

# Principle-based Medicine

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## Abstract

The perspective of organized beliefs regarding contemporary medical practice, administration, reimbursement, research, and planning policies is based upon the metaphors of acute illness. The mental image of diseases as distinct causal agents is a legacy of mythological explanation and biological classification and nomenclature based on the structure and origins of life forms. However, diseases are not life forms but ideas we form about similar groups of people. The confusion of name with cause embodies linear thinking, lacks scientific basis, and is without merit as a paradigm for the prevention and treatment of chronic illness.

Principle-based medicine is founded on the recognition

of irrefutable individuality, rhythmicity, and consciousness of human systems and the balance that is inherent in health. Its paradigm provides to the practitioner and the patient a shared rationale for applying common sense and logical maxims to clinical decisions.

A better metaphor for medical language and thought provides, moreover, a base for the collection, organization, and analysis of narrative and laboratory data. If such data are detailed, accurate, and logical, it's possible to analyze the data in such a way as to enable answers to questions that we were previously unable to ask without first presupposing what the answers were.

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This essay describes the conceptual landscape of medicine as it is evolving based on influences by an increasingly collaborative spirit among patients, practitioners, and researchers. I anticipate a shared understanding of basic scientific principles, metaphors, and maxims. Unified access to such tools for thinking is reinforced by a shift toward democratization of medical information fostered by the Internet and information technology.

The traditional hierarchical structure of the medical profession will yield as we replace the linear, martial metaphors of “attack” and “victim” with an understanding of balance within a framework of systems biology. The term principle-based medicine calls attention to the benefits that can accrue for our contemporary medical practices once we identify the underlying scientific principles.

In this paper, I first describe three of the principles behind the idea of principle-based medicine; then I present maxims and practices before explaining the last principle (the reasons for delaying the fourth principle are explained at the time of its introduction). I have found that a metaphor for conceptualizing the landscape of chronic illness such as described herein nourishes my communication with colleagues and patients. It is offered as a unifying map of a landscape that, up to this point, has been fragmented by language that pictures not the individual patient but disease entities as the target of prevention and treatment.

## Individuality: The First Fundamental Principle

The practice of medicine draws freely from the storehouse of scientific fact. The metaphors of the basic medical sciences of physics, biology, physiology, biochemistry, and epidemiology embody the accrued names and principles of their fundamental laws. To reiterate a point made by F.C. Crookshank, MD, nearly a century ago, “There is, however, no science of medicine in the formal sense.”<sup>1</sup> Contemporary medicine in contrast to its “basic sciences” relies on metaphors that confuse ideas, things, and their names.

Naming is a human need and mission that comes with biological and Biblical imperative.<sup>2</sup> The Swede Carl Linnaeus (1707-1778, aka Carl Von Linné) and two Englishmen Charles Darwin (1809-1882) and Herbert Spencer (1820-1903) gave to medicine's closest science, biology, a framework for its nomenclature: the naming and classification of living things embraced both the phylogeny and the origins of life. The practitioners and teachers of medicine in the 19th century adopted such a scheme to depict the “morbid entities” that populate our imagination. Linnaeus himself at the end of his prolific career published works classifying human diseases along the same lines as those for organizing the hierarchical interrelationships among plants and animals, with the implication that such an effort would yield a greater understanding.

Today we speak of asthma, colitis, Alzheimer's disease, diabetes, depression, and autism as if they are causative of their defining signs, symptoms, and laboratory abnormalities. Public policy and medical research use martial exhortations to “battle,” “conquer,” and “eradicate.” We and our scholarly publications regularly conflate name and cause into logical absurdity: “The cause of your sadness is depression”; “autism

causes problems in speech, behavior, and social interaction in children”; “Crohn’s disease is a chronic inflammatory disease of the intestinal tract that causes pain and diarrhea and may result in fistulae.”

These mental constructs borrow from the naming and classification of entities: plants, animals, and microorganisms. In truth, diseases are names not of things or organisms formed by nature but of ideas formed by us as we create conceptual groups based on certain “defining” similarities. In so doing, we lay traps of circularity in our thinking that foreclose conceptualizing chronic illness<sup>a</sup> in terms of questions about the individual, as discussed below.

A.N. Whitehead’s explication of the fallacy of misplaced concreteness is concisely reviewed by Lara Pizzorno, MA, LMT, in her essay in *The Textbook of Functional Medicine*.<sup>3</sup> The logical flaw introduced by our habit of conflating name with cause is reinforced by the model of acute infectious illness with its notion of attack by an entity. Carried over to the concept of chronic illness, such a metaphor puts medical practice and policy on a defective foundation: If we deny that disease entities exist as material realities, then why must we be bound by ancient habits of speech that perpetuate what I call “name-it, blame-it, tame-it prescription-pad medicine” (in which descriptions of disease are assigned causations of disease)? Can we not, with our modern understanding of systems biology, find metaphors and basic principles that replace fictitious linear images of causality?

The association of the name strep with the sore throat is, after all, true. And streptococci are truly material entities. Also true is the connection between streptococcal antigens and the antibodies that represent the immune system’s problem of mistaken identity, the concept of which is embodied in the names of more than a dozen manifestations of post-streptococcal autoimmune diseases—each with its own definitions and boundaries. But those definitions and boundaries, necessary as inclusion criteria for research studies, carry a false implication that such diseases exist in nature like robins or the city of Boston rather than being our mental constructs.

Strep is, moreover, an “entity,” and it invites concreteness in thinking about its diseases. To say to the patient with a streptococcal pharyngitis “The cause of your problem is strep” turns into a betrayal of logic when it is restated in the context of a chronic illness of unknown etiology: “The cause of your sadness is depression” or “The cause of your joint pain, rash, and fever is juvenile rheumatoid arthritis.”

When we enter the realm of complex chronic infection, our language of cause and effect leaves us poorly equipped in the application of the first principle of medicine:

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<sup>a</sup>The logical fallacy of “begging the question” (*petitio principii*) occurs when the premise of an argument assumes elements of the conclusion. By defining a chronic illness according to selected criteria, we presuppose the findings that will be “discovered” in the course of its investigation. Hence, if autism is a mental illness exclusively defined by behavioral, cognitive, and social symptoms in children, we escape with difficulty the trap of that definition—especially at a time when a flaw in maternal attachment was assumed to be causative.

**Principle 1:** It is the individual, not the disease, that is the target of our therapeutic efforts.

Our carelessness in utilizing the language of acute illness in our approach to chronic illness sacrifices the principle of individuality by giving our patients the names of their diseases. A poignant definition of chronic illness is “one in which it becomes the main feature of the patient’s identity.”<sup>4</sup>

What exactly is a principle? “A fundamental truth or proposition that serves as the foundation for a system of belief or behavior or for a chain of reasoning.”<sup>5</sup>

Our naturopathic colleagues cite six principles that underlie medical practice:

- 1) Do no harm,
- 2) there is healing power in nature,
- 3) identify and treat the cause,
- 4) heal the whole person,
- 5) the physician is a teacher, and
- 6) prevention is the best cure.

