Functional Medicine for Optimum Mental and Physical Wellbeing

Guest: Dr. Jeffrey Bland

Niki Gratrix Hi, everyone! Welcome. Today, I have another phenomenal guest for you. I'd like to introduce you to Dr. Jeffrey Bland. Dr. Bland is known as the father of functional medicine, which is a medical approach that focuses on the personalized prevention and treatment of chronic diseases.

Over the past 35 years, Dr. Bland has traveled more than 6 million miles teaching more than 100,000 healthcare practitioners in the United States, Canada, and more than 40 other countries about functional medicine.

He's been a university biochemistry professor, a research director at the Linus Pauling Institute for Science and Medicine. He's the co-founder of the Institute for Functional Medicine in 1991. And is the founder and current president of the Personalized Lifestyle Medicine Institute in Seattle. He's authored more than 100 scientific papers and 10 books for healthcare practitioners and consumers.

So it's a real pleasure and a huge thrill to welcome Dr. Bland to the summit today.

Dr. Jeffrey Bland Well, Niki, thank you! What a pleasure to be with you. And this is an exciting topic!

Niki Gratrix Fantastic! And our audience, people listening, we've got people at all ends of the scale in terms of health and energy. So we've got people with great energy who want more. We've got people in that vague middle zone who are wired but tired through to the people with serious diagnosed fatigue-related syndromes.

But I think everyone would benefit from an explanation of what functional medicine is because it's the foundation of building a healthy energized life. It's not just about treating disease. And also I think many of us feel it's the future of medicine and it represents the next major revolution in the history of medicine since microbes and germ theory.

So can I give you the floor to expand on that?

Dr. Jeffrey Bland Yes, thanks. I'll try to give it a quick elevator speech summary. It was now nearly 30 years ago that myself and a round table of my colleagues sat down for 3 days in Vancouver, British Columbia and asked the question, "What would the ideal healthcare system look like if we were to start with a whiteboard and draw it up based on what we knew at the time?"

And out of that came the recognition that for most people, and certainly for the group that was assembled there, the most important thing of all is what are the things that lead to our decreased capability to function at the level that we want to? And function can cut

across several areas. That could be physiological function that's associated with certain diseases.

But it could be physical function that's associated with certain kinds of disabilities that help prevent us from doing what we want to do in our life in general. Or it could be psychological, mental, or cognitive dysfunctions that prevent us from being clear, sharp, having the kind of memory we want, having the electrical capability that we want or being depressed and having anxiety and all those other kinds of things that steal from us the feeling of quality of life.

So when we sat down. And we said within the medical circle and how we're presently constrained to focus on differential diagnosis and treatment of disease, how much time is actually spent by the average practitioner in understanding dysfunction? Or let's call it the status of function. And we came to the recognition, it was very little.

So when we looked at the medical literature, we found out there were literally now hundreds of papers that were being published around the function of the cardiovascular system or function of the neurological system or function of the endocrine system that relates to hormones or function of the gastrointestinal system or function of the musculature.

And so we started saying, well, maybe we need to be focusing on the development of not what you call something once you get it, but what are the changes in your body's function that ultimately steal quality of life and ultimately lead to the expression of disease.

And so from that then we birthed the Institute of Functional Medicine. And the concept of functional medicine is really focused on not what you call something once you have it, but how you got it. And what it is that actually leads to the loss of function that later becomes called something that we label as a disease?

And so the focus of the functional medicine practitioner is to really start understanding the earlier signs of dysfunction. What I would call precursor markers or things that ultimately steal from us our ability to perform as we want in life, which if we don't deal with them early, they later become more and more serious until they eventually become a diagnosed disease.

So that has become the focus of functional medicine asking the question, "Why did an individual patient lose their function in whatever area that they were having a problem, not just what we call the ultimate end disease?" And by asking that question, it provides an opportunity to personalize a program to that individual patient's need to improve their function. And the results over the last 25 years of using that strategy have been absolutely remarkable in restoring many hundreds of thousands of people's good health.

So I think it's a different approach than just finding a disease and then treating it or really looking for the cause of the individual nature of dysfunction in the person.

Niki Gratrix You see that. It's a revolution. Most people think that the body is a closed system, unaffected by the environment. And if something breaks, it's because, "Well, it was down to our genes. There's nothing we were going to be able to do about it." That's a

complete change from the old paradigm, which is suited to treat acute illness, rather than the chronic complex illnesses.

