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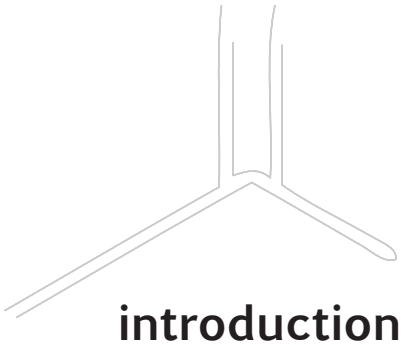


introduction

In more than one hundred years of psychotherapy very little has changed, except cosmetically. It is still the fifty-minute hour, the sit-up, face-to-face talk, with insight contained in the dulcet tones of a concerned therapist. There is still the horror of the unconscious as a place of ill-defined demons to be avoided at all costs. No one says it, but it is implied in how we carefully steer the patient into the present and away from the past. The Freudians now call it ego-psychology but it is really psychoanalysis with a slightly different focus. Sadly, in the name of progress, more and more therapists have moved away from the past into a present-focused approach; this is particularly true for the cognitive behavior therapies. There is an apotheosis of the present, of the here-and-now, and a move away from the one thing that is curative: history. We are historic beings, imprinted neurophysiologically with our past. Any proper treatment must address that history.

More sadly, for one hundred years we have been talking to the wrong brain. It is that verbal, "talking" brain that prevents any hope of a cure for emotional illness. Communicating with the brain that talks was fine a century ago but now we know so much more about the brain and what it contains; we know that damage done to us is imprinted on lower levels of consciousness far below where words live. Further, we know much more about how early memory is imprinted and how it affects our lives.

A bit immodestly, I have known and seen this now for decades. When I first wrote about how the birth trauma and prenatal experi-

ence affect adult behavior, in the 1970s, my ideas were considered "new agey." Now, there are literally hundreds of studies verifying this proposition. There seems to be little question in the scientific community that a pregnant woman's mood and physiology can produce long-term effects on the offspring. If we want to ensure the health and mental stability of future generations, we need a paradigm change in psychology and psychotherapy. We need to push back the envelope from childhood to infancy and gestation. For there is where the most good and harm is done to our offspring. And there is where many of our later ailments and personality traits get their start.

As we move forward, I trust you'll see the enormity of the influence of our life in the womb; the most unexpected effects of womb-life on later heart disease, blood pressure, migraine, epilepsy and personality deviations. While we live inside our mothers we are responding to an environment—her—and the life that unfolds after birth is, in some ways, just a continuation of that maturation inside mother. Think of it: she is the only world the baby knows. He is already developing a personality during these critical nine months of life—growing up in an isolated world where there is only one source of input. He can be born neurotic and prone to disease (or carefree and healthy), not simply because of heredity but also because of experience during womb-life.

Understanding this, what we now must do is fashion a therapy commensurate with our knowledge. Continuing to approach treatment by zeroing in on the talking brain prevents any hope of cure for emotional illness. Instead therapists must traverse the bridge between knowing and feeling. They must adopt an emotional, experiential approach rather than a cognitive one. That is not an easy task.

We need to learn a new language—that of the unconscious—a language with no words, just feelings and sensations. I submit that psychotherapy has not changed radically in nearly the last century because we've always believed that words could help us make profound change in patients; and, in fact, words often are our defense against feeling. But as psychotherapists our goal is to produce feeling human beings, not mental giants. I have stressed for years that access to feelings begins with the right brain, and several studies have demonstrated that addressing the right brain may help penetrate repressed feelings. So long

as we focus on the left frontal, thinking brain progress will be limited to this area, not the region where feelings are stored. We will be loaded with insights that mask feelings rather than expand them. Progress will be limited to the psyche and not the whole system.

Now why is that so important? Why should the language of feelings take precedence to thoughts we can verbalize? Because, quite simply, we can only heal where we were wounded. We know that emotional wounds lie deep in the brain, out of range of consciousness. Although the lower brain "talks" to us all of the time, we have never learned how to talk to it. Hypoxia, for instance, a pathological condition in which the body is deprived of oxygen, speaks to us every day. The problem is we do not have the language to talk back, to create a dialogue with higher levels of the brain, such as the prefrontal cortex, and make meaningful changes. The lower brain talks to us in other ways, as well: in our nightmares and colitis, in our high blood pressure and migraines, in our sexual difficulties and interpersonal conflicts. Indeed, our history is asserting itself in our every waking moment; yet, time and again, we go to psychotherapists who want to concentrate solely on the here and now; who want to use the left brain exclusively, coaxing patients to think they are better rather than actually making them better. Worse, these methods often lack the sort of neurophysiologic measurements that are needed for a proper psychotherapy.

At the Primal Center in Santa Monica, California, we treat patients experiencing pain due to repressed childhood trauma. Every patient, every day, has his or her vital signs (heart rate, body temperature, blood pressure) measured before and after sessions, and we have found dramatic changes in our patients after just one year of therapy. For a long time we made brainwave studies of our patients until it got too expensive. As we'll see later in the book, these vital signs and brainwaves may indicate a good deal about our personality and mood, as well as why primal therapy may help to normalize them.

