

NEEDED: A COHERENT ARCHITECTURE FOR 21ST-CENTURY CLINICAL PRACTICE AND MEDICAL EDUCATION

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The Second Coming

Turning and turning in the widening gyre

The falcon cannot hear the falconer;

Things fall apart; the centre cannot hold;

Mere anarchy is loosed upon the world . . .

—William Butler Yeats (1865-1939)

We need to build a new foundation for 21st-century medicine. The architecture for 20th-century organ-system medicine was not designed to accommodate both the robustness of traditional medical principles and wisdom and the riches that have poured from the biomolecular sciences in the last half-century. The 21st century heralds the entrance into the life sciences of the systems-biology model that has been evolving rapidly over the last 20 years,¹ compelling us to address the notion of pervasive networks that link the mechanisms of both health and disease: everything is connected to everything, in a coherent wholeness.* If we look and listen, we can perceive everywhere a continuous dynamic dance in which the various elements never stand still or exist in solitude.²⁻⁴ The search for one-gene-one-disease answers has given way to concepts of gene networks and bidirectional epigenetic vectors that sum to phenotypic expressions of health and disease. The answer to the quantum mechanics EPR Paradox⁵ (Einstein-Podolsky-Rosen, 1935) has arrived: there is experimental proof^{6,7} that the unfathomable uncertainty of the behavior of electrons is real (God apparently does play dice),⁸ and uncertainty and quantum phenomena are now foundational concepts that must be accommodated in our scientific and medical principles and practices.^{7,9,10(pp51-52)}

Building a new structure requires conceptual blueprints with clear foundations. When the primary morbidities were infectious diseases and trauma, the design theme was simple: “See the clinician when you are broken, and he/she will make a diagnosis based on the organ system most affected; you will be treated with a pharmacological or surgical intervention for your

infection or injuries.” Unfortunately, the job of medicine is no longer—if it ever truly was—that simple. Clinicians and medical educators today face the daunting challenge of multiple comorbid conditions presenting as chronic, complex illnesses in need of a comprehensive methodology for both clinical medicine and medical education—in a phrase, a new architecture.^{11,12}

This new “medical house” requires a many-storied construction with a firm and enduring foundation to support the complex flow of information traffic through the seemingly infinite rooms revealed by the creative and innovative blending of science and art; history and modernism; body, mind, and spirit that shape medicine today. This architecture also needs a theme, a Louis Sullivan–like representation of how form follows function¹³: a theme that reflects the limitless dimensionality of the human organism afloat in an equally diverse and unique environmental context.^{14(pp44-46)} That theme is coherence.

We are still relying on the blueprints of the past; we have a patchwork strategy that “cannot hold.”¹⁵ We have not constructed a personalized network medicine¹⁶ or a systems medicine that is congruent with the wholeness of the systems-biology perspective. Dean Ornish, MD, provided intimations of what systems medicine will look like when his team began to publish its results of treating patients with atherosclerotic heart disease (ASHD) with a whole-systems “lifestyle medicine” approach.^{17,18} Before his elegant research reports, practitioners dealing with the reported epidemic of cardiovascular disease in the second half of the 20th century were narrowly focused on an organ-system model, primarily applying statins to the epidemic of ASHD. Pharma had entered the fray with competitive single (new-to-nature) molecules that disrupted the metabolic flow of cholesterol through its multiple pathways. From the original findings of the lipid-lowering efficacy of Chinese red-yeast rice,¹⁹ a multibillion-dollar industry emerged (\$21.5 billion in 2004 alone for noninstitutionalized adults in the United States²⁰). Activity centered on the ability of these new molecules to inhibit 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase,

*From Rollin McCraty’s article in this issue of *ATHM*: “Coherence implies order, structure, harmony and alignment within and amongst systems—whether in atoms, organisms, social groups, planets, or galaxies. Thus every whole has a relationship with and is a part of a greater whole, which is a part of something greater again.”

an enzyme that catalyzes the rate-limiting step for cholesterol formation in the liver and other tissues, thereby reducing cholesterol content in hepatocytes and other cells.^{21,22} Soon a large family of statins²³⁻²⁷ flooded the marketplace, vying for share.