Dr. Jeffrey Bland Niki, you said it beautifully. I believe that's exactly where we find ourselves as we move into the twenty-first century. When I was in doing my medical school and graduate school training…Really, and this is back, I hate to even say this. It sounds so long ago. But it was in the 60s. 1960s. That we at that point didn't really understand the origin of virtually any of the major diseases: heart disease, cancer, diabetes, arthritis, dementia. We didn't have a good mechanistic understanding.

And so the medicine that we used at that point was really treating the symptoms of the condition because we didn't know where these conditions came from. So we had developed a whole array within the pharmaceutical sciences of very effective drugs to block or to inhibit or to antagonize certain metabolic processes that were associated with the symptoms, associated with these diseases. So we were treating the effect and not often the cause.

Over the last 40 years however, that is no longer the case. Now we have had tremendous advancements in the understanding of the what's called etiology or the cause of these diseases at the cellular level. And as a consequence of this breakthrough and understanding, we now have, if we assess this information correctly, the ability to both recognize by diagnosis earlier the appearance of these dysfunctions and do something about them well before they become so serious that we're just obligated to treat the effects and not the cause.

So the functional medicine model, as you said, is really a model that is born out of the revolution that's occurring in the biomedical sciences that gives us the ability to actually ask different questions that we could ask in the late twentieth century and get different answers. And those answers I think are going to revolutionize healthcare because the biggest problem we have today is the rising burden of chronic diseases.

And the heart disease, diabetes, arthritis, and dementia families of diseases and cancer, as well, are conditions for which you have to ask a different series of questions earlier on so that you can personalize the approach to the patient to prevent later stage serious disease.

Niki Gratrix Yeah. And the chronic diseases now, this is what's taking up all the time… And you said this in your latest book, *The Disease Delusion*. You go into this in great detail about how most of the doctor's time is taken up with chronic complex illness these days.

But doctors are trained really in acute illness. And all the drugs seem to do is suppress symptoms and aren't dealing with causes. And then we have the long term detrimental effects of drugs being used for too long for complex illnesses, which they were never designed for. Would you like to expand a little on that, too?

Dr. Jeffrey Bland Well, thank you. I think that that's again a beautiful summary of the advocacy that I was taking in to the writing the book. And the reason I wrote *The Disease Delusion*…First of all, the title sounds a little bit like a contradiction in terms. Why would I label a book or title a book *The Disease Delusion*. We have diseases. It's not a delusion.

I think the delusion is that we feel that these diseases that we have come magically as a bump in the night. They have no real explanation. And the principle reason we get them is because of our genes that our family inheritance have the genes for heart disease or the genes for breast cancer or the genes for prostate cancer or the genes for arthritis. And therefore, we got them because we had these genes.

And what has been found over the last, as I mentioned, 40-plus years is this concept of genetic, what I would call hardwired of these chronic disease is actually not correct. Probably less than 30 percent of the origin of these very common chronic illnesses that now constitutes more than 75 percent of our healthcare expenditures and most of our disability in society are only 30 percent is really hardwired to our genes, probably even less than that for most people, meaning 70 percent or more is related to the genes and how they are treated, the environment in which we express our genes, how we eat, live, think, act? What we're exposed to? Our stress patterns, environmental exposures. All of those factors in which are the major wild cards that influence and how our genes are expressed are going to be the major contributors to chronic illness as we grow older.

Now, the good news about that is whereas we can't change our genes, they're hardwired to the moment the sperm met the egg, what we can change is the information that our genes are receiving from our lifestyles. How we act, think, eat, drink, move, and so forth? Those are areas that if we do the right things based upon our genetic uniqueness, we can get remarkable health outcomes.

In fact, I think within most people's genotype is the capability of living essentially with very good health if they just send the right messages to their genes. And that's the secret of twenty-first century medicine, matching individual characteristics of lifestyle, diet, and so forth with their genetic strengths and weaknesses.

Niki Gratrix And that's profound because the power is back with us as the patients and the people. We can do something about our health. And it's not just predetermined. And one day something suddenly breaks. No, there's been a whole set of decisions that we've been making and behavioral choices over time, which is eventually going to cause a trigger event. And that's one of the things which people get caught up thinking it's the trigger event which caused the illness. And it's not. It's been decisions over 15, 20, 30 years. Right?