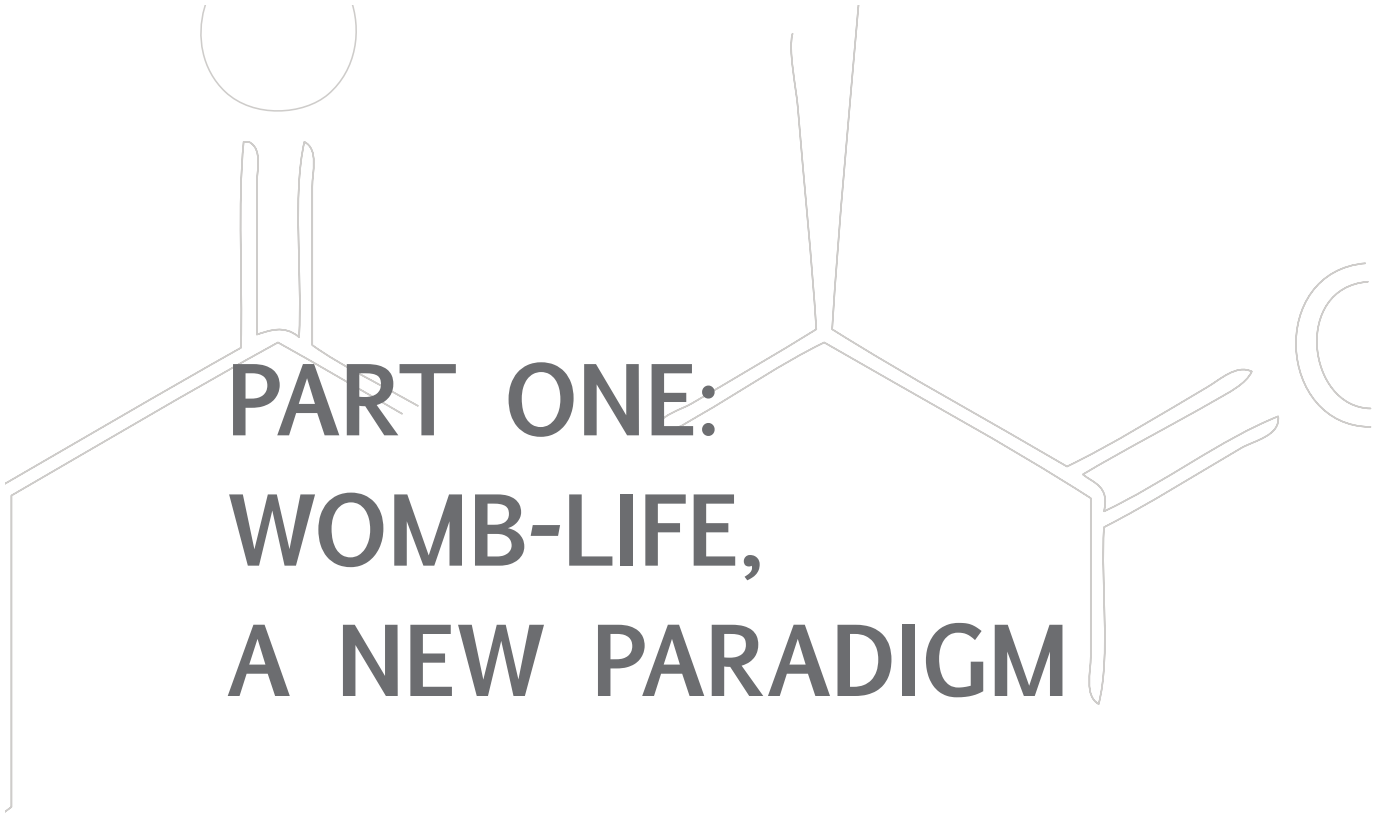
We are walking archives, living in the imprint of our past. For too long we have focused on the present and words, because these are the easiest to access and take no great effort. On top of that, we have not known how to access our neonatal and early childhood history. We do now. To get better, we need to take the emotional trip to our history

and undo the damage. We need to relive the repressed pain of early trauma through what I call a "Primal."

The time we return to during a Primal, our fetal life and infancy, is when and where our problems begin and resolution resides. Not only is this time key to the mental health of adults, but it is also profoundly important for expectant mothers who, while carrying their children in the womb, are shaping their destiny. In the course of this book, I hope to clarify what happens to the fetus and baby when the mother feels or acts in a certain way, and what the mother can do to help her child.

Skeptics scoffed when I first described, in the 1970s, the capacity of the fetus to absorb his mother's reality through a neurophysiologic connection. "Where was the research?" they asked. Now the research is catching up. Fifty years ago who would have dreamed that a heart attack at the age of sixty is, in part, caused by things that happened to us sixty years earlier? Who would have guessed a migraine at age thirty has its start before we set foot on this planet? But, as you will see, there is mounting evidence that this is the case. What the mother does, how she feels, what she eats and drinks—all of these are structuring a new life on this planet.

How do I know that the past is engraved in our brains for a lifetime? How do I know that reliving our traumatic past helps us heal? That is the subject of this book.



PART ONE: WOMB-LIFE, A NEW PARADIGM

1

how love sculpts the brain

During pregnancy and the first critical months of the baby's life, the mother is downloading a good deal of her neurochemistry into the fetus. Her state of being produces alterations in hormone output that will affect the baby, perhaps for a lifetime. If the mother is depressed, hormones change; if the mother is anxious, hormones change; and the expectation of the fetus is that it will meet the same kind of environment after birth as before. The fetus's whole physiology and neurology changes to adapt to the mother's alterations; inside the womb, the baby is reacting to an environment that is possibly the most important one in his or her life. That is why the loving bond between the mother and child is so important.

In my theory, love between the parent and child takes many forms, but essentially it means fulfilling the needs of the baby, including the need for oxygen and proper nutrients while being carried. Lack of love for the fetus deprives him of essential nutrients for his development. This deprivation may assume many patterns and changes as he develops, but, in all cases, it is the subsoil on which later personality is built. Unless we believe that intrauterine life doesn't count, which is to dismiss the considerable evidence that has amassed in the last decade, we must not ignore this time. The child will have emotional needs after birth and still later there will be intellectual needs. Needs have a timetable for when they appear and when they must be fulfilled. This is a basic biologic law, which means that any attempt to fulfill needs out of that timetable will not be effective and will leave the child deprived.

Though he may spend a lifetime trying to fulfill that need, it will always be symbolic rather than real fulfillment because the critical window has passed. I must add one proviso here: later love can and does ameliorate the early imprinted pain but cannot erase it. Only reliving can ultimately get rid of it.

