



BRUCE H. LIPTON:

Mastering Your Cells



Underneath your skin is a bustling metropolis of 50 trillion cells, each biologically and functionally equivalent to a miniature human. Current popular opinion holds that the fate and behavior of our internal cellular citizens are preprogrammed in their genes, a notion derived from the now dated scientific concept known as *genetic determinism*. Since Watson and Crick's discovery of the genetic code, the public has been programmed with the conventional belief that DNA "controls" the attributes passed down through a family's lineage, including dysfunctional traits such as cancer, Alzheimer's, diabetes, and depression, among scores of others. As "victims" of heredity, we naturally perceive of ourselves as being powerless in regard to the unfolding of our lives. Unfortunately, the assumption of being powerless is the road to personal irresponsibility: "Since I can't do anything about it anyway...why should I care?"

Shattering Illusions

Just as the Human Genome Project got off the ground in the late 1980s, scientists began to acquire a paradigm-shattering new view of how life works. Their revolutionary research has become the foundation for a new branch of science known as *epigenetic control*, which has shaken the foundations of biology and medicine. It reveals that we are not "victims," but rather "masters" of our genes.

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From the Microcosm of the Cell to the Macrocosm of the Mind

For the first three and a half billion years of life on this planet, the biosphere consisted of a massive population of individual single-celled organisms, such as bacteria, yeast, algae, and protozoa. About 700 million years ago, individual cells started to assemble into multicellular colonies. The collective awareness afforded in a community of cells was far greater than an individual cell's awareness. Since awareness is a primary factor in organismal survival, the communal experience offered its citizens a far greater opportunity to stay alive and reproduce.

The first cellular communities, like the earliest human communities, were basic hunter-gatherer clans wherein each member of the society offered the same services to support the survival of the community. However, as the population densities of both cellular and human communities reached greater numbers, it was no longer efficient or effective for all individuals to do the same job. In both types of communities, evolution led to individuals taking on specialized functions. For example, in human communities some members focused upon hunting, others upon domestic chores or child rearing. In cellular communities specialization meant that some cells began to differentiate as digestive cells, others as heart cells, and still others as muscle cells.

Most of the trillions of cells forming bodies such as ours have no direct perception of the external environment. Liver cells "see" what's going on in the liver, but don't directly know what's going on in the world outside of the skin. The function of the brain and nervous system is to interpret environmental stimuli and send out signals to the cells that integrate and regulate the life-sustaining functions of the body's organ systems.

The successful nature of multicellular communities allowed evolving brains to dedicate vast numbers of cells to cataloguing, memorizing, and integrating complex perceptions. The ability to remember and select among the millions of experienced perceptions in life provides the brain with a powerful creative database from which it can create complex behavioral repertoires. When put into play, these behavioral programs endow the organism with the characteristic trait of *consciousness*—: the state of being awake and aware of what is going on around you.

Many scientists prefer to think of consciousness in terms of a digital quality, an organism either has it or not. However, an assessment of

The conventional version of heredity still taught in schools emphasizes *genetic control*, or "control by genes." However, newly revealed *epigenetic control* mechanisms provide a profoundly different view of how life is managed. The Greek-derived prefix *epi-* means "over or above." Consequently, the literal translation of *epigenetic control* is "control *above* the genes." Genes do NOT control life—life is controlled by something *above* the genes. This knowledge of how life works provides the most important element in our quest for self-empowerment.

The new science of epigenetics recognizes that environmental signals are the primary regulators of gene activity. As described in my book, *The Biology of Belief: Unleashing the Power of Consciousness, Matter and Miracles*, cells read and respond to the conditions of their environment using membrane protein perception switches. Activated switches send signals to control behavior and regulate the activity of the genes—the hereditary blueprints used to make the body. Amazingly, epigenetic information can modify or edit the readout of a gene blueprint to create over 30,000 different variations of proteins—the cell's molecular building blocks—from the same gene. This editing process can provide for normal or dysfunctional protein products from the same gene. One can be born with healthy genes and through epigenetic processes express mutant behaviors, such as cancer. Similarly, one can be born with defective mutant genes and through epigenetic mechanisms create normal healthy proteins and functions.

