

William Walsh, PhD: Epigenetics as a Source of Mental Health Dysfunction and the Nutrient-based Solution

Interview by Craig Gustafson

William J. Walsh, PhD, president of the nonprofit Walsh Research Institute, is an internationally recognized expert in the field of nutritional medicine and a key scientist driving the development of nutrient-based psychiatry and nutritional medicine. During the past 30 years, Dr Walsh has developed biochemical treatments for patients diagnosed with behavioral disorders, attention-deficit/hyperactivity disorder, autism, clinical depression, anxiety, bipolar disorders, schizophrenia, and Alzheimer's disease, which are used by doctors throughout the world. His book, Nutrient Power: Heal Your Biochemistry and Heal Your Brain (Skyhorse Publishing, 2012), describes the evidence-based nutrient therapy system. Dr Walsh has conducted chemical analysis of more than 25 serial killers and mass murderers, including Charles Manson, Richard Speck, James Oliver Huberty, Patrick Sherrill, and Arthur Shawcross. He has assisted medical examiners, coroners, Scotland Yard, and the FBI in these forensics studies. He has designed nutritional programs for Olympic athletes, NBA players, major league baseball players, a heavyweight boxing champion, and PGA and LPGA golfers. (Adv Mind Body Med. 2014;28(2):26-32.)

Advances in Mind-Body Medicine (Advances): Dr Walsh, please tell us about your educational background.

Dr Walsh: I started out at University of Notre Dame and earned a BS in chemical engineering. From there, I went on to University of Michigan and received a master's degree in chemical engineering. Then, I got involved in nuclear engineering and started doing experimental work of a nuclear nature. I was heading toward a PhD in nuclear engineering when I decided to move to Iowa State University's Institute for Atomic Research and the Ames Laboratory. It was at Iowa State University where I earned my PhD in chemical engineering with a minor in nuclear engineering.

Later I moved to Los Alamos, New Mexico, accepting a position as a visiting scientist at Los Alamos National Laboratory. I also worked for a summer while doing research on hydrogen bomb production at DuPont's Savannah River

plant in Aiken, South Carolina. I discovered why the nuclear reactors were scrambling, which was reducing our production of hydrogen bombs by 20%.

I became an experimentalist, basically, which provided an "education" or foundation to what would lie ahead. In 1964, I accepted a position in research at Argonne National Laboratory.

Advances: That is quite a leap from nutritional biochemistry. What drew you in that direction?

Dr Walsh: When I was at Argonne—in my late 20s and early 30s—that was the time when the Peace Corps was popular and it seemed like everybody I knew was volunteering for something good. There was an incident in my neighborhood where a woman was murdered, so I decided that I wanted to do something in the area of crime and violence. I became a volunteer at Stateville Penitentiary in Illinois—which, at that time, was 1 of the 3 toughest prisons in America.

My prison volunteer work really started with a chess game. I was president of the Argonne chess team and we had just won a Chicago championship. We heard they had a good team in Stateville and I scheduled a match to keep in "chess shape." But within a year or 2, I found myself head of a group of about 125 volunteers doing a lot of different things. My real education started in an ex-offender program. We realized that if we were going to help these people, the time they need help is when they get out of jail. We thought that it was not a good thing for them to be hungry and homeless. These are pretty tough people; they know how to make money fast so ... anyway, I became closely involved with some of the families that had produced a criminal.

What I learned was that even though many criminals have had deprived backgrounds and very difficult upbringing, many others had ideal upbringings and came from caring and capable families, with other brothers and sisters who turned out fine. I kept hearing the sad stories from these families that they knew their child was different from the

time he was 6 months old. They told me their horror stories about their own children—how they were shocked by what their little babies and children were doing. For example, I heard a couple of stories of 2-year-olds torturing the family pet. By the time they were 3 or 4 years old they were oppositional, defiant, and completely different than the other children in their families.

I heard the sad stories of how these families felt that they had done everything they could to help their child: counseling, psychiatry, institutionalization ... everything. Many had really tried hard to help their child but came to believe that their children were headed for prison from the day they were born—that they were born different. After doing this volunteer work for a few years, we began to ask the question, “What is the cause of a behavior disorder?” We felt like we did not know what we were doing. We had always thought it was caused by life experiences and traumatic events and child abuse and poverty and that sort of thing.

We started going to libraries and studying everything we could find on mental health and behavior and found out, interestingly, that right at that time there was a revolution going on in mental health—the biochemical revolution in psychiatry. Up until that time, the belief was that if a person had depression, anxiety, or violent behavior that the cause was very negative life experiences. Eventually adoption twin studies showed that the major problem appeared to be inborn and that people are born with a predisposition for these very problems.