There have been warnings regarding the clinical and metabolic side effects of these products,²⁸⁻³⁰ but because the primary and singular endpoint being tracked was reduced mortality from ASHD, these warnings went unheeded. In fact, the call for an over-the-counter polypill³¹ with a statin as a central member for prevention of ASHD was widely disseminated in spite of emerging information regarding side effects. The evidence apparently seemed clear to the cardiology community that the benefit of longer life outweighed any reduced quality of life that might be associated with cognitive, hepatic, musculoskeletal, and mitochondrial dysfunctions. Or as Catherine Willner, MD, a neurologist formerly on staff in the field of dementia at the Mayo Clinic has stated, “the cardiologists’ patients may live longer, but they won’t know it.”

From the perspective of more than a decade of experience, Dr Ornish pointed out in his 2002 review article “Statins and the Soul of Medicine” that we have shed our role of being physicians and healers, abandoning our patients as they wrestle with the difficult challenges inherent in major diet and lifestyle changes, acquiescing to the role of technicians who follow algorithms that end with treatment protocols based on pharmacology rather than personalized, whole-person approaches.³² In 2001, Dr Ornish and his team again applied a whole-systems “lifestyle medicine” approach to another common malady, prostate cancer. The outcome was similar and equally as startling; not only was remediation substantial and with fewer side effects than standard allopathic treatments, but gene modification connected to the specific lifestyle changes was demonstrated.^{33,34} In 2009, Dr Ornish, along with Mark Hyman, MD, and Michael Roizen, MD, challenged the 20th-century allopathic model (Dx followed by Rx) in their seminal paper, “Lifestyle Medicine: Treating the Causes of Disease.”³⁵

A coherent system of medicine recognizes the warning signs of the inadequacy of the allopathic model and challenges the barrenness of this singular approach. Communication and understanding of the underlying mechanisms that cut across organ systems (and specialties) is essential to a coherent, systems-medicine approach.* Instead, contemporary medicine is characterized by an organ-system, specialist-dominated mindset, with information silos that are neither networked nor focused on the mechanisms that actually do underlie and explain the crosstalk between organ systems and the specific phenotypic expression of drug metabolism that we recognize as side effects.

This pervasive incoherence in the conventional medical model prompted a subset of concerned clinicians educated in the second half of the 20th century to start journeys of investigation into whole-systems approaches for managing the emerging epidemic of chronic, complex illness (including the growing epidemic of ASHD). Many turned to traditional whole systems such as traditional Chinese medicine, Ayurveda, naturopathic medicine, etc. The urge to construct a whole-systems approach also

inspired others to integrate the traditional principles underlying the origins of illness with the scientific breakthroughs in pathophysiological mechanisms of disease.³⁶ With the publication of the 1998 *JAMA* article that estimated that adverse drug reactions to “appropriately prescribed” medications represented the fourth to sixth leading cause of death in our hospitals,³⁷ the urgency of our need for a new, coherent, systems-medicine model increased.†

There are certain fundamental principles that are essential to both describe and clinically apply a coherent approach to medical care. For example:

1. Acknowledging the biochemical individuality of each human being, based on the concepts of genetic and environmental uniqueness³⁸⁻⁴⁰;
2. Incorporating a patient-centered rather than a disease-centered approach to treatment⁴¹;
3. Seeking a dynamic balance among the internal and external factors in a patient’s body, mind, and spirit^{42,43};
4. Addressing the web-like interconnections of internal physiological factors⁴⁴;
5. Identifying health as a positive vitality—not merely the absence of disease—and emphasizing those factors that encourage a vigorous physiology⁴⁵⁻⁴⁷;
6. Promoting organ reserve as a means of enhancing the health span, not just the life span, of each patient⁴⁷⁻⁵⁰; and
7. Recognizing that 21st-century medicine is a science-using profession.^{10(p32),51}