Dr. Jeffrey Bland Absolutely! And again going back to the book, *The Disease Delusion*, the reason that I actually wrote that book was really to try to take these remarkable discoveries that are being made that often are not understood by the general population because they are kept in cloister within the scientific community and say, "Hey, you ought to really understand this revolution that we're undergoing and how it can be assessed in your life to produce much better health outcomes and to put you in charge of your own health. Rather than being a victim, you can be the advocate for your own program."

And when I look at what's going on actually in the development of what I call the new medicine of the twenty-first century, it's a medicine that really is now starting to understand that in the absence of having a patient-activated relationship between the practitioner and the patient or the person, that there's going to be a much lower success rate and outcome.

Because in the end, we all as individuals, do control our lifestyles, our diets, our activity patterns, our stress patterns. That's not going to be controlled by a drug. That's not going to be controlled by a medical professional walking around with us all the time. It's controlled by us. We are the arbiters. We are in charge of our own executive centers that relate to our health or disease outcome.

So I think that this framing of a different relationship between the healthcare provider and the healthcare consumer, who is now an activated consumer, the Internet being a driver for information and giving access now to things that the person never had the ability to understand before, is really a determining of a revolutionary change in healthcare.

Then if you add to that, the genomics revolution, in which soon virtually every human will know some aspect of their genetic strengths and their genetic susceptibilities by these simple gene tests that are becoming so inexpensive, that there will be a standard lab test. Those abilities to know ourselves intimately from the genetic level up are really transforming processes that are creating the new medicine.

Niki Gratrix Yeah, that's one of the most exciting things. I'm going to ask you a bit more about the personalization aspect in a second. Also, just wanted to have you expand a bit about the functional medicine paradigm which based on basically systems biology, and the amount of evidence for that is phenomenal. It's reality. It's the way the body works.

And yet the old paradigm, the conventional paradigm is based on this reductionistic, organ-centric, one-drug-for-one-illness based on this old, outdated idea that either a germ or a single anatomical, structural, serological abnormality or a single problem localized in a single organ is the problem. And that's just not the way the body works.

Dr. Jeffrey Bland Yes, that's exactly right. I think what happened in the development of medicine if you go way back to Paracelsus or Hippocrates and you start working your way up or even before that to the Yellow Emperor's Handbook in China or Ayurvedic medicine and you start asking how did medical concepts develop, well, they developed a little bit in a triage way.

The first things that you would do is you would look at those things that people had that were most obvious like if they were bleeding or if they had a big growth on their body or they fell over or they were nauseated, things that were very obvious in the way they displayed their disease.

And you would first start worrying about those conditions and codifying specific types of ways of defining them. So that became the first vestige of what we call the disease model, saying, "Oh, if I had a person has that condition, we're going to call it this disease. If they have this condition, we're going to call it a different disease."

And if you use that model of differential assessment based upon symptoms and signs, over time—and I'm talking about a couple thousand years—you develop an extraordinary sophisticated nomenclature for defining all the various nuances of how people would express these conditions. And that becomes the diagnostic code book that has over 10,000 different disease names associated with it.

And these start growing up the model that each of these diseases must be independent from every other disease. And therefore, you have specialists that treat one family of diseases. They don't treat another family. And that becomes the whole subspecialty focus of medicine, in which we get gastroenterology, neurologists, endocrinologists, and so forth and so on. And so we have all subspecialists that know a tremendous amount about a specific disease assuming that those diseases are independent and isolated from any other disease.

Well, as we get more knowledge, over particularly the last couple hundred years, that model of compartmentalized separate diseases starts to look a little not so clear. And the reason for that is if you look at people, you'll often find that a person who has one disease is likely to have another disease. And let me give you an example of that.

An example would be a person—let's use a woman as an example—who has cardiovascular disease. So she's got a heart problem. She also has rheumatoid arthritis, which is an immune problem that's seen by a rheumatologist. And then she also has osteoporosis, which is a thinning of her bones. And that is being seen by an endocrinologist.

So she's got 3 different sets of diseases, seen by 3 different kinds of doctors: cardiologist, rheumatologist, and an endocrinologist. And they're all diagnosing their diseases and treating with their own array of drugs. So you have 3 different set of drugs for 3 different set of conditions, treated by 3 different sets of doctors.

And what we say is that that woman who has those 3 conditions, that those diseases are co-morbidities meaning that they often appear together. So it's not unusual for a person who has one of those to have more than one, to have 2 or 3 of them. And in some times this is even termed disease adjacencies. Meaning the disease of osteoporosis is adjacent to the disease of arthritis.