So, that is how I got started. And since I was working at a national laboratory with 5000 other researchers, I decided to start getting some data. I started collecting samples from the ex-convicts and from the people in the prison—including some extraordinarily violent people, death-row criminals ... people who had murdered. It was a scouting expedition looking to see if I could find differences in their basic body chemistry values. The nice thing is that I had people coming to me

saying, “Hey, Bill, I hear you are doing something interesting at the prison. Can I help?” So I had people with world-class chemistry equipment willing to devote evenings and weekends on their own time. We had no funding, which turned out to be really good—no one from Washington was telling us how to do experiments.

We did some classic experiments, but it took a year before I got data of any value. I had a lot of data that looked like somebody shot a shotgun at a wall. We could not correlate anything looking at the kind of chemicals that I thought would be dominant in brain chemistry—until we looked at

metals. In trace metals we found really striking consistent differences. Things like copper, zinc, manganese, lithium, cobalt: We found striking differences in trace metal levels between criminals and noncriminals. We did 2 very careful double-blind studies with a university in California. They even challenged us to examine double-blinded samples and tell them which came from violent individuals and which did not. We had about a 95% success rate in both experiments.

Advances: How did your collaboration with Carl Pfeiffer, MD, PhD, come about?

Dr Walsh: In the 1970s and 1980s he was considered to be the world’s leading nutritional scientist. He had been nominated for a Nobel Prize by Linus Pauling, PhD. He was famous for his work in natural therapy for schizophrenia and he was a colleague of Abram

Hoffer, MD. They were the 2 world leaders in analyzing brain function and brain chemistry and developing natural therapies for schizophrenics without necessarily blasting them with drugs.

In 1981, after I had been studying criminals for 5 or 6 years and getting very exciting information, Dr Pfeiffer learned of the work that I was doing and we collaborated for 12 years. I started sending him violent people—ex-convicts, straight out of the prison, to his clinic in Princeton, New



Jersey. He had drug-free treatments for these very imbalances that we found. We also found that it was more than just metals. There were methylation disorders, there were pyrrole disorders, and there were malabsorption disorders. He had developed treatments for these severe chemical imbalances that these criminals were apparently born with and had predisposed them to bad behavior.

In 1981 I formed the not-for-profit charity called Health Research Institute, as I did not think that it was proper for the Argonne National Laboratory—which was a national laboratory devoted to energy—to be directly involved with medical treatments for people. In 1989 I founded the Pfeiffer Treatment Center, which eventually became the world's biggest complementary medicine clinic. We were a not-for-profit public charity. We eventually saw about 30,000 patients.

I have always collected a lot of data and been a numbers person. In my 30 years of clinical work, I believe I have collected the world's biggest chemistry database for behavior consisting of more than 1.5 million chemical analyses of blood, urine, and tissues. I have similar gigantic chemistry databases for depression and schizophrenia. I think my group saw more autistics than anyone in the world. We have approximately 6,500 cases of autism documented.

Advances: Why did you decide to found the Walsh Research Institute?

Dr Walsh: I left the Pfeiffer Treatment Center in 2008. I do not want to get into the details but had given up all my power. I did not like working with accountants, bankers, and lawyers and I did not like being the boss. So I gave up all my power and they gave me the fancy title “Chief Scientist.” That went on for many years and worked out beautifully. But I lost track of the board of directors and they started transforming the organization into something that I thought was not proper for a public charity. So, I eventually gave them a 60-day notice and started another public charity—The Walsh Research Institute, which is where I am now. I am still engaged in research, all aimed at the brain: brain function, brain disorders, and how to help people who have brain disorders. Epigenetics is, I think, a key to many things in mental health and is providing a road map for the best treatments for people with problems like anxiety and depression.

Advances: There were quite a few nutritionists, several of whom you have already mentioned, who had tried to address nutrition and mental health. Although they were able to produce anecdotal results, they had not really been able to identify why they were finding success. How is some of the current research validating some of the work of these pioneers and the work that you and Dr Pfeiffer did?