The conventional belief that the genome represents the equivalent of a computer's "read-only" programs is now proven to be false. Epigenetic mechanisms modify the readout of genetic the code—which means that genes actually represent "read-write" programs, wherein life experiences actively redefine an individual's genetic expression. The "new" biology is based upon the fact that perception controls behavior *and* gene activity! This revised version of science emphasizes the reality that we actively control our genetic expression moment by moment throughout our lives. Rather than seeing ourselves as victims of our genes, we must come to own the responsibility that our perceptions are dynamically shaping our biology and behavior.

As organisms experience the environment, their perception mechanisms fine-tune genetic expression so as to enhance their opportunities for survival. The expression of a healthy or dis-eased biology is directly influenced by the accuracy of an individual's interpretation or perception of their environment. Misperceptions rewrite genetic expression just as effectively as accurate perceptions, yet with far graver, perhaps even life threatening consequences.

the evolution of biological properties suggests consciousness, like any other quality, evolved over time. Consequently, the character of consciousness would likely express itself as a gradient of awareness from its simpler roots in primitive organisms to the unique character of *self-consciousness* manifest in humans and other higher vertebrates.

The expression of *self-consciousness* is specifically associated with a small evolutionary adaptation in the brain known as the *prefrontal cortex*. This is the neurological platform that enables us to realize our personal identity and experience the quality of “thinking.” Monkeys and lower organisms do not express self-consciousness. When looking into a mirror, monkeys will never recognize that they are looking at themselves; they will always perceive the image to be that of another monkey. In contrast, neurologically more advanced chimps looking in the mirror perceive the mirror’s reflection as an image of themselves.

An important difference between the brain’s *consciousness* and the prefrontal cortex’s *self-consciousness* is that consciousness enables an organism to assess and respond to the immediate conditions of its environment that are relevant at that moment. In contrast, self-consciousness enables the individual to factor in the consequences of their actions in regard to not only how they impact the present moment but also how they will influence the future.

Self-consciousness is an evolutionary adjunct to consciousness in that it provided another behavior-creating platform: the role of a “self” in the decision-making process. While conventional *consciousness* enables organisms to participate in the dynamics of life’s “play,” the quality of *self-consciousness* offers an opportunity to simultaneously be an observer in the “audience.” From this perspective, self-consciousness provides the individual with the option for self-reflection, reviewing and editing their character’s performance. The conscious and self-conscious functions of the brain may be collectively referred to as the *mind*.

In conventional parlance, the brain’s conscious mechanism associated with automated stimulus-response behaviors is referred to as the *subconscious* or *unconscious mind*, for the reason that its functions require neither observation nor attention from the self-conscious mind. Subconscious mind functions evolved long before the prefrontal cortex; consequently, it is able to successfully operate a body and its behavior without any contribution from the more evolved *self-conscious mind*.

The subconscious mind is an astonishingly powerful information processor that can record and replay perceptual experiences (programs). Interestingly, many people only become aware of their

subconscious mind’s automated programmed behaviors when they realize they’re engaged in an undesirable behavior as a result of someone “pushing their buttons.”

The power of the subconscious mind lies in its ability to process massive amounts of data acquired from direct and indirect learning experiences at extraordinarily high rates of speed. It has been estimated that the disproportionately larger brain mass providing the subconscious mind’s function has the ability to interpret and respond to over 40 million nerve impulses per second. In contrast, it is estimated that the diminutive self-conscious mind’s prefrontal cortex can only process about 40 nerve impulses per second. As an information processor, the subconscious mind is *one million times* more powerful than the self-conscious mind.

As a tradeoff for its computational bravado, the subconscious mind expresses only a marginal creative ability—one that may be best compared to that of a precocious five-year-old. In contrast to the freewill offered by the conscious mind, the subconscious mind primarily expresses prerecorded stimulus-response “habits,” such as walking, getting dressed, or driving a car.