These precepts are better defined not by the definition of principle given above but by a second meaning of the word principle: “A rule or belief governing one’s personal behavior.” Such rules recruit the allegiance of all physicians.

The six principles listed in “What is Functional Medicine?”<sup>6</sup> are as follows:

- 1) An understanding of the basic principle of biochemical individuality;
- 2) awareness of the evidence supporting patient-centered, not disease-centered, medicine;
- 3) the search for dynamic balance among internal and external factors in a patient’s body, mind, and spirit;
- 4) familiarity with the web-like interconnections of internal physiologic factors;
- 5) identification of health as a positive vitality—not the mere absence of disease; and
- 6) promotion of organ reserve to enhance as well as prolong life.

The first of these falls within the first definition of principle and the others within the second definition.

Are there other principles, like individuality, that are fundamental in the scientific sense and achieve standing as irrefutable laws of nature that can serve us in the practice of medicine, as do the various principles that underlie the hard sciences? Does any other principle match the primacy of the principle of individuality: Every living creature that ever has or will exist is an individual in the sense of being unique? Or do exceptions (eg, twins, armadillos,<sup>b</sup> and clones) challenge the foundation of this principle?

In every instance of exceptions to the individuality rule, we immediately come up against the dual facts of environment

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<sup>b</sup>Armadillos are always born as genetically identical quadruplets.

and time. That is, as soon as four genetically identical armadillos are born, they each enter different physical and temporal dimensions that will cumulatively add to their individuality. Two patients, no matter how closely matched and identified with the same disease they may be should be treated according to the underlying principle and reality of their individuality. Decisions should not rest upon a flawed metaphor that gives precedence to the shared name of their chronic illness and what we falsely construe as the unique “effects,” by definition, of the disease.

### **Capturing Individuality**

A word formerly applied to a medical history, anamnesis, is one that carries an etymology indicating memory. In practice, anamnesis constitutes a process of matching patients’ histories to patterns. Such a match of features from the patient’s narrative to a diagnostic “entity” is memorable and brings comfort to both the patient and physician of “knowing what you’ve got.”

The myriad of distinctions that define each patient as unique cannot, however, be kept in a physician’s mind. Fortunately, information technology now provides the means to capture a detailed, accurate, structured memory of the words and numbers that describe the unique portrait of each individual. The context of complex chronic illness imposes demands that such a record be created and subject to analysis, reporting, and graphic representation to make it accessible and intelligible to the individual and the clinician. Beyond that, information technology offers the capacity for an interchange between individual and collective data.

If you ask people to list the ways in which they are different, special, and/or distinctive, they may first give you their strengths and skills and then, perhaps with coaxing, their weaknesses, problems, or symptoms. They may cite the name of a disease. It is more likely that they will tell you their stories and unlikely that they will give you their lab data.

Medical data focus on biochemical, immunological, toxicological, and genetic data for the same reason Willie Sutton, the notorious bank robber of the 1930s, concentrated on financial institutions: it’s where the value lies. We have data banks in which we can determine biochemical individuality, which is treasured even among those of our profession in whom the patient’s history is still honored as a starting point. The question remains, however: Why is the patient’s narrative not honored in our data systems? One answer is that our use of narrative begins and ends with chasing the diagnostic squirrel to the terminal branch of a classification tree to find the treasured name of the patient’s disease. The path and the branches that were unheeded in the ascent to this final destination contain the data ignored en route to the diagnostic destination. Another answer is that heretofore, we have not had a system for capturing an accurate, detailed, structured electronic version of the patient’s narrative under the protective shield of the patient owning an anonymous record.

### **Data Collection**

In 1970, I began the development of a coding system for

what information technologists aptly call the “granular” data from which the mosaic of individual portraiture is composed. The granules in these data are the patient’s signs, symptoms, life events, exposures, strengths, special skills, and treatment responses as well as lab data. The granules are, however, in a sense immaterial. The data exist in the coding system as intersections in a multidimensional space. As such, they form precise patterns that can be seen with the technological eye of the computer. Statistical methods can calculate proximity as defined by vectors in the virtual space of the records of many individuals and find patterns invisible to the naked eye, but such methods are susceptible to reduction to comprehensible graphics.

Data arranged in this way can answer questions we did not know to ask. Fourth Paradigm Data Intensive Science<sup>7</sup> is the name of the method of data curation used in this approach; it is gaining ground in the fields of remote viewing (of the earth) and in cosmology. Satellites and telescopes facilitate information collection for these efforts.

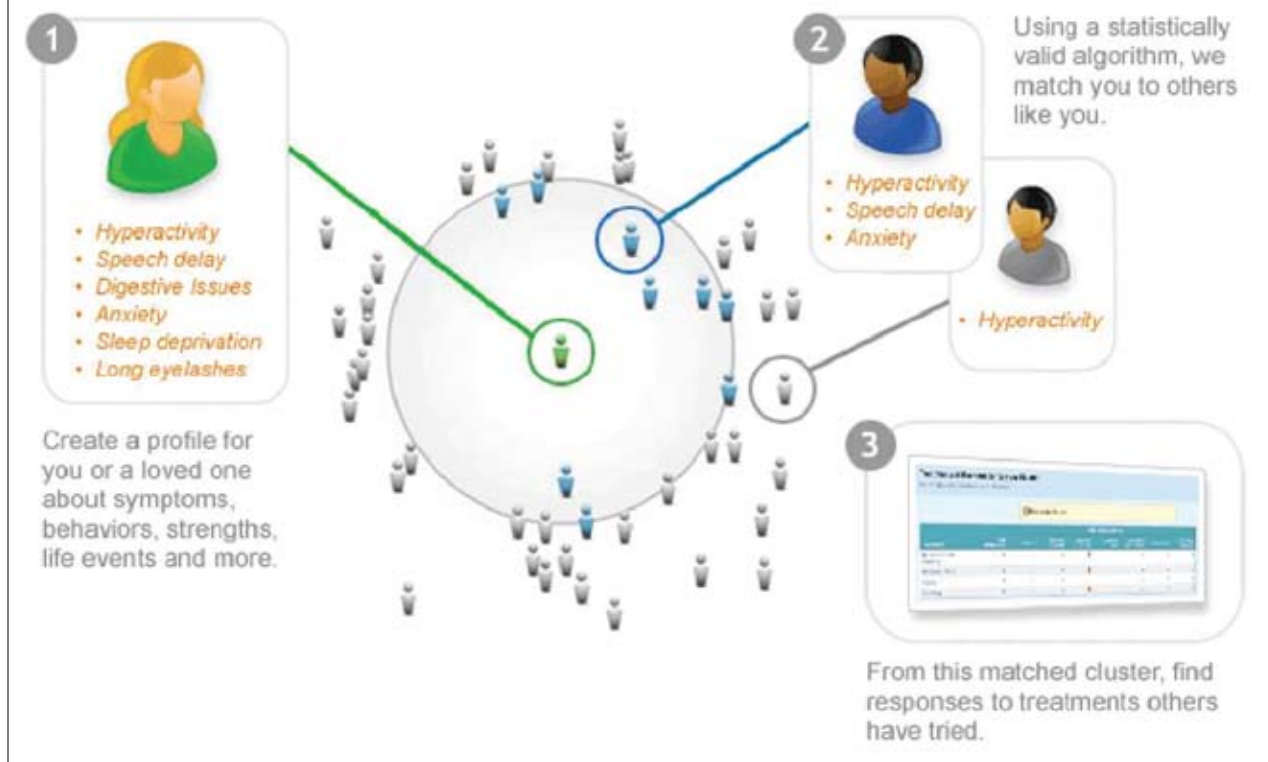
There is an interest as well in the medical realm and health statistics. How do we obtain health data that capture the hard primary signals of individual narrative and lab data as opposed to soft secondary conceptualizations of disease names? First, we must make sure that our method provides value to the source of the data—the person whose narrative is of interest. That person is interested in accuracy and detail just as is the bearer of a passport or driver’s license, who would like the photo to bear a reasonable resemblance, if not a flattering one. Second, we require a means by which we can place the granular details into a logical structure.