Dr Walsh: You are absolutely right. The pioneers did find treatments that worked, but they had the wrong theories—they had plausible theories or maybe the best at that time. Dr Hoffer had the theory called adrenochrome hypothesis,

which we now know is not why his treatments for schizophrenics worked. Dr Pfeiffer thought it all had to do with histamine in the brain. Histamine is one of the neurotransmitters and it is abnormal in schizophrenics and many mental disorders. But eventually I learned that histamine abnormalities are not the cause of schizophrenia. Fortunately for me, brain science has advanced dramatically in the last 25 years and the answers are now readily apparent. We now know that most mental disorders are dominated by the process of reuptake. And reuptake is dominated by genetic expression of specific proteins, called transport proteins, that populate the membranes of the brain cells. They are passageways for the reuptake, or the return of, neurotransmitters. We now are learning, chapter and verse, what regulates these important brain functions.

The science of epigenetics is still in its infancy but we already have enough information that we know—for example—there are some nutrients that are rather powerful serotonin reuptake inhibitors. We also understand why Dr Hoffer's use of niacin and folates was effective for a many schizophrenics. It has to do with the epigenetic effect on gene regulation that dominates brain chemistry in neurotransmission. Much of the best research is not our research—most of it has been done by pharmaceutical companies and by universities.

What I am finding is that all the knowledge is there to treat patients with a lot less medication, and in some cases, no medication. The problem is that the people doing this wonderful research have the wrong goal. It seems like their goal is to find the next billion-dollar drug, even though they now have enough science and knowledge and understanding to get a lot of the outcomes accomplished without drugs.

Advances: So the mission of the Walsh Research Institute is to distill and refine that body of research, then come up with protocols for addressing this dysfunction?

Dr Walsh: That is part of it. I am presenting a paper at the American Psychiatric Association, or APA, annual meeting in May. Based on my chemistry database for depression, which involves more than 3,000 depression cases, I have learned that depression is a name that I refer to as an umbrella term. It is a term used for several completely different disorders. What I am presenting at the APA are the 5 major phenotypes of depression. They all have different body chemistry imbalances—brain chemistry imbalances. They involve different neurotransmitter abnormalities and need completely different treatments.

DSM 5 just came out and it fails to recognize this, even though this information is really out there, scattered throughout hundreds of journal articles. My data clearly shows and identifies 5 types of depression and we have tailored treatments for each one of them. One of the 5 types involves people who have elevated serotonin activity. These are the people who get worse if they take a serotonin reuptake inhibitor, or SSRI. Psychiatry has known for many years that, even though many individuals are helped by SSRI medica-

tions, there is a consistent, small, alarming number who get dramatically worse. That is why, when anybody buys an antidepressant, the pharmacy includes a warning insert informing them that some people, especially young men, may become suicidal or homicidal.

And, by the way, I think that this is the primary cause of school shootings in the United States. Studies of the 50 major school shootings since 1990 show that the great majority of them occurred in young men who were pretty much okay until they are about 15 or 16 years old—when they developed anxiety and depression, went on an antidepressant, and then became suicidal or homicidal and disaster occurred. I have already written that up in a couple of articles, and it will be part of my presentation to the APA. I think they need to know this.

Dr Pfeiffer developed 3 classifications of schizophrenia and I think that holds true—although the emphasis is no longer on histamine imbalances but on what is really going on abnormally in the brain. We have seen more than 10 000 cases of behavior disorders. Our recommendations for reducing crime and violence: Basically, it involves identifying violence-prone children at a young age—that is not hard to do because most of them are extraordinarily troubled by the time they are 4, 5, or 6 years old—and to give them effective treatment before their lives are ruined.

Advances: Have you published your results?

Dr Walsh: We have published our behavior outcomes in peer-reviewed journals and it is better than anything I have seen with any medication. However, not a whole lot of attention has come to this. I think people just cannot believe that you can really help a violent person with nutrients—and that you really need a powerful drug to do the job. That is why, when I wrote the book, I titled it *Nutrient Power*. This is something I really want to get through to the psychiatric world—that nutrients have great power and for 3 reasons:

One is that the brain is a chemical factory and it is constantly producing serotonin, dopamine, and norepinephrine—these very powerful brain chemicals—and the raw materials are nutrients: amino acids, vitamins, and other natural biochemicals in the body. If a person has an extraordinary deficiency or an overload of 1 of those chemicals, or 1 of those ingredients—1 of those precursors—you would expect something wrong with their brain chemistry.

Then you have the epigenetics. We know, for example, that folates have a tendency, because of an epigenetic mechanism, to reduce serotonin activity. That is why you have to avoid folate therapies for low-serotonin depressives. We also know that methionine acts as an SSRI. In other words, it provides the same benefits that an antidepressant drug might do—only it does it by a slower mechanism.

