the gut leads us back to the vaccine-autism relationship. Children with compromised gut flora are already immunocompromised. Vaccines are designed for a healthy immune system, and cannot be tolerated by immunocompromised children. For them, vaccines deepen the damage to the immune system and tip the scale to induce autism. For some, the vaccine is MMR, but for others it can be DPT, a triple vaccine administered at 1.5 months, 2.5 months, and 3.5 months (CAM, 2003).

Bad flora. Some pathological gut flora have been implicated in the etiology of autism already, such as candida, claustridium, and sulphate-reducing bacteria are likely linked to autism, although research into the human gut flora in autism has been extremely limited (Bingham, 2002). Salmonella is an example of a bad microbe that is normally kept in check by good flora. If you have salmonella poisoning, it is indicative of a gut dysbiosis, or as Dr Leon Hammer and Claude Bernard would say, a weak terrain. In fact, the herpes virus is another common and proliferate virus of the gut, usually kept in check by viruses belonging to a healthy gut flora. People who take Valtrex to control herpes have the worst gut floras because it kills so many viruses we need in the gut that gut dysbiosis becomes extreme in these patients. To reiterate, there are over 500 bad microorganisms in the gut commonly kept in check by good

flora, and it would be too large a task to name them all here. It should be well noted that bad gut flora do not just produce neurotoxins that target specific areas of the brain; they survive by producing endorphins as a waste product when they can eat foods they need to survive. These endorphins give the human host or child great pleasure and cause them to only want to eat that food (usually simple carbs found in crackers, pasta, and bread). This diet causes the bad flora to proliferate even more, and influences malnutrition and toxicity in children in multiple ways.

Recreational Drugs

Recreational drugs are more destructive to a child or adolescent with GAPS due to the already compromised activity of brain neurotransmitters and liver function (low serum sulfate levels) and the high load counts of neurotoxins already in the body being manufactured by bad gut flora.

Travel

Traveler's diarrhea is often symptomatic of unfriendly microorganisms such as amoebic histologica and parasites. Once in the gut, they are difficult to eradicate, and compete with good flora for space. Travel can worsen a child's condition. It can also contribute to the parent's inability to provide future offspring with a healthy gut flora to begin with.

Junk Food Diets

Junk food diets, sugar, refined foods, and foods with a long shelf life have negative impact on the gut health. Humans have developed for thousands of years on a diet rich in live enzymes, cultures, and lactofermentation in the absence of refrigeration. Our modern diet has none of these advantages. Worse, it has many unnatural substances that the gut cannot break down and can be passed through a leaky gut into the bloodstream if they are not passed out with the stool.

Eating Disorders

Starvation, anorexia, and purging with laxatives all negatively impact the health of the gut and probiotics. Again, if a child's mother has experienced these in adulthood, her gut dysbiosis is all the start in life her children have. These children are more vulnerable than their parents were at critical stages of development. Each generation gets worse.

Medical Imaging

The prep for some medical imaging may involve a barium swallow, or perhaps a protocol to flush out the gut entirely. Once good flora is flushed, bad flora gains an advantage in repopulating the gut.

Parents

Infants are born with a sterile gut (Bingham, 2002). They get their first inoculation of probiotic flora from their mother and father. The mother's vaginal flora matches her gut flora and is transmitted to her child passing through the birth canal. During the natural birthing process, the newborn swallows its first exposure to microorganisms, and gets them into the body through infiltrating other orifices like the eyes and nose (CAM, 2003). The father's gut flora is mirrored in his genitourinary system and influences (positively or negatively) the mother's vaginal flora via sexual intercourse. If a child is born via Caesarean section, his or her probiotic flora is compromised. This is evidenced in actual C-section births resulting in children with a higher incidence of low T-1 cells, asthma, eczema, overproduction of mucus, ear infections ("glue ear"), lung infections, and bronchitis. Furthermore, this sets them up for being prescribed antibiotics, which destroys any healthy gut flora they may have. It is a vicious cycle (Campbell-McBride, 2007).

In looking at mothers of children with autism, ADHD, asthma, eczema, and other problems, Dr Campbell-McBride states that between 95-100% of these mothers have conditions manifesting due to gut dysbiosis. Furthermore, the mother's gut will manufacture toxins that go into her blood, and pass into her breast milk and into her child (CAM, 2003).

PROGNOSIS

The good news is that autistic children are born with normal brains and sensory functions, and recovery is possible. If they are caught early, they become perfectly normal and are able to finish their education in mainstream schools. They may have some idiosyncrasies or be a bit eccentric, but they are within normal range (CAM, 2003). Dr Campbell-McBride says that she is able to cure two of three children if they are identified by the age of three. Some of the most dramatic and fastest recoveries have occurred in babies and young children with severe constipation and among children with serious behavioral problems. These included autistic-type hyperactivity as well as ADHD, often accompanied by severe and prolonged night terrors. Very often the behavior problems and night terrors cleared up within ten days after initiation of treatment. Dr Campbell-McBride also says that many cases of schizophrenia she finds comorbid with GAPS are entirely curable by eradicating the bad flora creating the neurotoxins (Campbell-McBride, 2007).

The bad news is that a compromised gut flora has been passed on through the generations and unless it is corrected, future generations are doomed to an ever increasing level of cognitive, emotional, and behavioral developmental disorders (CAM, 2003). Once the gut is healthy, even lethal strains of bacteria are rendered harmless to the body, as found by the research of Louis Pasteur and others in the context of Claude Bernard's work, as cited by Dr Campbell-McBride (2007).