For more than a decade, I coded every detail of every narrative of every patient until I figured out a code that covered nearly all possible elements and particularities in a parsimonious space. The US Patent Office recognized the value and individuality of this system in 2008,<sup>8</sup> and Autism360.org was launched as a free-to-the-public tool for capturing narratives, producing comprehensive reports for patients to share with their doctors, and proximity analysis to permit interchanges between individuals and collective data (Figure 1).

That interchange offers individual treatment options based not on a disease name but on the collective experience of others with closely-matching patterns. The underlying technology is generalized to all of medicine but has been adapted to the needs of the autism community with funding provided by the Moody’s Foundation of New York and the gift of a license from Medigenesis (Chappaqua, New York). The data in the system are anonymous and belong to the patients who may share their ID and password with their clinicians.

Research based on the data has begun to show informative patterns and offers promise of a new understanding of autism as the numbers of members grow from the current 4000 to beyond 10 000 when the data will support discovery of patterns that are not only near the center of the normal distribution curve, but also outliers who sometimes provide our most important lessons to science. A description of the coding system and presentation of research data has been submitted for publication.

**Figure 1** Autism360 is a unique tool providing an accurate report that captures the details of your child's or your own individuality and offers treatment options that have worked for others with closely matching records.



### Information Flow

“Metabolomics” is the name Jeremy Nicholson, PhD, has given to the study of the flow of information presented by the analysis of low molecular weight compounds found in the urine of individuals. This effort embodies an approach that consists in listening to the metabolic information as “volunteered” by the urine. Given instruments that can identify thousands of compounds representing the granular details of metabolic output, metabolomics revolutionizes research based on presupposition. It listens to everything that the urine has to say and then seeks patterns to make sense of it.

During an autism symposium in June 2008 at Ratna Ling in Cazadero, California, where Dr Nicholson and I each presented, a participant dubbed my approach to the capture of narrative as “narrativenomics.” I do not suggest this as a brand but as an apt label for an approach in which, at this stage of our development, there is a kinship with metabolomics.

Autism360 is not a survey. We allow the notion that what we doctors know be sacrificed to the expectation that there is a compensatory value in letting the flow of information be volunteered—in the end, providing details of at least 15 profile items. These profiles describe what is serious, vexing, special, different, or curious about patients in the context of a chronic illness, with the proviso that they will tell us about at least one strength or special skill along with a minimum 15 other items.

Once we develop a relationship with our users, we are able to return to them with some questions to clarify answers to

research questions but only with the understanding that we have something of interest for them in exchange.

With this tool for capturing, storing, and reporting data, we have a basis for enlarging the notion of biochemical individuality to embrace the details that constitute a comprehensive personal portrait—including the element of narrative with its implication of time (the fourth dimension). The direct input of laboratory data from cooperating labs is a step awaiting funding. The rewards to the patient are:

- 1) a carefully structured report constituting a portrait with details arranged by medical logic;
- 2) a kind of mirror in which to see oneself and be seen by professionals reflected not in a disease name but in a lucid, accurate, and structured individual image;
- 3) a system for tracking treatments and responses over time;
- 4) actionable treatment options based on the experience of others who are matched based on a proximity analysis of their comprehensive details; and
- 5) an opportunity to anonymously share experience with others for whom its specific value is assured.

### Rhythmicity: The Second Fundamental Principle

Consideration of the temporal dimension brings us to a second principle that underlies medicine with nearly the same gravity as the principle of individuality:

**Principle 2:** All living creatures are rhythmic.<sup>9</sup>

The mathematics of rhythm bring us a paradox when paired with the principle of individuality: Each of us is unique, but we all obey the same rules of harmony with their insistence on the meshing of frequencies that constitute fitness in a healthy organism.

Synchrony, coherence, resonance, tuning, entrainment, and harmony are parts of the lexicon of the fourth dimension in which we live our lives in the momentary and at the molecular levels. The mathematics of rhythmic integration is very strict: The nodes on a vibrating string and the notes produced on the keyboard are related by whole-number ratios. The meshing of frequencies such as the resting pulse rate and respiration in a fit organism<sup>10,11</sup> produces the benefits of rhythmic integration when their ratios are whole numbers—just as musical ratios produce harmony.

Our cardiac pulse stands in the middle of a range of rhythms that run from cycles-per-second to the 7-year unfolding of the spiral of human development<sup>12,13</sup> over a lifetime. Of these, the respiratory and circadian cycles deserve the most attention of clinicians wishing to minimize the vulnerabilities of chronically ill patients.

No matter how far the manifestations of chronic illness lie from the respiratory tract, patients will benefit from breaking habits of breathing with their chest muscles and allowing the diaphragm to do its involuntary integrative job of meshing respiratory and cardiovascular rhythms—whether in the context of athletic performance, driving in traffic, or meditating.<sup>14</sup> Allowing one's diaphragm to do its work free of the tensions that tend to drive breathing upward to muscles suited to emergencies is a task of letting go.