A newborn needs physical contact. When the desire for touch goes unmet early on, any caress or touch at age ten will be helpful but not biologically fulfilling. The early need has been repressed, and, in this sense, love is no longer viable. In order to recover it we will need to unearth basic need in our therapy, so that adults exposed to early trauma will, once again, be emotionally healthy and able to achieve fulfillment. Need is basic and must form the linchpin of any proper psychotherapy. When needs are not fulfilled neurosis steps in, and neurotic behavior follows suit. We've discovered, for instance, that it is very early deprivation that is behind so much of serious drug addiction; the earlier the need the more essential for survival and, hence, the more painful. Pain is commensurate with the urgency for fulfillment. That is why womb needs are almost always a matter of life-and-death.

Love means having a proper birth, without heavy anesthetics to shut down the oxygen supply to the newborn. Most important, it means a mother fairly free of anguish and depression; for her physiologic and emotional state is more or less the offspring's state, not just momentarily, but for a lifetime. And it is not strictly hereditary; it is experience layered on top of genetics, what fetal researchers refer to as epigenetics. In fact, when we see the documentation we discover that how we've been nurtured in the womb and our first years is at least as important, if not more so, than heredity.

As it turns out, love is not as ephemeral as we might have thought. There are enduring physical consequences when it is not there. And therein lies the rub; we are dealing with errors of omission, an absence not a presence—which is why it is so hard to pin down. Research shows us, however, that it is the right side of the brain, in a kind of synchrony, that is sculpting the feeling centers of the baby. When the mother is not loving, not soft and warm and caressing, she is shaping a different kind of feeling structure in the baby's brain. This is particularly true of the

right brain, where the very early imprints take place. And this is historic, I might add, because it is the right side of the brain that develops first and handles the severe impact of early pain. The two hemispheres are different in other respects. The right brain is more global, capable of seeing the overview, whereas the left brain is more detailed and point by point. The right brain is attuned to nuance and subtleties; the left brain is easily deceived, not having a feeling base to call on. Though most of what happens to us during gestation is registered in the right brain, in today's therapy we usually utilize the left brain to get to our feelings. Not an efficient process. We keep going to the wrong address. If we want to understand our primordial ancestors, we cannot only focus on the present; and, in the same way, if we are ever to understand and cure behaviors and symptoms, we cannot neglect history. The left brain knows nothing of feeling; the right side knows just about everything. Therapy needs to go after the right brain, with left-brain therapy handled as the final phase of treatment. That is, left-brain insights must follow, not precede, feelings. As in evolution, feeling must come before thought.

love before birth

When love begins in the womb, the mother is speaking to her baby in "womb-speak," a language that has no words. Nevertheless, it is a very strong language, perhaps the most critical that will occur in our lives. Every "word" a mother speaks has great impact. In her physiology she is saying to the child, "I am calm. I am normal. And I love you." We find the message of love in the mother's energy, passion, and sexuality. When these are lacking, however, basic primal processes may be disrupted.

From a neurologic perspective, a mother's love and calm while carrying not only strengthens the baby's brain but also produces better painkiller receptors, known as opiates, that allow him to manage pain more easily. His ability to feel comfortable also depends on an optimum level of the neurotransmitter serotonin, which animal research indicates may have a good deal to do with how socially gregarious we are (more on this in chapters ten and fourteen). Whereas

adverse events in the womb can decimate this neurotransmitter, early love normalizes it. This means a better handling of stress and adversity as the child goes through life. In addition, love boosts the proliferation of endorphins, our internally produced painkillers, which allow us to inhibit intense pain and experience greater joy and contentment. Some evidence even suggests there may be a more extensive network of dendrites (the parts of brain cells that receive information from other cells), which would indicate a better interconnectivity among nerve pathways and perhaps a more conscious life.

When I use the word "love," I am speaking of more than just physical closeness in the form of kissing, hugging, holding, soothing, listening, and attending to the baby—although these are certainly part of the definition. A baby has needs well before birth, as well as after, and the more these needs are met, the healthier, happier, and more intellectually capable the baby will be. So while it's true that in his first years of life a child may need encouragement and praise, the need for love really begins much sooner.

Besides holding the infant and caressing him, love means looking at the infant with warmth, paying attention to his moods, and caring about his needs. It means sensing what he is feeling; understanding when he needs attention and stimulation and when he doesn't. All of this helps determine how the emotional areas of the brain develop. A mother's physiology while carrying also helps establish the so-called "set-points" for various hormones in the baby. Her system regulates the fetus's hormone output and, to the extent she experiences high levels of anxiety during pregnancy, the child may be at risk for a higher output of the stress hormone cortisol, not just for a few days or weeks, but for a lifetime.

During pregnancy the mother is essentially transferring her patterns and rhythms of mood, in addition to any hormonal imbalance she might have, into the child's feeling centers; namely, the hypothalamus and other limbic structures in the brain. Early love helps determine the maturation and development of these neurologic structures, which in turn has a direct effect on the release of hormone secretions. The main point is that due to high levels of maternal stress early genetic set-points may be reset, modifying how "feeling" we become as adults.

A mother's emotional health during pregnancy also is important for the development of the frontal area of the child's brain where impulses are controlled and integrated.

It is easy to think our personalities and propensities for disease are strictly hereditary. After all, even in the scenario I've just described, these traits are transmitted from mother; however, not in the way we had once imagined. Though the child's emotions may already be fixed when he enters this planet (though he may be lethargic and passive from birth, for example) this personality type may not be wholly genetic. Instead the child's personality may be the product of what has been downloaded at pregnancy, that is, an imprint: either loving or non-loving, down-regulated or hyperactive. This imprint forms the matrix for the child's later physiology and brain development and, of course, his later mental health.