Although the prefrontal cortex’s ability for multitasking is physically constrained, the self-conscious mind can focus upon and control *any* function in the human body. It was once thought that some bodily functions—such as the regulation of heartbeat, blood pressure, and body temperature—were beyond the control of the self-conscious mind. It is now recognized, however, that yogis and other practitioners that train their conscious minds can absolutely control functions formerly defined as involuntary behaviors.

The subconscious and self-conscious components of the mind work in tandem, with the subconscious controlling every behavior not attended to by the self-conscious mind. Most people’s self-conscious minds are rarely focused upon the current moment, since their mental processing continuously flits from one thought to another. The self-conscious mind is so preoccupied with thoughts about the future, the past, or resolving some imaginary problem, that most of our lives are actually controlled by programs in the subconscious mind.

Simple Insights...Profound Consequences!

Cognitive neuroscientists conclude that the self-conscious mind contributes only about 5 percent of our cognitive activity. Consequently, 95 percent of our decisions, actions, emotions, and behaviors are derived from the unobserved processing of the subconscious mind. This data reveals that our lives are not controlled by our personal

intentions and desires, as we may inherently believe. Do the math! Our fate is actually under the control of the preprogrammed experiences managed by the *subconscious mind*.

The most powerful and influential programs in the subconscious mind originated during the formative period between gestation and six years of age. Now here's the catch—these life-shaping subconscious programs are direct downloads derived from observing our primary teachers: our parents, siblings, and local community. Unfortunately, as psychiatrists, psychologists, and counselors are keenly aware, many of the perceptions acquired about ourselves in the formative period are expressed as limiting and self-sabotaging beliefs.

Unbeknownst to most parents, their words and actions are being continuously recorded by their children's minds. Since the role of the mind is to make coherence between its programs and real life, the brain generates appropriate behavioral responses to life's stimuli to assure the "truth" of the programmed perceptions.

Let's apply this understanding to real-life behavior: Consider that you were a five-year-old child throwing a tantrum over your desire to have a particular toy. In silencing your outburst, your father yelled, "You don't deserve things!" You are now an adult and in your self-conscious mind you are considering the idea that you have the qualities and power to assume a position of leadership at your job. While in the process of entertaining this positive thought in the self-conscious mind, all of your behaviors are automatically managed by the programs in your more powerful subconscious mind. Since your fundamental behavioral programs are those derived in your formative years, your father's admonition that "you do not deserve things" may become the subconscious mind's automated directive. So while you are entertaining wonderful thoughts of a positive future and not paying attention, your subconscious mind automatically engages self-sabotaging behavior to assure that your reality matches your program of not-deserving.

Now here's the catch: Behavior is automatically controlled by the subconscious mind's programs when the self-conscious mind is not focused on the present moment. When the reflective self-conscious mind is preoccupied in thought and not paying attention, it does not observe the automatic behaviors derived from subconscious mind. Since 95 percent or more of our behavior is derived from the subconscious mind...then most of our own behavior is invisible to us!

For example, consider you intimately know someone and you also know his or her parent. From your perspective you see that your friend's behavior closely resembles their parent. Then one day you

casually remark to your friend something like, "You know Mary, you're just like your mom." Back away! In disbelief and perhaps shock, Mary will likely respond with, "How can you say that!" The cosmic joke is that everyone else can see that Mary's behavior resembles her mom's *except* Mary. Why? Simply because when Mary is engaging the subconscious behavioral programs she downloaded in her youth from observing her mom, it's because her self-conscious mind is not paying attention. At those moments, her automatic subconscious programs operate without observation.

Consequently, when life does not work out as planned, we rarely recognize that we were very likely contributing to our own disappointments. Since we are generally unaware of the influence of our own subconscious behaviors, we naturally perceive of ourselves as victims of outside forces. Unfortunately, assuming the role of victim means that we assume we are powerless in manifesting our intentions. Nothing is further from the truth! The primary determinant in shaping the fate of our lives is the database of perceptions and beliefs programmed in our minds.

Where Did That Behavior Come From?