GAPS treatment protocols regularly cure mental-emotional problems as found in autism, schizophrenia, bipolar disorder, obsessive-compulsive disorder, anxiety, depression, and endogenous depression; lung, skin, and large intestine (Metal) disorders such as asthma, eczema, irritable bowel syndrome, constipation, diarrhea, leaky gut, and digestive problems in general; toxicity of the blood, liver, brain and central nervous system; autoimmune diseases aggravated by gut dysbiosis such as rheumatoid arthritis, multiple sclerosis, and Grave's disease.

TREATMENT

Treatment typically takes two years, using nature to heal the body. The treatment principle is described as "heal and seal the gut." It is based on a two-year strict dietary protocols, detoxification, probiotic supplementation, and occasional but temporary use of vitamins and minerals. The cure is assumed when the treatment can be disregarded and the patient remains normal.

Strict dietary protocols designed to heal and seal the gut are based on the Specific Carbohydrate Diet. It functions to heal the digestive tract of leaks and to re-establish healthy gut flora. It is a strict grain-free, lactose-free and sucrose-free meal plan that limits the specific carbohydrates needed by harmful yeasts and bacteria. Only mono sugars are allowed: fructose, galactose and some others found in fresh vegetables, fresh fruit, and honey. The original diet was developed in the 1950s by Drs Sidney and Merrill Haas to cure patients with celiac disease. It was first published in the Haas's book *The Management of Celiac Disease* in 1951. It has since been championed by biochemist and cell biologist Elaine Gottschall, MS, author of *Breaking the Vicious Cycle: Intestinal Health through Diet*, first published in 1987 and still in print. The diet calls for the slow re-introduction of all foods as the gut heals. Details are available in her book and in a recorded talk she gave in 2007 for the Weston A. Price Foundation Annual Conference.

She encourages eating foods with active live cultures, including lacto-fermented vegetables, meats, condiments, and beverages as per the Weston A. Price Foundation guidelines. Recipes are available in Sally Fallon's cookbook *Nourishing Traditions*.

Detoxification is done very slowly. Juices are preferred to chelation, as juices are naturally gentle and effective. "The child has a couple of eight-ounce glasses a day of freshly pressed juice. Therapeutic kinds of juices are generally vegetable juices, particularly green juices—which taste ghastly---so I suggest 50% of something tasty, like pineapple or orange or apple or mango, to disguise the taste of the other 50%. Of that, about 40% will be carrot juice, 10% beetroot. You have to be careful with beetroot because it is extremely powerful and can really make you sick. So other juices we use are celery, lettuce, and greens like spinach, parsley, dill, fresh nettles, dandelion leaves, those sort of things" (CAM, 2003). It is imperative that detoxification is achieved slowly because probiotics kill toxic microbes. When toxic microbes die, they emit even more toxins, which in high doses can cause acute schizophrenia, OCD, suicidal depression, hyperactivity, and illness (CAM, 2003). Remember: treatment takes years. "Nothing works that fast in nature," says Dr Campbell-McBride (CAM, 2003).

Supplementation with probiotics is done at therapeutic "industrial strength" doses. These probiotics are not found in over-the-counter products; those products are merely prophylactic and cannot treat GAPS at this level. Probiotics are the foundation for the cure, and they must be of the right sort. A multi-strain product containing soil bacteria is needed to break down the putrefaction and clear out the pathogenic flora. Soil bacteria are aggressive and are used in industry and waste water management because they have a great ability to clear out putrefied waste. They work in a clinical setting even more effectively (CAM, 2003). Dr Campbell-McBride offers a proprietary blend under the name Bio-Kult™ available for purchase online

from the UK. Most probiotics administered orally are destroyed in the digestive juices of the stomach and small intestine; for this reason, prebiotics may be an alternative approach.

Prebiotics are non-digestible food ingredients that selectively stimulate a number of bacteria in the colon to improve overall health. Examples used in Europe include fructo-oligosaccharides and soybean oligosaccharides. They are typically administered through common foods sold in Europe and Japan. The combined use of probiotics and prebiotics is known as synbiotics. One of the first symbiotic foods was an enriched yogurt from Switzerland called Symbalance (Bingham, 2002).

Vitamins and minerals are not supplemented unless absolutely necessary. The philosophy is that all vitamins and minerals should be derived from the diet and digestion. Nutritional deficiencies are addressed by correcting gut flora. Dr Campbell-McBride recommends nut and seed oils (2007) for dietary use, and for supplementation she recommends fish oils (CAM, 2003). Fish oils are necessary because they contain derivative essential fatty acids (EFAs) that would be made in the body from parent EFAs found in other foods, but in the case of severe toxicity, the body cannot manufacture the derivative EFAs and must ingest them. Aside from fish oil supplements, the only other supplement she might include is digestive enzymes (Campbell-McBride, 2007).

For a complete discussion of Dr Campbell-McBride's treatment protocols for GAPS, refer to her book *Gut and Psychology Syndrome*.

Ongoing research of gut flora in autistic children has gained status in the area of gut microbiology. At Reading University in the UK, topics of research includes molecular tracking of the human gut microflora, in-vitro human gut modeling, and isolation and development of specific probiotics, prebiotics, and synbiotics (Bingham, 2002).

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