The third powerful role of nutrients involves oxidative stress—the excessive free radicals in the body—that have a lot to do with mental illnesses. Antioxidant nutrients can help persons with a mental illness.

So, what we do is a medical procedure: We do a careful medical history, specialized laboratory testing of blood and urine, and we identify chemical imbalances—if they exist in that particular person—that are associated with these mental problems. Then we design a treatment program consisting of vitamins, minerals, and amino acids.

One of my organization's mission is training doctors. Two weeks from today we will be in North Carolina training 23 doctors. A month later we will be in Australia training 60 doctors, including 5 psychiatrists. We have an expert that conducts an international physician training program. Again, we are a not-for-profit charity and are not doing this for money—we think this is something that the world needs. The world of psychiatry needs to change and it needs to incorporate these treatments that could benefit so many people.

We are more science-based than most nutritional groups. One of our problems is there has been a lot of sloppy work and embarrassing studies that have come out of the nutritional complementary medicine field. Most of these people are dedicated and trying to do well, but the level of their science is sometimes very lacking. We have tried to do first-class science and experiments and be as evidence-based as we possibly can.

Advances: In your book you call out the fact that compliance with medication often times has to do with the potentially severe side effects that come with many of the drugs. Other people are oppositional and just say, “No I am not taking that.” How has your approach been received from the perspective of patient compliance?

Dr Walsh: Actually we have the same problem that most mainstream doctors have. Compliance is one of our greatest clinical issues. It is relatively easy to identify a person with chemical imbalances and to design a treatment program that is likely to help them. Getting them to actually comply is something else. We saw more than 10 000 cases of really quite seriously disturbed—violently disturbed—children and adults. Now, you can imagine that it is hard to get an oppositional, defiant teenager to do anything—much less swallow the capsules. So that, actually, is a great problem.

However, over the years, we got pretty good at it though. We found out that besides the mental health benefits, correcting nutritional deficiencies had general health benefits as well. For example, let's say that a 15-year-old, oppositional-defiant kid was very slender or not very tall. We might point out that, “We found that you have zinc deficiency and we think this may be stunting your growth.” When they find out there is a good chance we can make them bigger and stronger, they might be motivated to comply with treatment.

Teenage girls are the hardest ones to get to do anything. If they came in with acne we would rejoice because we would not talk about their truancy or whatever problems they were having behaviorally. We would talk about their complexion. Sometimes we would have a wild kid demanding to get her treatment by the time she left our clinic. We had to be smart about motivating teens.

We have worked with many patients with bipolar and schizophrenics. They suffer greatly. I mean there are very powerful medications that these people get and they typically get 3 or 4 medications at the same time. Yes, if you have a bipolar patient, the drugs may be able to eliminate the manic phases and, to some extent, ease the depression. But most of these people absolutely hate how they are afterwards. The major symptoms may be gone, but they may have gained 150 pounds—and I am not exaggerating. I have known people who have gained 300 pounds on the medications. They may not be able to use their brain like they used to—the schizophrenics, in particular, who are now receiving atypical antipsychotic medications like Risperdal and Olanzapine, etc. These medications often do a fairly good job of getting rid of hallucinations and reducing or eliminating delusions, but these people are usually very miserable. If you did a survey of even successfully treated schizophrenics, you would find that they absolutely hate the side effects. Sedation is probably one of the biggest. They have no energy and, again, they cannot use their brain like they used to. We now know that these medications affect the frontal cortex of the brain and inhibit the ability to use their brain cognitively. Of course, it is really dangerous when a mentally ill person suddenly goes off of a medication, cold turkey. I mean that is one of the leading causes of suicide in the United States—somebody suddenly stopping a medication. They do not realize that the medication changes their brain. It causes downregulation of receptors. And so, if they suddenly stop, they go through a withdrawal effect. It can be quite shocking—in some cases fatal. It is a big problem. The advantage we have is that our treatments normalize the brain. We are not using molecules that are foreign to the brain that can cause side effects. If we do our job right—if we are successful—we are just simply normalizing brain chemistry. As a result, there are rarely side effects with that. We do not give huge doses of anything, unless that's what it takes to normalize blood levels and brain levels.

Advances: You also have said that broad supplementation is probably not the best answer for addressing mental illness—that it is more targeted therapies. Why is that?

Dr Walsh: The key really is biochemical individuality. That concept was first advanced by Roger Williams, PhD, in the late 1940s. Basically people are different and we all have different chemistry. Anyone who has had several children knows how different kids are, innately. One of the first things that we learned in clinical practice was a surprise to me. First of all, we did find people who had deficiencies of metals or, maybe, of amino acids and that this was because of genetics in many cases. We found that, in some cases, they needed many times the RDA of these nutrients just to balance their chemistry—because we were fighting genetics.