The question of timing in regard to treatment is generally overlooked in medicine despite abundant evidence of its relevance to the sequential compartmentalization of biochemical processes that we wish to influence with our therapeutics. For example, glutathione production and detoxification, in general, have their circadian acrophase (peak) during the night. Awareness of this fact should produce schedules for therapies that provide precursors and induce desired substances, as is the case in the administration of folate in the context of chemotherapy.

Coordinating one's daily activities with one's circadian clock in modern life requires choosing the timing of eating, activity, sleep, and exposure to light—all of which depend on understanding the obvious: Nighttime is dark, and daylight provides the milieu for activity. Less obvious is that nighttime is when we grow and detoxify. The sequential compartmentalization of physiologic tasks calls upon us to fit therapies to their appropriate time slots: for example, protein in the morning and carbohydrates in the evening.<sup>15</sup> Glutathione precursors and inducers should be taken at bedtime<sup>16</sup>; in addition, where there is a need, such therapies as low-dose naltrexone,<sup>17</sup> cancer chemotherapy, and folate rescue<sup>18</sup> should also be conducted at bedtime.

Strategies for adapting a variety of activities and therapeutics to life's rhythms are as fundamental to health as looking both ways a few seconds before crossing the street, as opposed

to a few seconds after. The temporal landscape and priorities are not as crisp on the complex paths of chronic illness as they may be for the safe crossing of Main Street, but still they are ignored at our peril. The circadian rhythm is "circa," that is, about an exact day's length, so that constant adjustments keep our organism in an adaptive frame obedient to the signals of food, activity, and light.<sup>19</sup>

Living organisms possess means for adaptation—not only collectively and over time in the evolutionary sense but, more relevant to the practice of medicine, within more or less narrow time slots in the life of the organism. Entrainment and induction are terms we use to describe the way we adjust our circadian clock to transmeridian (long distance east-west or west-east) travel or the push by environmental and dietary exposures exercised to make adjustments in enzyme production and synthesis of glutathione and other key response molecules as well as the shifts in the phases of the immune response.

The application of adaptation in clinical practice emerges with the administration to patients of substances to induce biochemical or immunological processes. Here the enactment of the principle follows the rules obeyed in the days of starting my old Ford with a push from my friend's Chevy. Fifteen miles per hour (MPH) is the necessary velocity for achieving ignition, but it needs to be achieved from a stationary point of first contact. So it is, likewise, with the administration of effective inducers of glutathione synthesis,<sup>20</sup> such as turmeric or broccoli sprout extract or of immunologic stimulation with low-dose naltrexone or immunization. There also, too much induction or too many supplements can cause mischief that accompanies surprise in adaptive systems that may take a little time to respond to signals. Similarly, my Ford would not have welcomed being hit by my friend's Chevy when it was already going 15 MPH.

Apart from the individuality vs rhythm paradox—that each of us is unique biochemically, but all of us share the same strict mathematics of rhythmic integration and timing—the rhythmic domain carries its own paradox. However precise and strict may be the ratios that define harmony, departures from those limits characterize a healthy organism that is enriched in its component qualities by a lack of fixity. The chronically ill organism may be very much out of sync but may also display ominous fixity of heart rate when its adaptive resources are exhausted. Rhythmic repair from music therapy, dance, other rhythmic exercises, getting away from shift work, and diaphragmatic breathing aims toward the reestablishment of the flexibility implied by the "circa" in circadian with the flexibility it allows for adaptation.

### **Virtuous and Vicious Cycles**

Rhythmic principles bring the notion of cycles. Confronted by the intricacies of a full two-dimensional diagram of biochemistry, one cannot fail to notice three conspicuous circles concerned with detoxification, repair, and energy production. The methylation/thiol, urea, and citric acid cycles are the landmarks of functions that are not only periodic but repetitive and self-reinforcing. The downward spiral of negative self-reinforce-

ment—as in a “vicious cycle”—is a feature of the pathology of chronic inflammation that gives an important place to the principle of circular repetition in the clinician’s mind.

The research of Richard Deth<sup>21</sup> and of Jill James<sup>22</sup> tells us, for example, that certain heavy metals such as lead and mercury tend to disable the very chemistry required for their detoxification. Similarly, dietary-refined carbohydrates may feed microorganisms that disable digestive enzymes in order to enrich their “diet” at the expense of their human host, who may benefit from the regimen described under the title “Breaking the Vicious Cycle.”<sup>23</sup>

Certain aggressive therapies are based on the observation that breaking or “rebooting” a vicious cycle requires more intensity than is needed to sustain the self-reinforcement of a healthy cycle before its descent. Water fasting and fecal transplantation exemplify the extremes that may be required to reboot a gut flora that has not responded to the milder interventions of carbohydrate restriction or the administration of enzymes, probiotics, antifungals, or antibiotics. In other words, the bad thing about vicious cycles is that they are vicious. The good thing is that they come from virtuous cycles to which they can be returned by clinical craft that recognizes the need for transient force. That is to say, the return of a vicious cycle to its original virtue may require interventions that constitute the aforementioned rebooting, such as prolonged fasting does to the intestinal microbiome.

### **Balance: Get and/or Avoid**

All this leads us to the third principle:

#### **Principle 3: Get and/or avoid**

“Get and/or avoid” have been the by-words of my practice for the past 4 decades. Soon after leaving a full-time academic post and becoming the pediatrician–family doctor in a fledgling prepaid health plan, I heard stories from my patients that planted two “could questions” in my imagination.

One patient, a serious engineer in his 40s, revealed on a follow-up question to his notation of food allergy on his questionnaire that the tiniest exposure to egg provoked severe abdominal pain. His story led me to consider that there might be individuals who so far had failed to identify that tiny exposures to any allergen, among a vast diversity of foods and environmental substances, could be the cause of any illness, among a vast diversity of symptoms or syndromes. Hence, the first question of my clinical logic was “Could this patient have a special unmet need to avoid some antigen or toxin that if avoided or eliminated would provide relief?”

Another patient, a hard-working, single mother of two children, whose headaches I had been pleased to be able to define as migraines and refer to the neurologist, found little relief from migraine medications and sought the advice of a chiropractor. His form of testing, which at the time I took to be pure quackery, led to her taking supplements of magnesium and vitamin B6 and resulted in complete resolution of her crippling headaches. Hence the second question: “Could this patient have had special

unmet need to get something that if provided would favor nature’s buoyant impulse toward healing?”

These two questions continue to serve me at the level of a fundamental principle in my practice. They provide a recurring theme for reflection when I feel stuck in my efforts to untangle my patients’ problems. Perhaps of more importance is the role of these questions in kindling the collaborative ethos of shared deliberation. That exercise consists of steps in which another question recurs to focus a scope that can be intimidating with all possibilities in view: “What is the best next step?”