However, over the last say 20 years as the cause of each one of those diseases has become more well understood, what has been discovered is that the underlying mechanism that leads to each of those diseases is similar. Without going into great detail about the specifics, there are underlying principles of imbalances and physiological processes that are unique and shared among all 3 of those diseases.

So what that leads you to is then saying whether than treating each disease as if it's independent one from the other with a separate set of medications for the symptoms of that disease, why don't we treat the underlying cause that relates to all 3 of those diseases? So these are really not disease adjacencies or co-morbidities. They are conditions that are likely to be seen together in the same patient because they're all cause for the same physiological disturbance.

And that is the underlying of the functional medicine model is to try to probe deeper into what are these underlying disturbances and physiological processes that give rise to many diseases so that we're treating the fundamental cause and not the effect. And when we did that, what we came up with was a recognition that there were what we call 7 core physiological processes that really related to virtually thousands of different diseases.

And so if you can then identify in the individual where the imbalances in one or more of those 7 physiological processes occurred, you could modulate those, treat those. And lo

and behold, the effect would be across many diseases ranging from cognitive disturbances to low energy to pain to disturbances in blood sugar to effects on blood fat to cell reparation to inflammatory disorders that basically by treating one of those or more of those causes, you get the effects across all these different diseases.

Niki Gratrix And this you actually go into in great detail in *The Disease Delusion*, the book. So I really recommend everybody read the book. So it's a fantastic book. We'll talk more about that later, as well.

And I was just going to shout out as a testament to how well this kind of approach is working. For people who don't know, recently the team from the Institute of Functional Medicine, led by Dr. Mark Hyman, was requested to open a center for functional medicine at the prestigious Cleveland Clinic, in the U.S. So the first of many, we hope, many more centers.

Dr. Jeffrey Bland That was a very, very exciting step forward in the evolution of the functional medicine model and the Institute for Functional Medicine. I think that Dr. Mark Hyman, who is the chairman of the Institute for Functional Medicine and Dr. Patrick Hanaway who is the chief science officer and medical officer for the IFM have been very, very, I think strong advocates working with Laurie Hofmann, the chief executive officer of the IFM, to develop this evolving, really strong relationship with the Cleveland Clinic that's a I think a very, very innovative and forward-looking institution.

Dr. Cosgrove, who's the chief executive officer of the Cleveland Clinic, is well known for his innovative thinking, his forward-looking thinking. And I think the alignment between Cleveland Clinic and functional medicine has really been quite remarkable with the establishment, about a year ago, of the functional medicine clinic within the Cleveland Clinic facility and watching how people with these complex chronic illnesses who really have been falling through the cracks by traditional pharmacologically-based therapies—and they're not really getting better—are now having tremendous success and improvement when they're treated with a functional medicine approach.

So I think it's a good proof of concept. And it's in the right environment and very critical research-based environment in the Cleveland Clinic where this model could be appropriately tested and validated.

Niki Gratrix And I think this is the thing is some people can hear about functional medicine and think, "Oh, it might be another passing fad or it's just some part of alternative medicine." And it's proof like this that it's actually state-of-the-art. And it's not just the Cleveland Clinic recognizing that, "Wow! This is the future of how we need to be approaching complexity in health." It's also some of the titans of science, who are at the cutting-edge of science, who are saying the same things.

And let's talk about personalization and the outcome of the human genome project. I think this is some of the most exciting aspects of personalization of medicine from finding out, for example, about SNPs and how we're all genetically unique.

And there's some major statements from people like Dr. Leroy Hood, who was saying nutrition's in the Dark Ages and the impact that the understanding of SNPs is going to have. It's made recommended daily allowances (RDA's) a thing of the past. It's profound. It's a huge thing. Would you like to share more about that, as well?

Dr. Jeffrey Bland Yes, I think that we are living in a time of unbelievably dynamic change in the way that health and disease are seen and the way that they're going to be treated. And the role that things that we may have trivialized in the past or marginalized like diet and lifestyle, the role that they play in the determination of health or disease.

And the reason that we're seeing that revolution is to some extent a consequence of the kind of work that Dr. Leroy Hood and others in the field, Dr. Eric Schadt, Steven Friend—I could go down the list of some real remarkable people—who are really the pacesetters in this genomic age in which we're living.