The surprise was that nutrients—important nutrients in the body and the brain—that are at abnormally high levels, because of something going wrong in your body chemistry,

cause more mischief than the deficiencies. So that is why multiple vitamins usually do not work in mental illness. If you take a person with depression, anxiety, or almost any mental problem, and you just stuff them with vitamins and minerals and amino acids, they are likely to get worse. This is because what you are giving them includes some nutrients that for them are like poison. So biochemical individuality is key. Clinically and medically, the challenge is to find out what the person's biochemistry is—to find the nutrients that really impact the brain powerfully, you need to find which ones are in overload, which ones are in deficiency, and then just normalize them. That is really the essence of our treatment.

Advances: Will you describe your findings about epigenetics and mental illness?

Dr Walsh: There are several mysteries of mental illness and many of them are now being solved by epigenetics. For example, we know that autism runs in the family. Looking at identical twins, if one twin eventually develops autism, the chances that the other will are more than 60% but not 100%. If you look at paternal twins, chances are less than 10% that the other one will. So, what you have is very strong heritable or familial tendencies. These illnesses are violating the classic laws of genetics and epigenetics explains why. What epigenetics reveals is, basically, gene expression that has gone wrong.

Every cell in our body has the exact same DNA and the DNA has more than 20 000 genes. A gene has only 1 job and that is to make 1 particular protein. It might be a small protein or it might be an important enzyme that has a lot to do with physical and mental health. What happens during the 9 months in the womb is quite remarkable because, as the tiny fetus begins to develop different organs, every part of the body needs a different mix of chemicals. This natural process in embryology, as a little fetus is developing, gives a blueprint for which genes express where. For example, in your liver, in your kidneys, in your eyeballs, and in your skin, you have to have completely different mixes of these chemicals that are being genetically expressed.

The way this happens is with chemical tags of your DNA. If you stretch out the DNA, packed into each little cell in your body, it would be 6 feet long. But it is all jammed together and compressed into a tiny little nucleus. In early development, you get chemical tags that can either enhance gene expression or silence it. That is what epigenetics is: a natural process of gene regulation that we have to have survive and for each part of the body to function properly.

What we have learned is that severe environmental insults can alter these marks and produce an epigenetic disorder. We now know that most types of cancers are epigenetic. We now know that more than half of heart disease is epigenetic—that is, disease in which the environmental insults have altered our gene expression. When you have an epigenetic disorder like that, it does not easily go away. A major environmental insult can permanently change gene expression. For example, it might turn on a cancer gene or it

might turn off a cancer-prevention gene. That is why they believe smoking tends to cause lung cancer. If you get enough of an environmental insult from the smoking, it can actually change gene expression in your lungs, permanently, and maybe turn on a cancer condition.

The exciting thing is that it now looks like many parts of mental health—many conditions that have been plaguing us for centuries—appear to be epigenetic in nature. One of these is schizophrenia. I have talked to hundreds of families who said their young person was doing great in life and achieving in school. Then, in a very short time—often just a matter of days or a week—their life completely changes. They have a mental breakdown. And that mental breakdown typically plagues them the rest of their lives. That is a classic epigenetic disorder. I believe that within 5 or 10 years, this will be nailed down. I think the same is true with regressive autism. There are thousands of families who told me they had a child who was developing beautifully through 1 or 2 years old and then, within a very short time, disaster struck. This autism developed that just horrified the whole family. And then they were told that this condition is not going to go away and the child would be handicapped permanently. That appears to be another example of an epigenetic disorder.

The good news with epigenetics is that if a person has one of these disorders—whether established before birth or whether it was established from environmental insult afterwards—they appear to be quite treatable. Medicine has been trying for 40 years to do genetic surgery or to change the genetics for some of these diseases and that has been pretty much a failure. There is very little success with that. The early attempts at altering the epigenetics have been really successful in many cases and it is really promising. Epigenetics research and progress may eventually head to the cure for cancer. It may eliminate heart disease—many kinds of heart disease. And I think it also may eliminate many of the most serious behavior disorders and mental disorders. It is extraordinarily exciting and it is just beginning.