The get and avoid “could questions” embody the principle of balance that underlies this statement about orthomolecular medicine from Linus Pauling, MD, a half century ago: “the right molecules in the right amounts.”<sup>24</sup> Simplicity and accessibility give this principle a place of honor in clinical logic. It may not fulfill our notion of a “fundamental law of nature” such as we may find in physics. It does, however, merit a high place because of its role in demystifying the diagnostic process and engaging the patient’s intellect and intuition, and thus it deserves its own standing as a principle within my thesis. An understanding of the principle and practicalities of the get and avoid questions liberates the observations and intuition of my patients who are then more able both to join in and contribute clues that otherwise remain submissive to the assumption that the doctor knows what questions to ask and the patient’s job is to answer.

### **Autoimmunity and Infection**

In the context of probing for the potential existence of a patient’s unmet special need to avoid or be rid of germs, allergens, or toxins, the term “special” imparts the notion of sensitivity. People differ with respect to their responses to every imaginable stimulus, whether it be the first dip on a roller coaster, a trace of egg white in a sauce, or the experiences of loss and invasion that may link the soul and immune system in the initiation of the mysterious origins of hypersensitivity. Even in recognizing the vexing reality of sensitivity, we still know relatively little about its mechanisms. Not the mechanisms of how—the cells and their cytokines—but the mechanisms of why. Why is one person’s food another’s poison? Individuality is an unsatisfying answer.

At a seminar on autoimmunity in 2009, Yehuda Shoenfeld, MD, opened the meeting by saying, “Until proven otherwise, all chronic diseases are autoimmune.” The opening paragraph of the major work on autoimmunity and infection edited by Dr Shoenfeld elaborates on that point:

About 80 recognized autoimmune diseases fulfill the Rose-Bona criteria. Yet many other conditions are claimed to be of autoimmune origin. While some would say that “everything is autoimmune until proven otherwise,” reading the chapters in this book written by world leaders in autoimmunity brings one to the conclusion that everything after all is infectious until proven otherwise (including autoimmune diseases).<sup>25</sup>

I worked in Chad, Africa, in the 1960s, where nematode parasitosis protects people from allergic and autoimmune disease. Even in the turmoil of day-to-day practice as a freshly minted



doctor, I was able to perceive the hygiene hypothesis—more properly called microbiome depletion<sup>26</sup>—at work. In Chad, my patients were among the poorest in the world, but they were well nourished and generally appeared to be very healthy, truly beautiful people who were normally parasitized by plasmodia, schistosomes, amoebae, and nematodes. They were conspicuously free of chronic allergic and autoimmune diseases.

In the context of hygienic industrialized societies, I believe that Dr Shoenfeld’s statement merits the status of a principle. For practitioners, his statement awakens us to the possible benefits of helminthic therapies as a generic answer to the generic problem of autoimmunity.

### Maxims

Ascending from the base of fundamental principles to maxims that govern the more practical aspects of communicating our style of thinking to our patients, here are the “Tacks Laws” that I have promulgated elsewhere.<sup>27</sup>

1) If you are sitting on a tack, it takes a lot of aspirin to achieve relief.

**Moral:** Tack removal is the proper remedy for tack-sitting.

2) If you are sitting on two tacks, removing one does not result in a 50% improvement.

**Moral:** Chronic illness is, or becomes, multifactorial.

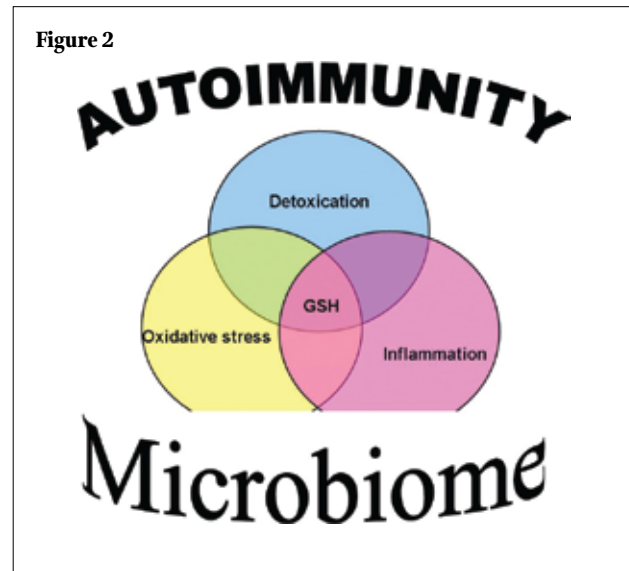
Other maxims that protect me and my patients from jumping to conclusions are the following thoughts on listening and looking:

When you least feel like listening is when you should attend most carefully. This happens especially when one has already reached a diagnostic conclusion and the patient is intent on elaboration. Those are the moments when your patient may, perhaps unwittingly or without using the right pronunciation of the right word, drop a pearl for which you have the string to place it in an effective clinical strategy. Listening is not only a matter of empathy and giving one’s time and ear. There are, moreover, aspects that may be embodied in information technology that can empower patients to tell their stories so as to create a logically-coded, comprehensive, and lucid record that they can own and share with practitioners as they deem necessary and as described above.<sup>c</sup>

Another danger that haunts my office is to be blinded by the obvious. The bright light that I may shine on a prominent feature of my patient’s narrative, physical examination, or lab profile may cast shadows that obscure details that should not wait to be brought to light. A diagnostic label presents the deepest shadows by its illumination to the patient and doctor alike of “knowing what it is.”

My scientific obligation to view each patient as a unique individual would be intimidating if I had no better map of the landscape of illness populated by “disease entities.” My guidance in that space comes with a conceptualization illustrated in Figure 2. The Venn diagram at its core was the subject of

an essay<sup>28</sup> describing the common ground of chronic illness as viewed by investigators of the fundamental mechanisms of chronic illness. Justification for the primacy of glutathione<sup>29</sup> (GSH) as a mediator of the three major issues in essentially all chronic illness is well defended in the references of that essay. These make the case that induction of GSH is a strategy to be considered in any individual with any chronic illness.



Here I place Shoenfeld’s maxim over the Venn diagram to invoke an invitation that autoimmunity—and perhaps any triggering infections either past or present—should be considered as a target for investigation and treatment options. Completing the “oceanic disease” sandwich is an underlying notion that the flora, or, more properly, the microbiome, has a major controlling influence in the evolution of our species as well as on the health of its members. We ignore that fact at peril to our patients no matter how their pathology is presented. (For more information on the metaphor of oceanic disease, please see IMCJ. 2008;7[1]:40-45).

