The Epigenetic Process

Bruce Lipton talked us through epigenetics, the idea that we may have more control over our genes than we once thought. Here, he explains the process in our body and brain that could be the catalyst.

Dr. Lipton: “To the cell, it makes no difference if it is in a plastic culture dish or inside a skin-covered culture dish – the fate of the cell is still controlled by the environmental information, which is called culture medium.

The culture medium of the blood is what controls the cells inside our skin-covered dish.

We then come to the next most important question: since the composition of the culture medium is connected to the expression of the cells, what controls the chemical composition of the blood?

The answer comes down to this: it is the brain. The brain is releasing neurochemicals and neurohormones, the regulatory agents that are coordinating and conducting the concentrations of different elements in the blood.

So, that means the brain is the chemist – the brain creates the culture medium and by definition, the information coming in that
culture medium controls the fate of the cells. That is a scientific connection” (on p. 7-8 in the Part 1 Transcript).

The Importance of Perception on Gene Expression

Our emotions and how we perceive a situation can often have a great impact on how our day goes. And it turns out that they can also affect your genetics. Here, Bruce Lipton explores how our perceptions can impact how our genes express themselves.

Dr. Lipton: “The function of the brain is to connect the cells of our body with the environment outside so that the cells can adjust their biology, just like cells in a Petri dish are adjusting to the environment.

Here’s the simple point: I open my eyes and I see someone I love. The perception of that person and the interpretation of love from that person lead me to release chemicals from the brain that match the perception.

Love is associated with dopamine release; it is associated with vasopressin release; it is associated with oxytocin release; it is associated with growth hormone release.

Very interesting: if I take the chemicals just released by the brain in the perception of love
and add them to a plastic culture dish of cells, the cells grow exuberantly well.

All of a sudden you realize why people who fall in love almost always are exuberant in their own health; they glow with love because the chemistry going into the culture medium of love is a chemistry of health and growth.

Now that same person opens their eyes and sees something that scares them. They are not going to release the chemistry of love – they start to release cortisol, inflammatory and stress agents into the blood.

If I add these agents to a plastic Petri dish, they will cause the cells to shut down their growth and the cells begin to die. That is why fear causes death – fear shuts down the cells.

Again, the significance is that the same individual can have two different perceptions – two different chemical compositions being controlled by the brain of love chemicals versus fear chemicals – and the result is two different biologies.

We now have a whole scientific lineage on how a thought turns into a chemical released by the brain, which goes into the blood – the culture medium, which then goes to the surface of the cell where the receptors pick up the signals.

The receptors send the information to the genes and adjust the genetics. We are not ‘victims’ of our genes – our life is controlled by our
The Impact of Experiences on Our Biology

We probably have new experiences every day, and big or small, they may have more of an impact than you realize. Here, Bruce Lipton explains why our experiences can affect our biology.

Dr. Lipton: “Signals from the environment will determine which behaviors are going to be expressed and which change is going to be read.

If I change my response to the environment, then I change the signals going from my nervous system to my cells, and in doing that, I change the genetics and the behavior of the cell.

We really come down to this basic understanding: the brain’s chemical control of blood, which in turn has the signals that control the genes, is the direct connection between brain action and the biological expression of our body, health, and behavior.

When we ask: Where did you get your perceptions from? What did you learn about the environment to respond to it this way or that way? In the end, it comes down to this: what we acquire from our experiences programs our biology” (on p. 11-12 in the Part 1 Transcript).
Epigenetics and the Child’s Brain

Our experiences not only affect our biology, they can also have a big impact on our behavior—especially in our first seven years of life. Bruce Lipton shares why positive experiences are so important for our behavior.

**Dr. Lipton:** “First of all, the knowledge of how we respond to life is based on our experiences. It is habituation. This is how you learn how to do anything in life.

You experience and then you create a response to it, and after you repeat the experience and the response, it becomes habit at some point. Our experiences shape these behaviors.

Once we start to learn, the experiences we have are programmed – and there is a reason for this.

In order to function in society, there are so many rules you have to learn . . . Who is in charge? We have to learn how to say what to whom. A parent talks differently to a child than this same person talks to another adult. The parent talks differently to a policeman than to another person. Every one of these is a different form of behavior and that becomes really important.

If I want to be a member of my society, then I have to have knowledge of this behavior – how to do this, because otherwise I won’t fit in.

Here comes the interesting part. We now know that in the last trimester of pregnancy and in the
first seven years of our lives, our brains are operating at a lower EEG frequency than conventional consciousness – primarily theta, which is expressed as a state of imagination.

There’s a reason for this. When kids, especially from two to seven, are functioning in theta, they share a world, the real world, with their imaginary world. They blend them together. This is the experience of a child.

This is not just a coincidence – there’s a reason why, and it goes like this: in order to be conscious, you have to have data.

What does that mean? An individual child experiences life, and from those experiences, sees the repetition of those experiences. The child sees these repeat patterns and the repetition of patterns create a habit.

So, what do children learn in the first seven years? They learn how to be a member of a culture by observing their parents, their siblings, and their community – and more importantly for their own health, children learn who they are in that community.