To take an example, a mother on heavy drugs or alcohol may shape a suppressive tendency in the offspring—a newborn who rarely if ever cries or reacts strongly. The child is such a good boy, in fact, that we rarely comprehend something is wrong until months later. He is born passive and lacking in energy, unresponsive and non-reactive. He may even get "love" for being so undemanding and out of the way. His prototype is based on the dominance of the rest-and-repair nervous system, what I call the parasympathetic system. Later in life his drug of choice, most likely a stimulant such as cocaine, will tend to normalize his deficiencies for a brief time, but inevitably it will wear off. Like many addicts, he will try to recover the lost half of himself, the part that was missing at the start. That is addiction; we should not look at this pejoratively any more than we should a child born with kidney problems. It is a lifelong sentence, and there is good reason to believe its physiologic roots are planted in the womb.

Besides abstaining from alcohol, drugs, junk food, and other toxins, a primary way a mother can express love is by fulfilling the child's dietary needs. Recent animal models have found that changes in the protein input of the carrying mother may significantly affect the baby and produce a propensity for later obesity. The baby is learning to adapt to its most important environment; the problem is that the adaptation endures, so the adult continues to expect conditions found in the womb. He sees food at age thirty and immediately gobbles it up. This is

known as one-trial learning, and it is one of the reasons womb-life is so important to our long-term health.

A proper diet also means breastfeeding right after birth. There are mothers too busy or too harassed to do that, and so a nanny or caregiver offers the bottle. No matter the rationalization, the child is unloved. Later, when he sees a breast, that very same early stimulation may be present again. He will feel sexually excited (as an adult male), but the real excitement is primal. The excitement is in anticipation of fulfillment—to be touched and caressed, to suck—which later takes a sexual turn. There may be orgasm and relief in adult sex life, but the relief is only temporary; it is only a substitute or symbolic fulfillment of the early unmet need. As with overeating, the gratification does not last. The impulse soon returns because it is driven by a basic need which has found an outlet, albeit a counterfeit one. Alas, many of us go chasing symbolic love for the rest of our lives.

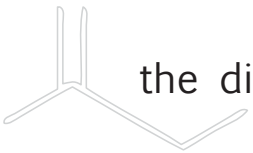
In one experiment, women were encouraged to place their babies at the breast right after birth. The earlier the contact, the more physical the mother was later on with the newborn. In general, we see more loving contact with early bonding. In fact, if there were one word to describe love from birth on, it would be "touch." Intimate contact between mother and child in the first weeks and months of life regulates the opiate receptor system, ensuring optimum levels to make us comfortable. As adults, we are then able to make our own children comfortable, enabling them to handle stress without being overwhelmed. The loved parent exhibits a calmness that is translated to the baby.

Without sufficient touching, however, inhibitory neurohormones fire in overdrive, attempting to shut off the pain caused by deprivation. If a lack of love has been imprinted, as we will see later, inhibitory or repressor neurotransmitters may be called upon to do that for a lifetime. Eventually, serotonin supplies become depleted. And, in the worst cases, the brain will be compromised: there will be fewer neocortical, top-level neurons to deal with arousal, fewer brain cells to suppress feelings or hold back impulses. The result may be chronic anxiety throughout life—a tendency which begins its life during gestation and infancy.

So what do parents do that is so damaging? Obviously, a tense mother who handles her child roughly is not imparting a feeling of

calm in him. Similarly, a mother who desperately needs love may use her baby to fulfill her needs, demanding too much from him so that he cannot be himself. The autobiography *Open*, in which tennis star Andre Agassi discusses how his father drove him unmercifully in order to fulfill his own failures, is an excellent cautionary example. What drove Agassi to drugs? Above all, a parent's greed for love. And, indeed, how a mother treats her child after birth is frequently indicative of what went on during womb-life. For instance, a mother who is narcissistic may try to keep her weight down to look pretty and attractive, without adequate thought for the life inside of her.

Indeed, there is little doubt that a mother's physiology while carrying is reflected in the baby's biology. The mother's lowered output of key neurohormones may show up in a baby who is imprinted in the hyperactive mode. On top of that, there is clear evidence that mothers who smoke produce smaller babies, at high risk for asthma, slow lung growth, and lower respiratory conditions. If the mother has been a drug addict, newborn babies may go into withdrawal, showing symptoms such as sweating, shaking, and vomiting. And, understand, trauma to the system is not just chemically induced. Pregnant rats repeatedly exposed to loud noise produced smaller offspring, an experiment that seems to indicate that maternal stress has a direct effect on the newborn. A tense system is an improperly functioning one, and research concerning how tension levels of pregnant women affect the condition of their babies should certainly be a priority for the future.



the die is cast

Scientists claim that the brain is plastic, malleable. But based on my experience, once the critical period when needs must be fulfilled is over, the brain is incapable of a great deal of change. The brain adjusts its shape and function based on very early experience, and rarely makes any radical departure after that. As long as imprinted memory of pain endures, and it does, we cannot expect a different kind of brain. I disagree with most of the current therapeutic efforts to change the brain. Yes, the hippocampus and a few other brain structures go on chang-

ing for most of our lives but, in important ways, the brain is inflexible. What is more flexible is the part of the brain that thinks, spouts words and ideas, and holds beliefs—the top layer known as the neocortex (or frontal cortex). What are intransigent are lower brain levels that function as survival mechanisms. In fact, it is in our best interest if these do not undergo great change, for they allow us to react instinctively. If we cannot feel the rightness of something, we are handicapped; if we cannot react immediately, we are likewise handicapped.

In a 2010 study, Justin Feinstein, of the University of Iowa, compared the effect of sad films on those adults who had their hippocampus damaged versus those who did not.[1] Adults with a damaged hippocampus, he reported, could not form new memories. They had little memory capacity and could not express their feelings about the films or even remember them, but physiological markers showed that they continually felt sad. Amazingly, their feelings continued even without the ability to call them up. In other words, we don't need higher-level input to feel sad; we respond instinctively, with or without it. Feelings are inscribed as feelings. And these primitive instincts can be imprinted long before we have the cortical capacity to define them.