There are three sources of perceptions that control our biology and behavior. The most primitive perceptions are those we acquire with our genome. Built into our genes are programs that provide fundamental reflex behaviors referred to as instincts. Pulling your hand out of an open flame is a genetically derived behavior that does not have to be learned. More complex instincts include the ability of newborn babies to swim like a dolphin or the activation of innate healing mechanisms to repair a damaged system or eliminate a cancerous growth. Genetically inherited instincts are perceptions acquired from *nature*.

The second source of life-controlling perceptions represents memories derived from life experiences downloaded into the subconscious mind. These profoundly powerful learned perceptions represent the contribution from *nurture*. Among the earliest perceptions of life to be downloaded are the emotions and sensations experienced by the mother as she responds to her world. Along with nutrition, the emotional chemistry, hormones, and stress factors controlling the mother's responses to life experiences cross the placental barrier and influence fetal physiology and development. When the mother is happy, so is the fetus. When the mother is in fear, so is the fetus. When the mother "rejects" her fetus as a potential threat to family survival, the fetal nervous system is preprogrammed with the emotion of being rejected. Sue Gearhardt's very valuable book *Why Love Matters*,

reveals that the fetal nervous system records memories of the womb experiences. By the time the baby is born, emotional information downloaded from the life experiences in womb have already shaped half of that individual's personality.

However, the most influential perceptual programming of the subconscious mind occurs in the time period spanning from the birth process through the first six years of life. During this time the child's brain is recording all sensory experiences as well as learning complex motor programs for speech, and for learning first how to crawl, then stand, and ultimately run and jump. Simultaneously, the subconscious mind acquires perceptions in regard to parents, who are they and what they do. Then by observing behavioral patterns of people in their immediate environment, a child learns perceptions of acceptable and unacceptable social behaviors that become the subconscious programs that establish the "rules" of life.

Nature facilitates the enculturation process by developmentally enhancing the subconscious mind's ability to download massive amounts of information. EEG readings from adult brains reveal that neural electrical activity is correlated with at least five different states of awareness, each associated with a different frequency level:

<u>Activity</u>	<u>Frequency</u>	<u>Brain State</u>
<i>delta</i>	0.5-4 Hz	sleeping/unconscious
<i>theta</i>	4-8 Hz	imagination
<i>alpha</i>	8-12 Hz	calm consciousness
<i>beta</i>	12-35 Hz	focused consciousness
<i>gamma</i>	>35 Hz	peak performance

EEG vibrations continuously shift from state to state over the whole range of frequencies during normal brain processing in adults. However, EEG vibration rates and their corresponding states evolve in incremental stages over time. The predominant brain activity during the child's first two years of life is *delta*, the lowest EEG frequency range. In the adult brain, *delta* is associated with sleeping or unconsciousness.

Between two and six years of age, the child's brain activity state ramps up and operates primarily in the range of *theta*. In the adult, *theta* activity is associated with states of reverie or imagination. While in the *theta* state, children spend much of their time mixing the imaginary world with the real world. Calm consciousness associated with emerging *alpha* activity only becomes a predominant brain

state after six years of age. By twelve years, the brain expresses all frequency ranges although it's primary activity is in the *beta's* state of focused consciousness. Children leave elementary education behind at this age and enter into the more intense academic programs of junior high.

A profoundly important fact in the above timeline that may have missed your attention is that children do not express the *alpha* EEG frequencies of conscious processing as a predominant brain state until *after* they are six years old. The predominant *delta* and *theta* activity of children under six signifies that their brains are operating at levels below consciousness. *Delta* and *theta* brain frequencies define a brain state known as a hypnogogic trance, the same neural state that hypnotherapists use to download new behaviors directly into the subconscious mind of their clients.

The first six years of a child's life is spent in a hypnotic trance. Its perceptions of the world are directly downloaded into the subconscious during this time, without the discrimination of the dormant self-conscious mind. Consequently, our fundamental perceptions about life are learned before we express the capacity to choose or reject those beliefs. We are simply "programmed." The Jesuits were aware of this programmable state and proudly boasted, "Give us a child until it is six or seven years old and it will belong to the Church for the rest of its life." They knew that once the dogma of the Church was implanted into the child's subconscious mind, that information would inevitably influence 95 percent of that individual's behavior for the rest of his or her life.