And what these investigators have really discovered…And let's use Dr. Hood as an example. Dr. Leroy Hood has been credited as being the inventor or developer of the 5 major instruments that have been used to decipher the human genome. So he is a medical doctor, PhD, was at Caltech, moved to the University of Washington with a Gates Foundation Fellowship to set up a huge center for biomedical research a number of decades ago, transitioned from that into the development of a number of companies that have been very successful in employing genomic-based medicine, including Immunex and Amgen was involved with both of those companies. I think he started more than 15 successful technology companies. And then he started the Institute for Systems Biology, too. He really developed this systems thinking in medicine.

And he won the President's Science Award, which is the top award in the United States for scientists. And his contributions and that of his colleagues has been for us to recognize that this genomic revolution, in which we find ourselves, is to give us information about ourselves that not just tell us about how we're going to get sick, but tell us about how we're going to stay well. And I think that's a really powerful new way of thinking about our genes.

There are many individuals who I think are a little bit fearful of exploring their genetic history because they're afraid they'll find out something that doesn't look so good. That maybe they have a gene for some disease and they really don't want to know that. But if you actually look at what our genes contain, there's much more information in our genetic history about what makes us healthy than there is about what makes us sick.

And therefore, Dr. Hood's concept is that this information that we're getting out of the genomic evaluation are looking at our book of life. Our genetic history is going to empower individuals and the medical world to develop a wellness approach, not just a sickness approach. You can't ever get a healthcare system that's built solely on treatment of sickness.

Now, those are really mutually contradictory. The only way you're going to get a healthcare system that's focused on health is to have a quantification of wellness, an ability to define what in that individual will produce a well outcome, a healthy long term outcome.

And I think the empowering of us through this genetic information and how it will be analyzed and how it influences our decisions because we can personalize the way we live our life. Let me give an example. Let's use gluten because that's one that is certainly in the news right now. We know that gluten is a protein found in many cereal grains.

And it is a problem protein for many individuals based upon a genetic uniqueness or the way that their bodies respond. Their immune systems respond to that wheat or grain protein. And it produces an immune response. It can lead to inflammation, not just locally in the intestines. But it can produce systemic inflammation and has relationships to all sorts of other conditions like arthritis and dementia and even vascular problems like heart disease.

So in people that have this genetic issue that relates to the reaction to the gluten protein, that particular protein would be considered a foe. Whereas, people who don't carry that genetic information, they have a favorable reaction. So it's considered a friend.

So as was once said, the food of one can be the poison of another so understanding these relationships at the genetic level so that a person can properly orchestrate their way through life without a mystery. And they can say, "Well, I know that I have these strengths and I also have these susceptibilities. So I'm going to design a program that's personalized to my need and live by it as best I can so that when I roll the dice of life, I'm more likely to come up a winner than a loser."

There's no such thing as the sure thing. But we're all talking about probabilities and proving the probability that we can roll the dice of good life and healthy life and a long health span for a century or more by empowering ourselves through good information to make good selections.

And that's what this revolution is really bringing to us. And it's really the work of Lee Hood and others. And he's developed his P4 medicine concept that's personalized. And it's preventive. And it's proactive. And it's a medicine that's prospective because it looks forward and not backwards. And it gets a person participating, another P, in their health as an advocate, as a patient advocate for their own health.

And this is a totally different medical system than the one that we've grown up in. It's all there. It's focused on disease. Everything is reinforcing the treatment of disease. There's very little that's focused on the promotion of wellness. So that is the moment of this age of change that I think we're all looking forward to as we move into the twenty-first century.

Niki Gratrix Yeah, and it really is. Companies like 23andMe, obviously where you can get a wide range of your genes tested for $99.00. It's resolving so many of these inconclusive things to do with nutrition.

Like, for example, coffee. Is coffee good for us or bad for us? Well, it depends whether you've got the CYP1A2 SNP? Are you a fast or slow metabolizer of caffeine? So once you find that out, you'll know if you're a slow metabolizer, it's not going to be so great for you. So it's the same thing. Should I be on a high-fat, low-fat diet? All of these things are starting to become available at the practitioner level finally. So it is a huge revolution.

And the other thing, you've talked about the aspect of the participatory medicine and how it's become so important now for the patient. It's not this old patriarchal system anymore where the doctor prescribes this for this person. It's now going to be so much more about the patient as they're the expert on their own body because there is no prescription for the standard person any longer. It's the patient being able to say, "This is

working for me. This isn't working for me." Being able to articulate on a level with the doctor. Right?