Feinstein is not alone. Michael Meaney, a genetic researcher at McGill University in Canada, has done experiments with rats.[2] He compared the offspring of normal mothers, who frequently licked their babies but subjected the offspring to stress during pregnancy, with a second group of pups who were also under stress but experienced no licking. Not surprisingly, those babies who were heavily licked turned out to be the most normal and well adjusted. What is a surprise, however, is how much womb-life counts. For animal mothers, licking is tantamount to hugging and caressing in humans. And, just as we see in the rats, a woman who is unhappy or depressed while carrying can influence that child for a lifetime, even if she later normalizes and feels better.

The notion of a maternal imprint—a sort of physiologic signature passed from the pregnant mother to the child—has sparked interest from journalists and science writers, in recent articles on stem cells. Scientists, it appears, have found a way to avoid using embryonic stem cells for research by using current skin cells, instead. Through a com-

plicated procedure, they've managed to wind back the clock and return those cells to an embryonic state. In general, embryonic refers to a time within twelve weeks of conception. Embryonic cells can be used in stem-cell therapy because they are not, as yet, "dedicated." Known as pluripotential cells, they have not become what they are destined to be: bones, blood, kidneys, etc.; thus uncommitted, they have no special identity and researchers can make them into anything they want. In a way, this is similar to what happens to infants who are short on experience; they can be molded into what their parents need and want.

Once cells take on their imprint, however, they often cannot be changed; their identity (the skin cell, George, for example) remains unshakeable. In recently reported studies, researchers found that some skin cells that were rewound back to their primitive selves could not be used later to rebuild a different organ or tissue—bone, for example. The cells retained the memory of what they were originally. And the danger of all this, if some exaggeration may be allowed, is that you start using imprinted cells for therapy and suddenly you have a patient growing teeth in his throat. More likely, you get what is called a teratoma (not particularly pleasant, either), where a patient will grow tumors instead of the desired organ.

The point is that the imprint is rock solid, engraved even into microscopic cells that do not shed their identity easily. Our human imprint, I propose, is found in every fiber and cell of our being and retains a precise memory of its past. It cannot be pinpointed to any particular location in the system since it is everywhere, from our hormonal balance to our neurology. The imprint says, "This is what happened to me and this is who I am." And because the imprint is everywhere, when we relive it there may be changes throughout the system. That is why we need to relive experiences: to reset the set-points and, in so doing, exercise a profoundly new approach to medicine and psychiatry. We need to "remember" with our entire physiology and being, not just the neocortex.

There is more to this story, for early gestational stress leaves a mark on the genes. That mark is then hard-coded and becomes a part of each of us, an epigenetic memory. The way this happens is through DNA methylation—meaning the gene expression pattern in cells is altered,

so that cells can "remember" their history and suppress certain viral or hazardous elements. Early trauma tends to add part of the methyl chemical group to the cell so that it becomes fixed as memory: epigenetic memory that is easily confused with genetics, more generally.

In short, stress or primal pain is encoded into the most basic aspects of our cells; it endures and can mark us not only in terms of lowered resistance to disease but also by producing changes in hippocampal cells that affect later memory. The way methylation evolves helps to define the critical window—the time in which our needs must be fulfilled or we run the risk that pain will be permanently imprinted; it also defines where the patient must go for resolution. In my view, only major imprinted pain that alters the system occurs within the confines of the critical window. Thus, when we see methylation of cells it means that the mark of trauma was stamped in during the critical period before birth and at the very beginning of life (more on this later).

What scientists are finding is that it is largely due to methylation that genetic switches are altered. The methyl chemicals seem to cling to the gene and control whether the switch is turned on or off, and whether it is on when it should be off, such as in serious disease. The good news seems to be that, unlike pure genetics, methylation can be reversed. Thus, epigenetic-caused disease may be normalized at last.

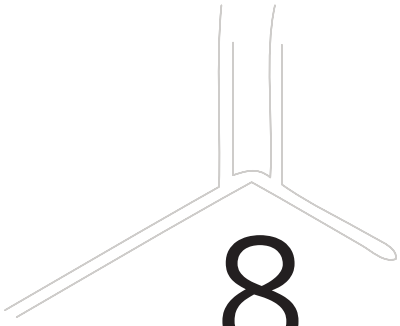
And in truth the distinction between heredity and epigenetic "heredity" must be made, if we are ever to reverse disease. When a mark is made on certain anxiety-regulating cells, for instance, we may be stressed until that mark is revisited and relived (perhaps for life). What's more, the mark can be relived unconsciously, without our specific awareness of it, if connection is made through the proper memory circuits. But the process of methylation also can be temporarily reversed with medications such as Prozac. So what is really going on?

Certain regions of the brain altered by drugs are the same areas that may be affected by reliving gestational events. That is part of the reason it is so easy to confuse genetics with epigenetics: our moods and personalities are shaped early on, so we believe psychological disorders are passed down through the bloodlines. After all, if both the parents have blue eyes, it is not a mystery that their child also has blue eyes. But when it comes to behavior and feelings, it is another matter. Genes

can be changed through experiences the fetus undergoes while in the womb. On the basis of those experiences, the offspring may then "decide" whether certain genes are expressed or repressed.

And it is here that some of the mystery of cancer may be uncovered, for it may be that cancerous cells would evolve as normal cells if not for the physiologic force of repression provoked by maternal stress. It may be that as benign cells surge forward along foreordained pathways they are blocked from their destinations. They are then "crushed" or deviated and can no longer be themselves; they lose their identity and become lethal. And as they are changed, we are changed.