### Practicing Principle-based Medicine

A new patient sits before you. He wants to know what is wrong with him and if you know what you are doing. The “you” in this case is often implicitly plural, as in “you doctors,” because the patient’s expectation is that you are working from a consensus among colleagues concerning what to do about what he presents. You and your patient are at the first of what may be many forks in the paths of the decision tree. On that left-hand path you choose to say to the patient, “What you’ve got is ‘A’ and the recommended treatment for that condition is either ‘X’ or ‘Y’, and I think we should start with ‘X’.” Risk avoidance weighs heavily in the choice. In many cases, the potential value of X is supported by randomized controlled studies or at least by a consensus of peers in your specialty. If you follow that path, you have their reassuring company.

The right, less well-trodden path is, by comparison, lonely. The objective of the essay below is to offer a logical, scientific

<sup>c</sup>As shown in Figure 1, Autism360.org is such a tool.

basis for that off-beaten path so that those of us who travel it share a foundation that is stronger than so-called evidence-based medicine. If you choose this path, you choose to say something along the lines of the following:

*I realize that after a somewhat long search for answers, Dr Von Linné has given you a diagnosis of chronic polymyolymphocytictendonitis, for which certain options have been offered to you, including adding Kineret, Methotrexate, a nonsteroidal antiinflammatory drug, and Thalidomide, all the way to the prednisone you had been taking. Knowing what you have is, of course, very reassuring since it means that you are not alone—others have faced what you are facing, and you may be relieved to know that Dr Von Linné offers expertise regarding the related treatments-of-choice.*

*The relief that comes with a diagnostic label can be short-lived, however, if you place importance, as I do, on the scientific fact that you are an individual before and after your problems have been given a label. If you agree with me on that point, you may also agree with me that it makes sense for us to share a full picture of every symptom, exposure, and life event you have experienced as well as a litany of your strengths and all other details of your narrative. The idea is to capture the ways in which you resemble others—as that is what a diagnosis is all about—but also to seek clues to finding actionable options in the ways that you are different or even exceptional.*

*The extensive questionnaire that you filled out for me provides a shared, preferably electronic, document that will serve as a collaborative effort to get to the bottom of your chronic polymyolymphocytictendonitis, which, as you know, is known informally as the “Four-Y disease”. I understand that you have sought my help with the understanding that I might have a different treatment for your condition. The difference is that the options I would consider have to do with treating not your “condition” but you in ways that I need to have you understand.*

*This begins with a collaboration that starts with me seeing you as an individual so that through my eyes, you may see and become your better self. Putting a name on a chronic condition risks having it become your identity. We are on another path. That path is more lonely because we may lose the company of many others who share your diagnostic label. The path is more true because it respects the scientific fact of your individuality.*

*When I say collaborative, I mean that you have already contributed a large amount of information well known to you. I will contribute a large amount of “my” information to form a joint pool of data from which options will arise to form a basis for common sense choices that we can make together. Most of those choices will be easy, like, “OK, what shall we do next?” Some will be hard, such as “Have we learned and done as much as we can from this approach to treatment or that lab test?”*

*The word “treatment” is worth a note. In principle-based medicine, most of the steps we take provide information that bears on the next step. When Dr Von Linné gave you prednisone, he did not know how well it would control your pain, inflammation, anxiety, insomnia, etc. By the same token, many of the options I might propose would be in the form of a trial that may bring results but, more importantly, may bring information as to whether we are in or near the right ball park.*

*I understand your point about my being the doctor and that you feel clueless about medical issues, but if we take some time to discuss strategy, I think you will see that common sense counts for a lot. Let us start with just the name of Four-Y disease, polymyolymphocytictendonitis. As you see, it ends in “itis,” which means “inflammation.” Inflammation has to do with things that are painful or tender, swollen, warm, and red. Many doctors believe that such things “just happen.” Common sense and experience teaches us that inflammation is a response to something. It is at least worth speculating what that “something” could be for you. It could be food, dust, animals, pollens, chemicals, or germs to which you have a special sensitivity. It could also be something inside you—your own tissue—to which you became sensitized because of a case of mistaken identity, a case of “autoimmunity,” usually engendered by a germ but sometimes by chemicals. It could be related to the germs that inhabit your digestive tract.*

*The list of categories of the substances to which you might be sensitive is short, and the detective work that is needed to find the culprit can be quite easy. All it might take is a few good guesses, a little intuition, or the answer to questions about what you may crave, already know of as a past or present sensitivity, or something to which you were either monotonously exposed or exposed to while under stress.*

*Just suppose for the sake of argument that you are sensitive to garlic, which you have indicated as a frequent food on your questionnaire. I am not saying that you are, but I am only using it as an example. Let us say that, on a hunch, we decided to have you avoid garlic for 5 days and your Four-Y symptoms began to clear up. Would not that be interesting? And would we kick ourselves if we waited until we had done all sorts of testing and trials for months before taking a shot at the garlic issue? Let us accept that Four-Y disease is the name, not the cause, of your inflammatory symptoms. Even well-named complex illnesses can have very simple answers. Your body reacts to traces of garlic by producing a crippling systemic state of inflammation. Likely? No! Possible? Yes—and haunting.*

*Without clarity on the principle of individuality and the understanding that garlic in my example is simply a stand-in for a variety of environmental considerations, a traditionally oriented colleague would balk at my proposal of garlic sensitivity as the cause of Four-Y. The idea simply does not fit in a landscape in which diseases are entities with different, if undiscovered, causes. In that landscape, there are, so to speak, many different diseases and few kinds of people. In our landscape, there are many different kinds of people and a few mechanisms by which their illness can be understood. Dr Von Linné report indicates that Four-Y is not curable, though it may have ups and downs but that the drugs he proposes will help control the symptoms.*

*I imagine that you feel that you are under a ton of bricks. My point is that it may be more like a feather up your nose, which, however completely preoccupying, may be cured by the simple removal of the irritant or a tweak to your metabolism.*

At this point in the conversation, which typically involves questions, comments, or at the very least reassuring body language, we need a reality check. Only the most emotionally and intellectually nimble patient would have entirely grasped



that I have taken him off the “name-it, blame-it, tame-it” path into a new landscape. It may help that he has not gone to medical school. The jump from the left-hand to the right-hand path is not an easy one. Practitioners of integrative or functional medicine yearn for the secure anchorage of linear thinking as we suspend ourselves in the multidimensional space of systems thinking in which the patient, not the disease, is the subject of the universe of descriptors that define the problem.

Long after believing that a patient is fully on board, I may receive e-mails based on the advice of a friend’s suggestion that, perhaps, his problem needs reclassification: “Maybe it is not Four-Y but fibromyalgia or the first signs of arthritis? How can we be sure? Perhaps,” suggests his cousin, “another specialist should be consulted.”

The most useful aspects of the reality check are embedded in the “get and avoid” and “tacks law” maxims along with a careful dissection of the patient’s narrative and interview to tease out details offering clues, such as a history of intolerance to cow’s milk as a baby, gluten intolerance in a child, or exposure to chemicals on the job.