The inhibition of conscious processing (*alpha* EEG activity) and the simultaneous engagement of a hypnogogic trance during the formative stages of a child's life are a logical necessity. The thinking processes associated with the self-conscious mind cannot operate from a blank slate. Self-conscious behavior requires a working database of learned perceptions. Consequently, before self-consciousness is expressed, the brain's primary task is to acquire a working awareness of the world by directly downloading experiences and observations into the subconscious mind.

However, there is a very, *very* serious downside to acquiring awareness by this method. The consequence is so profound that it not only impacts the life of the individual, it can also alter an entire civilization. The issue concerns the fact that we download our perceptions and beliefs about life long before we acquire the ability for critical thinking. Our primary perceptions are literally written in stone as unequivocal truths in the subconscious mind, where they habitually operate for life, unless there is an active effort to reprogram

them. When as young children we download limiting or sabotaging beliefs about ourselves, these perceptions become our truths and our subconscious processing will invisibly generate behaviors that are coherent with those truths.

Acquired perceptions in the subconscious mind can even override genetically endowed instincts. For example, every human can instinctually swim like a dolphin the moment they emerge from the birth canal. So, why do we have to work so hard at teaching our children how to swim? The answer lies in the fact that every time the infant encounters open water, such as a pool, a river, or a bathtub, the parents freak out in concern for the safety of their child. In the baby's mind, the parent's behavior causes the child to equate water as something to be feared. The acquired perception of water as dangerous and life threatening, overrides the instinctual ability to swim and makes the formerly proficient child susceptible to drowning.

Through our developmental experiences we acquire the perception that we are frail, vulnerable organisms subject to the ravages of contagious germs and disease. The belief of being frail actually leads to frailty since the mind's limiting perceptions inhibit the body's innate ability to heal itself. This influence of the mind on healing processes is the focus of psychoneuroimmunology, the field that describes the mechanism by which our thoughts change brain chemistry, which in turn regulates the function of the immune system. While negative beliefs can precipitate illness (nocebo effect), the resulting disease state can be alleviated through the healing effects of positive thoughts (placebo effect).

Finally, the third source of perceptions that shape our lives is derived from the self-conscious mind. Unlike the reflexive programming of subconscious mind, the self-conscious mind is a creative platform that provides for the mixing and morphing of a variety of perceptions with the infusion of imagination, a process that generates an unlimited number of beliefs and behavioral variations. The quality of the self-conscious mind endows organisms with one of the most powerful forces in the Universe, the opportunity to express free will.

Taking Personal Responsibility

We have all been shackled with emotional chains wrought by dysfunctional behaviors programmed by the stories of the past. However, the next time you are "talking to yourself" with the hope of changing sabotaging subconscious programs, it is important to realize the following information. Using reason to communicate

with your subconscious in an effort to change its behavior would essentially have the same influence as trying to change a program on a cassette tape by talking to the tape player. In neither case is there an entity in the mechanism that will respond to your dialogue.

Subconscious programs are not fixed, unchangeable behaviors. We have the ability to rewrite our limiting beliefs and in the process take control of our lives. However, to change subconscious programs requires the activation of a process other than simply engaging in the usual running dialogue with the subconscious mind. There are a large variety of effective processes to reprogram limiting beliefs, which include clinical hypnotherapy, Buddhist mindfulness practice, and a number of newly developed and very powerful modalities collectively referred to as Energy Psychology.

Learning how to harness our minds to promote growth is the secret of life, which is why I refer to the new science as *The Biology of Belief*. As we become more conscious and rely less on subconscious automated programs, we become the masters of our fates rather than the "victims" of our programs. In this way we can rewrite old, limiting perceptions and actively transform the character of our lives so that they are filled with the love, health, and prosperity that are our true birthrights.