What all this means is that by examining our womb-life in detail we can often predict our future: our sexual problems, the possibility of later cancer, psychosis, heart problems, Alzheimer's disease, and a whole host of afflictions. The question is, "How do we do that?" How do we get to those early driving needs that preceded our first steps in a new world? They may seem so "far-out" as to be unbelievable, but many thousands of patients have gone through my therapy, reporting what they went through even when I was unprepared to believe them. At last new research is confirming what they told me.



8

epigenetics: the inheritance of acquired characteristics

When we discuss repression there is something else we must add to the theoretical mix: epigenetics—how very early events in the womb and at birth can alter the genetic unfolding. Research has shown that one genotype, a single genetic predisposition, can give rise to many phenotypes depending on what happens to those genes during gestation. So what we might imagine is genetic, is actually genetic—plus what happens to us in the womb. I was astonished early in my therapy when long-term patients reported that their wisdom teeth descended. Now I understand it better; the genetic unraveling toward the teeth's destination was deferred due to repression.

In the early nineteenth century, a French scientist named Jean Baptiste Lamarck decided that we acquired characteristics from experiences that our parents underwent. Russian communists applied this to agriculture but, no matter, it was a widely discredited theory . . . until recently. Now this scientific view is being resurrected; for the emerging field of epigenetics largely upholds what Lamarck believed. So what is the evidence for epigenetics? And how does it work? What Lamarck said, quite presciently, was that individuals may acquire characteristics as a result of their environment and pass these characteristics on to the offspring. This could be anything from stress-related mood disorders, to dietary adaptations, to respiratory conditions caused by tobacco exposure.

Children may thus have vastly different life experiences without radical differences in genes, but, rather, in how the genes are expressed,

whether they are shut off or turned on. A mother's interaction with her environment is vital, in this way, for it may determine if the potential of her offspring's genes are fully realized. A fetus in the womb is always trying to adapt to its environment; its genes will evolve and be expressed depending on that adaptation. However adaptation may cause problems, if the carrying mother's neurochemical signals are imbalanced. As first reported in a 2007 study by Vivette Glover and her colleagues at Imperial College, London, the transmission of high cortisol levels to the child may lead to lower IQ, as well as anxiety, ADD, and depression.[1] Canadian research is supporting those findings. Following the 2009 Royal Society Summer Science Exhibition in London, Suzanne King, an associate professor of psychiatry at McGill University, concluded: "If there is anything we all agree on it's that the fetus is incredibly vulnerable and fragile, and that even subtle perturbations in the mother's mood can have measurable effects on the fetus that last for years."[2]

Epigenetic changes occur while the fetal brain is developing rapidly and needs proper neuronal input to evolve the way it is supposed to. If input from the mother is not successfully integrated, the child may not be able to form cohesive thoughts, nor to focus and concentrate. This is the kind of person, thereafter, who cannot accept high levels of stimulation because his internal input is so great that anything from the outside—two term papers due immediately, a job interview, a move to a new city, anything most of us would perceive as inordinately stressful—is, quite literally, overwhelming.

To get an idea of how early all of this may begin, consider a recent study at the University of Miami School of Medicine. Researchers there suggest that when mothers are depressed during pregnancy "fetal activity is elevated, growth is delayed, [and] low birth weight common."[3] In fact, newborns of a depressed mother show a profile that mimics the carrying mother's physiologic state, meaning high stress hormone levels, low levels of dopamine and serotonin, and above-normal right frontal brain activity.[4] The research on the subject is fairly consistent: higher resting levels of stress hormones in the carrying mother can have an effect on the later life of the offspring. All of this presages the child's later need for tranquilizers, since the early imprint has lowered

hormone levels permanently. With even minor setbacks later on, taking painkillers may become a matter of urgency.

I often talk about our internal pharmacy. When pain enters the body, our brain goes to the pharmacy, as it were, to order what it needs: more serotonin to help with repression, for example. What the commercial pharmacies do is produce the precise molecules that we manufacture inside our brains; and they do it because we cannot manufacture enough ourselves. I am convinced that, were it not for early events, most of us would manufacture the chemicals we need to feel content in the ordinary course of our lives. But in some cases, just as the brain is developing in the womb, traumas beset us, altering the serotonin set-points; that is, we cannot secrete what we need because pain has caused the brain to use up its reserves in the battle for survival. And this sets up a permanent deficit: a new set-point. The child of an anxious mother is thus chronically anxious because the mother's gating mechanisms were faulty and exposed the fetus to high levels of caustic hormones; thus, the cycle goes on.

There is a debate going on now about the advisability of using tranquilizers to normalize the carrying mother's system. Both sides have valid concerns. If there is no medication given to the mother, then she will likely continue to be anxious or depressed, and pass her chemical signature on to the baby. On the other hand, if we do give tranquilizers to the carrying mother, then these drugs can be transferred to the baby, thereby overloading the fetus's serotonin levels. There is really no great solution, except this: normalizing the system before pregnancy. That can be done, and we have shown in any number of studies that we tend to normalize the brain system after one year of primal therapy. This is preferable, in my view, to messing with our inner neurology.

In July 2010, Frederich van der Veen presented new findings on serotonin to the Forum of European Neuroscience in Amsterdam. In a landmark study, he gave a serotonin enhancer to subjects before they watched sad films, finding that those on medication cried much less.[5] The serotonin infusion effectively blocked the study participant's access to tears and, presumably, the sad feelings themselves. Keep in mind that we are not normally low in serotonin except when in trauma; and those traumas that occur the earliest in our lives are the most powerful,

dealing, as they do, with life-and-death matters. Accordingly, crying less doesn't just mean less tears; it also means less access to ourselves and our feelings. The purpose of serotonin enhancers is to numb our feelings and our reactions to those feelings. But taking shots or pills does not eliminate the pain; it disguises it, making us less conscious, which can hurt us in a variety of ways. Taking medication, in short, needs to be seen as a stop-gap method and not a cure.

epigenetics, birth, and stress

As the field of epigenetics grows, we are finding more and more research citing the birth experience as the hidden cause for a variety of common diseases and thinking and memory problems. Researchers at Karolinska Institute, in Stockholm, have found that cesarean births can result, for instance, in increased incidence of allergies, diabetes, and leukemia. The neonatologist Mikael Norman, explaining these findings, points out that "altered birth conditions could cause a genetic imprint in the immune cells that could play a role in later life."[6] The assumption is that the fetus is not prepared for an "unnatural" birth. Unlike a vaginal birth in which stress gradually builds and can thus be adapted to, cesarean birth is a shock to the fetal environment, which can affect how the genes behave.