Dr. Jeffrey Bland That's exactly right. I think you said it very, very beautifully. In the days of pre-Internet, if you think about the medical information that we as patients would get from visiting our doctors, it was generally parsed out to us in selective fashions. We'd have, say, a blood test done. We wouldn't be given that data. We'd be given a verbal account of the information. We wouldn't have a medical record that was accessible by us to evaluate things that we might be interested in exploring. It was all…I don't want to say concealed.

That's a little conspiratorial. But it was certainly thought that the patient, if they were to be given this information, they would be confused. And they wouldn't know how to react. They wouldn't know how to interpret the information. So it's best just to keep it under lock and key by the practitioner so that they would have the ability to use their professional opinion as to how to describe it, discuss it, or share it with the patient.

That particular style has completely changed. Now, it's under the new convention. Patients have access under the Freedom of Information to all of their patient records, all of their laboratory reports. We can go to the Internet. We can look at the *Physician's Desk Reference* and examine the pluses and minuses of any drug that we've been prescribed.

In fact, there are more patients that now examine the *PDR*—the *Physician's Desk Reference*—than there are doctors. And we can start to become an advocate for our own information, which previously was unavailable to us. And, of course, the Internet, which does have junk in it, also contains a huge treasure trove of really useful information that relates to our specific interest and concern.

So often patients now come into their doctor knowing much more about their condition than the doctor will ever know because they've lived with it for 24 hours a day, 365 days a year. They've been doing their own intelligence. And they come in loaded for real strong information and having some sense as to what questions to be asking.
So I think that this all plays together in this seismic event that's occurring right now in the changing of the healthcare system to become much more a patient-centered system.

And, in fact, Eric Topol's most recent book, which follows on from his previous bestselling book, Dr. Topol being one of the most highly and respected and published medical doctors in the United States, he has recently written this book that says basically as a doctor you should be prepared for what the patient is going to ask of you because the patient is going to demand a different and more information to be well informed. So it's not just the doctor parsing it out selectively. You as a doctor must recognize you're working for the patient. This is a whole different relationship.

Niki Gratrix My last major question so I think it's very interesting. We've talked before. And I talked about I had this scales effect of recovery that I talk about where people can be doing a multifactorial approach to recover. Or it's the same with athletes who are trying to make their scores better so they can run faster for longer and so on. They were taking a multifactorial approach.

And sometimes we see no change. And then suddenly, we're arrive at the tipping point where it all happens at once. And the scales effect, I've mentioned it before, is where you

can be taking weights off one side of those old scales. And you take the weights off. But you're not going to see the scales shift until that last weight has come off.

It helps if patients have the conceptual awareness of systems and complexity theory, that there can be a non-linear recovery or it can be a non-linear improvement in your time scores. But what many people are doing in my experience is they're giving up too soon or they sabotage what was actually going quite well because they're not seeing the results.

And so my question to you because I know you're so well-read…You read so many papers. And somebody mentioned to me where you quoted a paper about just how long it can take to change gene expression. For example, in PTSD or anything where we might change our diet, it's just sometimes it takes longer to change our gene expression than we'd all like and it might all happen in one go. Would you have any thoughts on that?

Dr. Jeffrey Bland Yes, I think that's another very, very important point as you move into this type of healthcare delivery where you're really restructuring the function of your body. You could be restructuring the physical function or the biochemical physiological function. How does that differ from a pharmacological intervention to treat a symptom? And I think that's a very, very important question.

If you give a drug…Let's use a drug like a non-steroidal anti-inflammatory drug for treating inflammatory pain. If you give that drug, it will be absorbed into your bloodstream. If it's an oral pill, you'll absorb that active principle, say it's Ibuprofen or it could be paracetamol, into your blood. That will then travel through your blood and get to the tissues. It will be then delivered across the membranes of the cells into the specific cells of the tissues.

And it will then interact with—in the case of a non-steroidal and inflammatory—it will interact with an enzyme called cyclooxygenase. It will block that enzyme. And it will shut off the message inflammatory pain at that particular part of the complex pathway of inflammation. That all occurs depending upon the rate of absorption and distribution in a matter of, say, hours at most to get that clinical benefit.

Now, that's very different than actually changing the architecture of the cell by altering gene expression where you change how your genes are expressed. You change messenger RNA. You change the translation of messenger RNA into protein, protein in the cell. Then you can be post-translationally modified. You're reengineering the architecture actually of your cell with an intervention that's going to change gene expression.