### **Consciousness: The Fourth Fundamental Principle**

I have separated out this principle from the first three so as not to distract the reader by presenting what you may perceive as an arguable principle in the company of the irrefutable principles of individuality, rhythm, and balance.

#### **Principle 4: The Agency of Consciousness**

That living systems are rhythmic and display individuality is self-evident. Scientific measurement is not needed to prove the fundamental truth of these two principles. The fact that balance, in the sense described above, is a feature of the fitness of living systems and can serve as a guide to the maintenance and restoration of health is common sense and need not be settled by scientific measurement. However, that consciousness has agency—that it exercises a force capable of changing the function of both living and nonliving systems—is a principle that differs in two ways. First, in the context of modern scientific beliefs, the agency of consciousness is neither self-evident nor accepted as a matter of common sense. Second, despite this, it has been settled by scientific measurement. I maintain therefore that, however controversial, it is moot.

The laws of motion and the understanding of the principles of gravity and the relationships among the planets and the sun were presumably embraced by many before they were subjected to the proof of measurement by Newton, Galileo, and Copernicus. These discoveries were, however, arguable simply because argument is a choice of the skeptic, whose reasoning is that “it is not true because it cannot be true” and in the case of the heliocentric reality, the alleged simple refusal to, so to speak, peer through Galileo’s telescope suffices to sustain that belief.

Measurement of the effects of consciousness in the laboratory of Robert G. Jahn<sup>30</sup> began in 1987 in Princeton’s Engineering Anomalies Research (PEAR) project. Those measurements force a consideration of the effects consciousness has on

machines as well as on living systems. Jahn’s studies engender a shift in the fundamental thinking about reality just as powerful, and as subject to resistance, as was the Copernican revolution in Western thought.

Jahn’s body of data is irrefutable, but stark conclusions regarding the nature of consciousness have been as thoroughly denounced as were measurements at the birth of modern physics and cosmology. The point of Jahn’s work is that consciousness is influential and exists beyond the boundaries of the material body. The ancient debate in Western culture between materialists and “believers” has, in my opinion, been settled by science.

If we physicians claim a scientific basis for our profession, we should become familiar with Jahn’s research. There is no synonym for the process we call measurement, and in science, measurement is the standard of proof. Proof may also be found in a single observation of an atomic particle or, for example, finding a live coelacanth fish off the coast of West Africa in 1937 and thereby refuting the idea of its extinction. In the life of a physician, many such fish appear in the form of synchronicities and stories that suffice to inform us that another reality lies just behind that of the everyday world of our senses. There is a vast body of objective evidence and personal experience that lends itself to this position. Many people, including hardnosed scientists, place their skepticism or outright and often indignant denial on the lack of a foundation in persuasive measurement.

Jahn was a skeptic. He was a rocket scientist as well as a professor and chairman of the Department of Engineering at the Princeton School of Engineering when a student entering her senior year exercised the option of independent study that Jahn had promised 3 years earlier to incoming freshmen who might subsequently keep a straight-A average. Having her A average, this student chose to study the influence of consciousness on machines. Jahn adamantly refused. The student said, “But you said” and so persuaded him to let her stake her degree on the proposition in which the initial experiments turned out to be convincing.

Over the course of nearly 3 decades, hundreds of experiments of impeccable scientific rigor were done in Professor Jahn’s laboratory and published in the peer-reviewed scientific literature. The failure of the scientific world to obey its own rules of proof should haunt all of us who claim science as our foundation.

Since this time, the scientific community has continued to react by expressing an unwillingness to believe what is before their eyes in a manner comparable to that of the Inquisition in 1633 when Galileo was required to renounce his findings after his measurements proved the motion of the earth around the sun. Jahn’s statement at the time of his retirement and the closing of his laboratory in 2007 reflected his position: “If people don’t believe us after all the results we’ve produced, then they never will.”<sup>31</sup> No further work is needed to establish proof of the effect of human consciousness on the behavior of both living and material systems.

Jahn’s team ran experiments using all manner of mechanical and electrical devices suited to repetitive runs, an endeavor that resulted in vast volumes of data. From the very first of

these experiments, statistical analysis proved that the intention of human observers has an effect on what is observed; for example, human observers are capable of moving the mean value of a random number generator to the right or left.

Bringing to the task a skepticism well honed by years of professorship, chairmanship of a department of engineering, and the study of rocket science, Professor Jahn applied exacting standards. In dozens of experiments, many facets of the phenomena were analyzed. The consciousness—not of individuals claiming psychic powers but of naïve participants recruited, for example, among graduate students—was proven with irrefutable statistics to have a material effect when expressed in a simple intention directed toward various devices.

When I met Robert Jahn in 1990 and understood his work, I thought that the leverage of his simple, irrefutable, abundant data would move the proverbial rock. It moved mine. Those who deal in human health should be the first among scientists to grasp the implication of Jahn's work to ours. We deal in intention. We inhabit a neighborhood soaked in the lubricant of placebo. Placebo stands for the capacity of intention to have agency, to be a means, to have an effect. Placebo is the most enigmatic of medical words and travels with sham, deceit, and fiction—evoking very emotional images such as the “filling up of the gas tank with Earl Grey tea,”<sup>32,33</sup> a phrase quoted in a recent commentary on the placebo effect.

My sense is that when we as humans are insecure, we tend to find support in dogma. The primary dogma of contemporary medicine is that of multiple disease entities and their separate etiologies. Heresy is sniffed out with the nose of that paradigm. Steven Novella, a noted skeptic and professor from Yale University School of Medicine, writes that a treatment purported to work for a long list of diseases with different etiologies should be a red flag signaling “another bogus treatment with claims that are literally too good to be true.”<sup>37</sup>

There is tragic irony in scientists' rejection of Dr Jahn's measurements based on their contention that it simply cannot be true or otherwise we would have to accept a new paradigm. There is a symmetrical irony in the belief that evidence-based medicine provides the security of scientific proof when the targeted diseases represent a flawed metaphor.

## Meaning and Intention

Principle-based medicine embraces general systems thinking in the sense of the interdependence of all factors related to an individual's health and illness regardless of diagnosis. Two critical ways in which the language of that interdependence enters

the landscape of clinical practice and research have to do with what may be viewed as vectors of meaning and intention.

Intention is a manifestation of consciousness whose agency is undeniable. We make our trip to the bank or grocery store by visualizing and enacting the completion of a shopping trip. The growth and repair of living systems may be viewed as the manifestation of intent to which we join our own conscious will with respect to the recovery from illness. The analogical vectors of the intentions of nature, the patient, and the physician—and perhaps other concerned parties—join in a process that may be manifest in a trip to the pharmacy, the organic food market, the gym, or a place of worship. Whether or not one understands the implications of Jahn's objective measurement of the influence of human consciousness on the “behavior” of machines, common sense leads us to the recognition of the agency of intention.