Several times a year epigenetic research provides us new insight into cancer. There is such a thing as a tumor-suppressor gene, which may cause cancer cells to die by halting additional cell growth. However something can happen early on to affect our cellular braking mechanism and allow unrestrained growth of cancer cells.[7] What seems to happen when the mother is under stress, that is, is tumor-suppressor cells are momentarily disabled. This is similar to when a mother stops a child from expressing his feelings: pressure builds in the system and disease may occur as a result. Here the only difference is that the suppression is purely physiologic and happens very early on.

There have been other studies of the epigenetic effect of maternal stress. A research team led by Thomas O'Connor of the University of Rochester Medical Center studied 125 pregnant women at roughly

seventeen weeks of gestation,[8] using samples of amniotic fluid to measure stress levels in the mother. When the children reached seventeen months of age, researchers tested the interactions between the mothers and their infants to find out, among other things, if the babies were secure, and if they cried when separated from their mothers. Longitudinal results showed that children of anxious mothers could not concentrate as well as those of mothers who were calm. Interestingly, if parents were closely connected to their children in the first months and years of his life, some of that harm could be undone—the implication being that the negative effects of gestational trauma can be eliminated in a loving home. I am skeptical of this conclusion, however, because once a trauma is imprinted it tends to endure. It can be softened by a loving homelife, but not eliminated. We cannot eliminate our history; it is the crucible that determines whom we will become.

heredity turned on its head

Let's make sure we understand this notion of epigenetics because in the coming years it will likely be one of most important areas of scientific research. As I've mentioned, one reason for its preeminence is that many of the serious diseases we think are genetic are actually epigenetic and, therefore, environmentally caused. The thinking is that with lower brain therapeutic techniques, such as primal therapy, these diseases may be able to be successfully treated.

When a harmful event occurs while we are being carried there is an imprint that remains for a lifetime. It is aided and abetted by a process called methylation, in which part of the chemical methyl group is added to the mark to help it endure. In other words, the imprint is laid down, in part, by a change in the cell, as certain chemical reactions are taking place—hydrogen removal, methyl infusion, and so on. For our purposes, we need not be so concerned with the process, which we'll leave to the biochemical scientists. Suffice it to say that methylation does exist, leaving a heritable imprint. So what we always thought was genetic may well be the result of very early experience diverting the genetic legacy.

Trauma causes methylation—that is what's important. Perhaps given a good environment there may be a way of demethylating the imprint. But what it looks like, for now, is that adding methyl may be one way to protect the cell against the adverse effects of a trauma. In other words, the imprint is a survival mechanism; it helps guide us in the future so that we avoid danger. And what is even more astounding is that the imprint can be transmitted across multiple generations, so not only is the parent important in all this, but so is the grandparent. A memory has been engraved into the epigenome and so passed from one generation to the next.

Animal experiments have shown that separating a baby sporadically and unpredictably from its mother causes severe stress, and the same applies to a human baby who is not touched right after birth and in the first weeks of life, as we find in babies raised in incubators. The effects of this stress become heritable from the epigenome. This imprint then affects many aspects of our biology, including the memory system. As we'll see later, that may mean that a condition such as Alzheimer's disease may get its start from birth, and not show up for another sixty years.

Research by D.K. Lahiri and B. Maloney, at the Indiana University School of Medicine, for instance, indicates how this all might work—first by the imprint and then, they suggest, by the methylation that carries on the imprint. The mark or tag, not so easily seen, can change or delay the development of a genetic trait. Again, the imprint changes how heredity manifests itself—which is why epigenetics is so confusing and why, until now, we have considered a number of serious diseases to be inherited when, in fact, they may not be inherited at all.[9]

As we saw earlier, Michael Meaney and his research team found that deprived animals, when later raised by a more loving mother, experience a partial recovery as higher-level brain processes override some of the effects of early imprints.[10] The neocortex can provide compensations for the pain, masking the imprint, but cannot eradicate it. Meaney's rats, deprived and damaged early on by a disappearing mother, were later put into an enriched environment where they seemed happier and played well together. But their stress hormone level was still high; they still suffered, as do humans under similar condi-

tions. Masking the pain is not the same as resolving it, and we may die prematurely from that masking. You might call it a devil's bargain: if we mask the pain we may die early, but if we don't we suffer. However there is a third possibility: relive and integrate the pain, and thus be done with it.

There seems to be a window of opportunity before methylation sets in when the imprint can be partially reversed.[11] But it is a narrow, short-lived window. After that the imprint remains for a very long time. What scientists are working on now is how to undo methylation. Investigations into using methionine to reverse the effects of methylation are bearing fruit, and other drugs, including some tranquilizers, are helping to accomplish it. I believe reliving early experience in a Primal may also partially undo methylation and help to normalize the system. This should be a subject for future research.

epigenetics and pain

Although the study of epigenetics can get fairly complex, one of the keys to proper understanding lies in accounting how the brain develops during the fetal period. The thalamocortical circuits are established very late in gestation. Only after they have developed and the amygdala-cortical circuits are in place is it possible for us to have a mental appreciation of the pain we are in. Before then we can experience pain without acknowledging it. Thus, pain is laid down unconsciously, without words to explain or clarify it.