How does a child know who he/she is? The answer is simply this: other people tell children who they are as they are in this hypnotic state of recording: ‘You are a wonderful, loving child. You are the most beautiful child ever. You can do anything in the world.’

Unfortunately, this is not the conventional programming that most of us get. Most children
get: ‘Who do you think you are? You don’t deserve that. You’re not that good at this/that.’

These are the critical assessments the child records – these assessments become the recorded life experiences and habits of life. When we get negative programming like that, it becomes the habit in our lives” (on p. 13-14 in the Part 1 Transcript).

**The Reality of Perception**

How we perceive certain situations can have a lot to do with the type of surroundings in which we’re raised. Here, Bruce Lipton gives an example of how our perceptions can alter both our behavior and our genes.

**Dr. Lipton:** “I am in my backyard with my mother as an infant. A snake slithers across the backyard. My mother sees the snake and screams her head off – it’s a life or death situation.

I, as a child, watch my mother see the snake and then I feel as if the snake is extremely dangerous and I could die! Now, the snake continues along and goes into the next yard.

There is another infant, exactly my age, and the mother is a biologist. As she sees the snake, the mother says, ‘Oh, it’s a nice garden snake.’ She picks up the snake and shows it to the child and shows how wonderful the snake is, and everything in the child’s experience is positive.
Now, both of us are older, and we are walking down the street together. A snake comes in front of us. You can guess what happens.

My life experience is, ‘Oh, my God – this snake is going to kill me! This is threatening. . .’

Hormones run through my body; I’m feeling stressed.

The person who’s walking beside me sees the exact same snake and is totally calm as if saying, ‘Oh, cool – what a neat garden snake that is.’

Now, why is that relevant? These responses to life experiences translate into the biochemistry of our body and our behavior and when we learn them, they become automatic.

When a snake shows up, my immediate response is my first response: ‘Oh, my God! This is deadly.’ My whole physiology is completely altered by that. If I live in a world of snakes and I have that belief, you can bet my life will be fully stressed from one minute to the next!

The more general question is this: What are the snakes in our world? What are we afraid of? What are those experiences?

This is important because if we buy into that fear from our earlier life experiences, then as we go through life from day-to-day, those are the signals from the environment that push the buttons and control our behavior and our genetics.
That’s how epigenetics works” (on p. 14-15 in the Part 1 Transcript).

How Our Lifestyle Can Affect Our Genes

When we make lifestyle changes, they can often have an immediate impact on our gene expression. Here, Kelly McGonigal gives an example of how big an impact even the simplest change can have.

Dr. McGonigal: “Looking at how lifestyle choices affect health, and particularly affect gene expression, is one of the most interesting areas of research.

So far, it has been done mostly on animal models, looking at rodents and non-human primates, but there is a lot of interesting human research just beginning to come out.

We’re seeing that the effects of lifestyle seem to be very quick on gene expression – on the way lifestyle can influence health; at the same time, health is very quick to change when a lifestyle behavior goes away.

For example, there is a lot of research on how diet affects gene expression in animal models. You can basically be turning up-regulating/down-regulating genes on the basis of almost an immediate change in diet – we are talking days and weeks, not months and years.
A study with human subjects that came out recently points to both the promise as well as the challenge of this idea.

You might have seen the study that came out of the University of Wisconsin-Madison, from Richie Davidson’s lab. They looked at changes in gene expression related to immune function and inflammation among people who are highly trained in meditation versus people who do not meditate.

There was a lot of press about this study that sometimes missed the actual point of the study: the researchers found there was no difference in gene expression between the highly trained meditators and the non-meditators.

But when they took the highly trained meditators and had them practice mindfulness for eight hours in a retreat setting, they saw immediate changes in gene expression in a way that would suggest improvement in immune function.

That is a really fascinating finding because it challenges some of our ideas about how lifestyle might save us, in the sense that it may really be what we do day-to-day-to-day, and our commitment to the processes or practices or choices – such as what we eat, how we exercise, and how much we meditate.

It requires true commitment to maintain any benefit we get from lifestyle changes.
We have seen this again also in the work of Dean Ornish looking at the changes in gene expression related to tumor growth and tumor suppression among men who have prostate cancer.

He has found that all the things we might hope would have a positive effect on gene expression for cancer are having that effect.

But changing diet, introducing exercise and meditation, and increasing social support, are very intensive lifestyle changing interventions, which may have more effect on gene expression than any other lifestyle choice we can make – that’s just how socially connected we are” (on p. 6-7 in the Part 2: TalkBack Transcript).

**Embracing the ‘Conscious Moment’ to Influence Genetics**

Changing our behavior for more positive gene expression doesn’t have to be difficult. Ron Siegel shares why it’s so important to stay in the ‘conscious moment’ and gives us an example of simple ways to exercise that practice.

**Dr. Siegel:** “How the conscious mind acts is certainly a fascinating area where studies of epigenetics and brain and body chemistry meet the ancient wisdom traditions – they meet all of our depth psychology traditions, which are all about trying to make us more conscious of what is happening in each moment.
The shift from automatic stimulus and response
to there being an experience in consciousness of
an event, and then a decision made before a
response, is the key element of increasing
complexity in organisms.