In the field of nutrition, complementary medicine people started out working on diet and making sure that we could get the right amount of nutrients into a person. Then, about 30 years ago, we learned a lot about biochemistry and how to affect the chemicals that are made from our nutrients. What we have been missing, until very recently—until epigenetics—is enzymes. In many cases enzymes, chemicals that are genetically expressed, are central to many of the physical and mental disorders we have been trying to develop treatments for and help people overcome. For the first time, we have the ability to influence, to adjust, and to regulate enzymes. This is a major development that adds power to what we can do. And the most important enzymes are not created from what we eat. Their source is genetic expression, which is different, and now we have a real handle on it.

Advances: How do enzymes impact the treatment of mental illness?

Dr Walsh: Let me give you an example. All of our norepinephrine comes from dopamine. There is an enzyme called dopamine-beta-hydroxylase. That enzyme dominates the regulation of these 2 important neurotransmitters and it is genetically expressed. And so, we are learning ways to regulate them with nutrients.

Dr Hoffer learned that niacin could help many schizophrenics. The primary problem of schizophrenics is elevated dopamine activity. We now know that niacin inhibits an enzyme that affects dopamine activity by an epigenetic mechanism and we now know exactly how it happens. So, if we can diagnose a person and be fairly certain this person suffers from excessive dopamine activity, we can successfully give them niacin and over a matter of several weeks their dopamine activity will actually decline. This may be doing the same job that an antipsychotic medication will be doing. We know that S_{AM}e, which is the primary methyl donor in the body, provides the methyls or methylation processes. We know that S_{AM}e has an extraordinary impact on epigenetic processes. So we are able to target certain kinds of disorders if we understand the biochemistry—if we understand which neurotransmitters are misbehaving. We can adjust those activities by nutrient therapies that impact these powerful dominant enzymes—very exciting.

Advances: How is the field accepting these ideas? Are they starting to get some traction?

Dr Walsh: I think that we have to be careful and we have to do this properly. One thing we do not do, even though we have successfully treated thousands of people with behavior disorders and autism and schizophrenia—we do not claim that we have an effective treatment for depression schizophrenia, etc. The way we present ourselves is that we treat chemical imbalances. We treat metal metabolism disorders. We treat zinc deficiency. We treat methylation disorders. We treat pyrrole disorders. I think that has kept us out of trouble, because until you do double-blind, controlled studies, you cannot really say that your treatment is proven. We have done a couple of double-blind studies, but they are extraordinarily expensive. I have been trying for 20 years to get the money for dedicated, proper double-blind controlled experiments and never have been successful in getting the money for it. Ultimately, that is what has to happen.

We have never been attacked or sued. Since we are a public charity, if anybody ever thinks we are some sort of a scam, we just invite them to come in and look at our financial books. They soon realize that nobody is making any money on it. The problem, really, is that mainstream scientists, mainstream universities, and mainstream medical people do not yet realize the power that nutrients can have if they are used in a scientifically targeted manner. I think it is a matter of disbelief. That is why I wrote the book and why I am planning to write a few more. Training doctors—doctors love this. And the doctors—with our training there are more than 150 who are now doing this throughout the world—tell me

that they love the fact that they can help patients who they could not help before. They love the science behind it. In other words, if a patient comes in with clinical depression, they do not just talk to them and do a trial-and-error application of antidepressants. They do careful blood work, take a medical history, and can usually identify what type of depression the person has and get a specialized treatment for them. Doctors really loved that. Psychiatrists are actually the ones who seem to love this more than anyone—the ability to have reliable, helpful lab chemistry to direct them on how to help a patient with a problem like anxiety or depression.

Advances: What does the future hold for addressing mental health?

Dr Walsh: There are a myriad of things that I addressed in my book. I would like people to realize that brain science advances have reached the point where it is just a matter of time until the need for psychiatric medications is going to fade away. There will be and there are natural therapies that are close to being developed. One example is for obsessive-compulsive disorder and addictions. We now know that it has a lot to do with the NMDA receptors in the brain. They are now finding that some of the best treatments are actually natural biochemicals, and I am sensing some frustration from the pharmaceutical companies that are doing this really wonderful research. The things that they cannot patent seem to be working better than the various drugs they are trying to develop.

Eventually it is all going to happen and I look forward to the time in the future when a baby is born and they will do a complete evaluation—not just of the DNA, but of the epigenetic factors and also the chemistry going on in the system, and the proteins that are part of chromatin. I think they will be able to discern which, if any, disorders that this child is likely to have. And I am quite sure there will be treatment that can correct these abnormalities. I think that is coming. I just hope that it happens soon. We are in the middle of beginning a new revolution in mental and physical health.

Epigenetics: It is the key.