There was a study reported in the British journal *Nature*,[12] in which the investigators noted that when babies are under threat the amygdala sends a signal to the prefrontal cortex, triggering the expression of fear in behavior. The cortex becomes the "decider," as it were, planning for action. As part of the study, the researchers trained mice to associate a tone with an accompanying shock delivered whenever the tone was issued. Each time the mice heard the tone, there was commensurate brain activity in the prefrontal area, signaling a threat. But when the amygdala was surgically removed there was no longer any prefrontal activity; the former could no longer signal fear to the top

level. The same is true when we drug that structure or tranquilize it: we thereby diminish the force that mounts in the prefrontal area. And, as we learned earlier, gating problems in the amygdala may be part of the reason so many of us have trouble either falling asleep, staying asleep, or even concentrating. Lower level imprints voyaging upward and forward keep us from traveling to a lower level of brain function by jolting us into a hypervigilant state whenever we lie down to relax. There is simply too much activity in that deeper level to permit sleep.

revisiting family history

When can a fetus begin to feel pain? A better question might be this: when can it signify pain? Research from K.J.S. Anand, a professor of pediatrics and neurobiology at the University of Tennessee, suggests this happens once the neural circuits are in place.[13] When Anand placed a needle into a fetus (in a process known as amniocentesis), the fetus grimaced in pain and its stress hormone levels rose dramatically. Not only did the baby suffer but, from our point of view, that suffering can be coded and registered in the memory system, thereafter awaiting connection. This is what we in feeling therapy are about—connection—restoring the missing links in the circuitry. Some serious diseases have been considered only in the domain of inheritance, muscular dystrophy being one of many. The cures for these afflictions have been slow in coming, in my view, because our emphasis has been on inherited factors rather than in utero experience. If we don't regard gestation as critical, our diagnoses are bound to be flawed.

Early childhood is important, as well, when attempting to identify the origins of later life problems, as evidence of imprinting can be seen in the experiences of very young children. There is a study by a Canadian group from the Douglas Mental Health University that found when child abuse exists there is a change in the gene NR3C1 that affects how the child will deal with the abuse.[14] Measures of the gene were much lower in abuse victims who eventually took their own lives. It appears that childhood abuse had changed the gene's structure, making the gene less active. And these modifications endured throughout the

children's lives, affecting the way the stress apparatus, what is called the hypothalamic-pituitary-adrenal axis (HPA), functioned.

Patrick McGowan, one of the study's principal researchers, implies that the changes are more or less permanent; they alter the gene's activity, leading to later illness and suicidal tendencies. When the NR3C1 gene is ineffective it cannot produce the kind of alerting, galvanizing chemicals that help one fight through things. As a result the body behaves as though it were constantly under stress. Moreover, what this research group believes is that mothers can affect the fate of their children even before they are born. Epigenetic changes passed on during gestation may contribute to depression and suicidal thoughts later on. So what looks like genetics, in reality, is a much more complex interaction between biological and environmental factors, an intricate "if-then" sequence which spans generations.

Finally, there is a study by the Israeli researcher Micah Lesham indicating that a mother who was stressed before getting pregnant can affect the life of her offspring.[15] In experiments with rats, Lesham found that those rats that underwent stress before pregnancy had offspring who were hyperactive; the females displayed symptoms of anxiety and were generally more nervous. Over and over we discover, uncomfortable as it may be to our notions of pregnancy and motherhood, that an anxious mother does not provide a good soil for having children.

Every day there is new information and research on this subject. A new study by Alberto Halabe Bucay of the Research Center Halabe and Darwich, in Mexico, now suggests that when parents are happy it can change the egg and sperm germ cells that affect the offspring. As reported in *Science News*,[16] Bucay's study shows that a parent's psychology and emotional state even before conception can affect the child's genes. For now this proposal is mostly polemical, but it is intriguing. It is for all these reasons that epigenetics will soon be a very important area of study, something that did not exist when I was coming up in psychology.

It turns out that heredity has become an "iffy" item. Michael Skinner, a molecular biologist of Washington State University, has been experimenting with the on/off switch of genes and sperm in animals. What new information is showing is that experience is altering the

sperm and eggs of the parents and creating micro-changes in "heredity," so that it alters the offspring and their offspring. These changes are not about altering the DNA sequence but about changing the switches so that when a switch should be on it is off and vice versa (a process described earlier as methylation). This process determines how heredity unfolds; it means that experiences of the parents and grandparents funnel down to the babies who are changed ever so slightly.

What this may mean is that my notion of the imprint has to be wound way back. A more accurate framework holds that the experience of the parent leaves an imprint on the sperm and egg. This imprint endures and affects our physiology for perhaps a lifetime; although it seems like pure heredity, it is actually the effect of experience on the genes and their action. And here later adverse effects on the kidney, liver, or heart begin. One experiment by researchers at the University of New South Wales was done with male rats who were fed a high-fat diet.[17] Their sperm seemed to change—that is, many of their babies had adult-onset disease, even though the mothers were normal. The children had a greater frequency for deviated insulin and glucose resistance, hence a propensity for diabetes, even though the fathers had no previous history of the disease. So what looks like pure heredity is actually a molecular memory of the experiential effects on that heredity. These research animals had defects with their on/off switches. For humans, this may mean the tendency to be fat derives, in part, from what a father ate before conception. If that father overate as a child, his offspring have a much greater chance of being fat and developing diabetes. Clearly, we need to change our focus in order to understand who we are. Our idea of what is heredity is rapidly changing.

There are all kinds of intriguing possibilities. In one recent experiment, some animals who were raised in an enriched environment and appeared smarter had offspring who seemed to inherit that intelligence (finding their way through mazes more easily) even though they were not raised in an enriched milieu. Let's be clear: when the parent had a chance to develop intellectually his offspring had a better shot at being smart. Somewhere there are indelible and permanent marks on the sperm and egg.