And in general, those types of effects are seen over the course of say 90 to 120 days. That's why we generally talk about something like a 3-month program because it gives time for these changes to occur at the architectural level. So it's different than just changing a lightbulb. It's actually changing the architecture of the electrical system, if you think about that. So that particular model requires a different timeline in order for your body to realize full improvement.

Niki Gratrix It was post-traumatic stress disorder. That's what PTSD stands for. And somebody mentioned you'd quoted a paper where they were talking about how long it may take to change gene expression. I might be able to start you off if you can't remember which paper it was…

Dr. Jeffrey Bland No, actually, you're right on target. What's been found with PTSD is that this is like an epigenetic imprinting process. They've actually been able to duplicate some of this in animal models showing that it actually with a very serious traumatic stress, it actually imprints the genes by altering the methylation patterns of the epigenome.

And with so doing, it actually chemically modifies the way that the genes will be expressed because these little attachments called methyl groups that are stuck into the genes silence the expression of certain of your genetic characteristics. So they are actually altered by changing the wiring of your gene expression the way that your genes will express their function.

So the question is are they stuck there permanently or can they be removed? And this is where you get into a term that's called metastable epialleles where they're not permanently stuck. But they're at least stuck to the extent that you've actually got these attachments, these marks that have been put on your genes through that traumatic series of events.

So can they be taken off and replaced with other marks or just eliminated. And the answer is yes, they can. But the more traumatic the stimulus upon which they are put on, the more difficult they are to take off. And so this is where people can find in very serious states of chronic illness that they've really been in an arduous balance with their illness.

And it doesn't seem to be remitting as quickly as they would like. It doesn't seem to be improving. And it is. It's a little bit more like a marathon than a sprint. It's hanging in there with enough new messages coming to your genes that these marks can be taken off so that your new cells will express a different genetic expression pattern, which is that of not post-traumatic stress, but of good health.

And I think that that is a watch word that we're saying as it relates to some of these epigenetic changes that occur as a consequence of a serious trauma that may have occurred in a person's life.

Niki Gratrix Well, that's hugely interesting. And for people with the more serious forms of fatigue listening, it's so important because adverse childhood events and emotional trauma in childhood is very strongly correlated with onset of chronic fatigue in later life. So at least we understand why it can take longer than 3 months for some of the patients with more severe forms and actually like you say to absolutely hang in there because they can be changed. But it might be longer than we'd like.

Dr. Jeffrey Bland Yes, I think that's very well said. Exactly.

Niki Gratrix Fantastic! Well, Dr. Bland, thank you so much for your time. I have to say *The Disease Delusion*, it should be on every healthcare practitioner's bookshelf. And anyone who cares about health, it's such an important book.

And it's remarkable that you've managed to put everything that was in that huge functional medicine textbook into this book, it's a history of how functional medicine and systems biology came together. You've got all the landmark papers. It's amazing how much you fit it into one book. And it's so well put together.

So for anybody who wants to understand more, there's an introduction in there so that people actually can start applying the principles of functional medicine. There's questionnaires in there so that you can actually start some initial guidance and markers and tips on how to start to apply this in your life.

And I've found that even people who understand the functional medicine model very well, have been working with it, they still will gain something from reading the book and having it there. It's a Bible. And anyone with fatigue, it's one of the most important books out there.

And, Dr. Bland, everybody else on the summit here, we're exploring all those core physiological processes you talk about. Each practitioner's going to talk about that area and that particular focus. And almost all of them have been inspired by you or touched by you and your work. And you've touched many, many people.

So it was a great honor to have you come on this summit. And I was able to share my teacher to my patients and my followers. More than me talking all the time, why not go back to the father of functional medicine. So thank you so much for everything that you do and for writing the book. And it was an enormous pleasure to have you on the summit.

Dr. Jeffrey Bland Well, Niki, I want to thank you. I think what you're doing, both with your patients and with your advocacy, is exactly how great revolutions in thinking occur that can make life better for people. And I really applaud your hard work and your advocacy and bringing this information available to people because let's face it, information is power.

Once we have an a-ha experience, it can be an extraordinary life changer for and I think that's what you're providing people is that opportunity. So thank you so, so much!

Niki Gratrix Thank you! And for everybody, you can follow Dr. Bland's work at PLMInstitute.org That's the Personalized Lifestyle Medicine Institute and at JeffreyBland.com Thank you so much Dr. Bland!