There is, moreover, a wealth of published literature documenting anecdotal as well as experimental evidence supporting the practical reality of intention in matters of health. In any other realm of inquiry, the quality of this evidence would be persuasive even though its level of proof does not meet the highest standards of hard science. Jahn's measurements meet that standard in the field of medicine—with the possible exception of “plausibility.”

Bradford-Hill carefully noted in his defining essay<sup>38</sup> on the criteria by which we must judge scientific proof that biological plausibility merits a keen understanding of the necessity to “force a reconsideration of accepted beliefs and practices.” Failure to respond to that necessity would put the barrier of “accepted belief” everywhere in the paths of discovery. It is fair to say that the evidence for the efficacy and safety of many interventions of current mainstream medicine is far weaker than the support for the assertion that the intention of both the physician and the patient influences the outcome of treatment.

The vectors of my analogy describing this joint activity are bidirectional. However the consciousness of the physician and others are brought to bear on the patient's condition, both the patient and the physician are changed by the outcome of the process.

## Conclusion

The language of medicine has kept its traditional metaphors of acute illness, in which distinctions between nomenclature and causation are blurred by the confusion of names, ideas, and things. The metaphor of diseases as things with the capacity to cause symptoms is reinforced by insurance forms, death certificates, television commercials, and charitable and governmental efforts to, in the old clichés, “make war” or “fight the battle” to defeat various conditions. Meanwhile physicians aim to manage the patient and treat, control, and sometimes cure the disease.

The contention underlying this essay is that our health care system fails to embody systems thinking in which there is a broad understanding of the interconnections among its elements. Instead, we retain a linear map of reality where we explain complex sets of facts, entities, or phenomena—such as chronic illness—by another, simpler set of data, such as

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<sup>32</sup>Jahn's work continues at the International Consciousness Research Laboratories in Princeton, New Jersey. More information is available at [www.icrl.org](http://www.icrl.org), including a response from Jahn and his colleague Brenda Dunne to critics in the scientific community.<sup>34,35</sup> A special issue of *Explore* magazine consisted of an anthology of Princeton's Engineering Anomalies Research (PEAR) articles relating to human health and included a tribute by Harald Walach, research professor of experimental integrative psychology at Viadrina European University Frankfurt (Oder), Germany, and Wayne Jonas, MD, former director (1995-1999) of the Office of Alternative Medicine at the National Institutes of Health, entitled “From Parapsychology to Spirituality: The Legacy of the PEAR Database.”<sup>36</sup>

**TABLE 1** Principles, Maxims, and Aphorisms for Clinical Decision Making

Name	Statement	Clinical Implication
<b>THE FOUR PRINCIPLES</b>		
<b>Irrefutable Principles</b>		
Individuality	It is a biological fact that each organism is unique in a special/temporal domain; this is the basis for adaptation.	The individual, not the disease, is the object of our therapeutic efforts.
Rhythm	Life in the temporal domain goes in cycles—a meshing of that which constitutes music and in which harmony is the basis for fitness and health.	Scrutiny and repair of rhythmic integration should be a part of all diagnostic and therapeutic steps.
<b>Common-sense Principles</b>		
Balance	Does this person have a special unmet need to <ul style="list-style-type: none"> <li>• get something that, if provided, would favor nature’s buoyant impulse toward healing?</li> <li>• avoid or be rid of something that has hindered nature’s buoyant impulse toward healing?</li> </ul>	These two questions provide a transparent foundation for clinical strategy in which clinicians and patients can form an intellectual partnership that is indifferent to the name of the illness.
<b>Proven Principles</b>		
Consciousness	Consciousness is a participating force outside of the space-time continuum of our everyday experience.	Intention is a force to be reckoned in considerations of cause and effect.
<b>MAXIMS</b>		
Etiology	“All” chronic illness is autoimmune.	The umbrella of the immune system covers all chronic illness decisions.
Listening	When you least feel like listening, beware. The patient is about to drop a pearl.	The pearl may be disguised by mispronunciation or context but may be a decision driver.
Beware the obvious	The bright light our egos shine on the obvious elements in the patient’s narrative or lab data cast dangerous shadows.	In those shadows may lurk a detail that is overlooked at the patient’s peril.
Systems	A basic feature of a system is its potential of the spread of stabilization or destabilization from a single component.	We need to abandon linear thinking about cause and cure.
Paradox	We are each unique yet we all obey the same rules of harmony.	In matters of biological rhythm, all dance to the same beat.
<b>APHORISMS</b>		
Individuality	Honor strengths and special skills.	Bringing these to awareness in the clinician and patient helps leverage healing.
Rhythm	Keep time in mind.	Time treatments and activities to mesh with the circadian acrophase.
Adaptation	Induction of anabolic and catabolic processes takes time.	Give time for adaptation to all interventions.
Vicious cycles	Pathology often involves self-reinforcing negative cycles.	The good thing about such cycles is that sometimes aggressive therapy can restore them to the virtuous cycles from which they originally descended.
Therapeutic parsimony	If you are sitting on a tack, it takes a lot of aspirin to make it feel good.	The treatment for tack-sitting is tack removal.
Two questions	If you are sitting on two tacks, removing one does not result in a 50% improvement.	Chronic illness is, or becomes, multifactorial.

germs, genes, toxins, or trauma that we have carried over from a legacy of acute illness. Simplicity has the merit of helping to engage and empower patients in their own care but only if that simplicity is based on a valid metaphor.

I would like to build on the explicit statement that functional or integrative medicine stands on certain principles. Practitioners may more easily find actionable options and engage patients in deciding what to do next by using certain principles as guides to judgment. In the accompanying Table 1, I have included an organization of principles, maxims, and aphorisms that may favor clinical decisions without trying to alter the basic human need to have a name with all the relief and grief that may attend its pronouncement.

When the man in the Stetson sitting next to me at the calf-roping event of the rodeo asks, “What kind of doctor are you?” I don’t reply, “Principle-based.” We are not talking about branding, only about making a distinction. The distinction is one that practitioners and patients can share in conceptualizing the therapeutic path. The four scientific principles presented in this paper provide the practitioner and patient with a logical space. The umbrella of evidence-based medicine has come to define good medicine, but I believe that, for all of its reasonable features, its tether to diagnostic entities is a restrictive flaw and its claim to scientific validity is confined to the statistical tools that award proof of efficacy to a marginal advantage found in one group versus another.

I distinguish principle-based medicine as having its ground defined by four scientifically proven, irrefutable truths. These principles have equal or greater weight than evidence based on a fundamental confusion among names, notions, and things.

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