It has happened evolutionarily over time – and
of course humans have the greatest capacity for
this.

But even though we have a tremendous
capacity for this, we vary tremendously in how
much we exercise it.

Many of us go through life really pretty much in
stimulus-response patterns where we have
conditioned reactions to things that have
happened, usually from what has been
pleasurable or painful in the past. We just play
that out automatically.

Others of us have spent a lot of energy trying to
be aware of what is happening – basically trying
to be aware of and mindful of what is happening
moment to moment.

There are, of course, many, many ways to do
this: there are all the different
psychotherapeutic approaches and all of the
world’s meditative traditions to do this.

What they all have in common is a certain
exercise of restraint. When an impulse arises, a
feeling that, ‘I want this/I don’t want that,’
rather than acting on it immediately, we can
turn our attention to it with curiosity: ‘What is
this impulse? What is this desire at this moment?’

We can even think about what the consequence might be – both the consequence immediately as well as the more distant consequences.

This is really what we think of as wisdom or maturity, and there are many, many different pathways to it.

Even though scientists are now mapping the advantages of being more conscious, humans have intuited this for quite some time” (*on p. 8-9 in the Part 2: TalkBack Transcript*).

**Finding a Positive Environment**

Bruce Lipton stressed the idea that positive experiences can have a big impact on our behavior. Here, Bill O’Hanlon expands on this concept and shares why nurturing environments can be so crucial.

**Mr. O’Hanlon:** “I heard something a while ago that said, ‘If a tree that needs a lot of water is planted in a desert, it’s not going to do that well. If it is planted near a source of water, near a river or a really nice source of water, it will thrive.’ And they say, ‘What’s the difference between a tree and a human being?’ Well, a tree can’t get up if it is planted in a desert, and move over to the water – and that is the difference between trees and human beings: we
can move to environments that nurture us a little more.

I have studied in recent years behavioral economics and positive psychology, and both of them have an interesting view: it is not the usual psychotherapy point of view that I was trained with or that even we have in our culture – that we control everything. Our environment influences us – that is what behavioral economics says.

And positive psychology, which is the study of what makes people happy, says the more you try to make yourself happy, the more happiness eludes you. But you can do some indirect things: you can create an environment by your actions and where you put yourself, and with whom you spend time. That can create happiness and change in your life.

So I, in positive psychology, can learn to do forgiveness, gratitude, kindness – and that has a side effect of creating happiness. In behavioral economics, you have got to be careful of what environment you put yourself into because your behavior, perceptions, emotions, and thoughts are influenced by this. So be careful with whom you spend time and where you spend it” (from Part 3: Next Week in Your Practice).
Motivating Gene Expression

According to Bruce Lipton, changing our perception can have a big impact on the way our genes express themselves. Here, Rick Hanson discusses finding the motivation to make those changes.

Dr. Hanson: “There is something about talking about the body, something about concretizing the body – or our understanding of what we are doing is actually affecting our body, which is really motivating for people. It is motivating for them to do things, to take better care of themselves; and it is also a way, if they work with others, as a leader, a manager, a coach, parent, educator, therapist, whatnot, it is a way to help motivate other people.

You know, there is an old line, ‘What is the most important exercise to do? Well, it is the one you are actually going to do.’ So it really boils down to motivation: how can you motivate yourself? And I have seen that with people when they realize that, literally, whether they help themselves relax through exhaling or see things in a more realistic and typically, therefore, positive kind of way, that that literally is changing the expression of genes – tiny little strips of atoms, the wrapped-up molecule of DNA.

I am seeing again and again that when people get that, their eyes kind of focus: suddenly, instead of me blathering on about relaxation or
something like that, I am talking about something very, very concrete and they are much more likely to do something about it.

So for me, one of the huge takeaways of Bruce’s work and related work is that it really supports motivation for doing things that will help us and help others” (from Part 3: Next Week in Your Practice).

The Impact of Our Surroundings on Our Genes

Bruce Lipton talked about how changing our surroundings can alter our gene expression.

Here, Bill O’Hanlon elaborates and tells us why changing our environment can have such a big effect.

Mr. O’Hanlon: “There is an old saying that says, ‘Travel is broadening,’ and I certainly experience that. When I stepped outside my usual patterns, my usual environment, my usual culture, it is eye-opening and brain-opening and epigenetic-opening probably, too. I think in the West we have this idea that we have this willpower, we can control everything. There is a saying in twelve-step programs, addiction programs, that it is easy to change your addiction: all you need to do is change your playground, your playthings, and your playmates – and that is pretty much everything in your life. Who you
hang around with, where you hang around, and what substances you have around you.

And I think we know this – all these people you are talking to, they are stressing a certain thing, you know: obviously eat well, have a good environment around you, create an environment for less stress around you. And I think the thing is that you can shift, if you don’t do the same thing and think the same thing and perceive the same thing over and over again, you can make changes by making changes in your environment. That is where you have the power” (from Part 3: Next Week in Your Practice).