The first six principles are congruent with the principles inherent in most traditional, whole-systems disciplines. The last principle (number 7) distinguishes systems-medicine as a modern medical discipline—a science-using profession. A systems-medicine model rests on a conceptualization of health and illness as part of a continuum in which all components of the human biological system interact dynamically with the environment. These interactions produce patterns that change over time in individuals. To manage the complexity and uncertainty inherent in this approach (unique individual moving through a unique environment), practical models for obtaining and evaluating clinical information that leads to individualized, patient-centered therapies must be adapted. A science-based framework can provide the filtering and information-sorting system for the underlying mechanisms of health and disease that ride on top of these enduring principles.

*Synchronization between multiple systems. See <http://www.heartmath.org/research/science-of-the-heart.html>.

†The apologists for these findings seem to find solace in the mantra “Serious illnesses, serious medications, serious side effects.” It is a numbing rationalization that diminishes the aspirations inherent to the healing professions and our commitment to *primum non nocere* (first do no harm). We should not be the apologists for a seriously flawed system but leaders in constructing a new, personalized, whole-systems medicine model that can address the need for comprehensive evaluation and treatment for chronic, complex medical problems.

In this issue of *Alternative Therapies in Health and Medicine*, Rollin McCraty, PhD, describes the science and clinical application of a coherent system for evaluation and treatment that effectively weaves through the autonomic system, using the heart rate variability frequency (HRV) biomarker as a surrogate for autonomic health.⁵² The ramifications for successful, translational clinical applications of the bench science that underpins HeartMath are profound. In Dr McCraty's article, he has aptly covered the more than 30 years of basic science and clinical research that provide fundamental explanations of the underlying mechanisms for phenomena that have puzzled many of us who have attempted to create a unified theory for both health and disease. His article is a true tour de force in its simplicity and appeal to intuitive correctness, but what may go underappreciated by the reader are the stringent science and the rigorous laboratory efforts that have enabled the author to identify this primary leverage point for achieving autonomic equipoise and a defining quality of living systems.

In a coherent system, all parts are holographic in nature and include feedback pathways that reflect the web-like processes of human biology in its broadest sense. The central theme of coherence, balanced against the countervailing forces that create dissonance within a system, provides a working hypothesis for further clinical research and for the construction of a more complete architecture for clinical practice that can comprehensively address the chronic, complex illnesses that are characteristic of the 21st century.

What is needed for the 21st century is a dynamic and coherent approach to assessing, preventing, and treating complex, chronic disease. Clinicians are faced with the identification and amelioration of dysfunctions in the physiology and biochemistry of the human body and human psyche as a primary method of improving patient health. This model of practice emphasizes that chronic disease is almost always preceded by a period of declining function in one or more of the body's organizing systems. Returning patients to health requires reversing (or substantially improving) the specific dysfunctions that have contributed to the disease state. Those dysfunctions are, for each of us, the result of lifelong interactions among our environment, our lifestyle, our belief systems, and our genetic predispositions.⁵³ Each patient, therefore, represents a unique, complex, and interwoven set of influences on intrinsic functionality that set the stage for the development of disease and/or the maintenance of health. A coherent systems-medicine approach encompasses the science and art of detecting and reversing alterations in function that clearly can move a patient toward chronic disease over the course of a lifetime. This is a model of patient care that seeks to identify underlying chronic dysfunctions associated with altered physiological processes and to maximize functionality at all levels of body, mind, and spirit.

Using the basic principles of coherence throughout the system, integration of diverse assessment and treatment tools and strategies based on this new model can be achieved. Additionally, we must learn to emphasize the importance of pattern recogni-

tion as a uniquely valuable clinical skill and sustain an unwavering focus on the healing partnership between clinician and patient. Together, these competencies create opportunities for experience, education, information, and intention to produce insight and change. We can create a paradigm shift that encompasses the uniqueness of each person, deriving probabilities and possibilities that are much more clinically meaningful.^{14(pp61-79)}

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