

# TRANSLATIONAL HEALTH AND WELLNESS

Paula J. Nenn, MD; Eugene Vaisberg

**Paula J. Nenn, MD, is medical director and Eugene Vaisberg is founder and chief executive officer at Optimal Health and Prevention Research Foundation, San Diego, California.**  
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*Corresponding author: Paula J. Nenn, MD*  
*E-mail address: Paula.Nenn@OptimalHealth.org*

**T**he need for a new health paradigm is irrefutable and well documented. The ever increasing number of complex chronic diseases that cannot be managed by the “pill for an ill” model of traditional health care has necessitated a medical paradigm that deals with the underlying causes of complex chronic diseases instead of the symptoms they manifest. A systems biology approach to medicine adopts the abundant scientific evidence that the human body operates through a web of interconnected systems, not as individual organs or organ systems working alone and independent of one another. Consider life as a tree, where the branches represent different organs and their corresponding specialties of medicine (eg, cardiology, pulmonology, psychiatry). These branches and specialties operate largely independently of one other in the current medical model, yet all of the branches are joined together at the trunk of the tree. Functional medicine addresses the state of the “trunk,” recognizing that there are core, unifying imbalances that are common to many chronic diseases, such as inflammation (Figure).<sup>1</sup>

We hypothesize that there are seven “roots” to the tree of life, seven fundamental necessities to thrive. These are outlined in our modified functional medicine tree as follows:

1. micro- and macronutrition, air and water;
2. physical fitness and structural balance;
3. micro-environmental protection and detoxification;
4. sleep, restoration, and circadian rhythm;
5. energy field balance;
6. psychological (mental and emotional) balance and resilience to stress; and
7. spiritual and social connections/meaning and purpose.

There has been a wealth of research on each individual “root,” including the ancient healing traditions, for which thousands of years of observational data are now being complemented by efficacy trials in the 21st century. In the same way that science is translated “from bench side to bedside” in traditional

medical practice, can the research in integrated functional medicine be translated into a model for assessing health and wellness? We hypothesize that it can. We also think that this approach provides a framework for health optimization, where health is a positive entity, not just absence of disease, as quantified by the World Health Organization.<sup>2</sup>

These tools have given us a way to assess nutritional status at the functional level. We have laboratory tests, such as urinary organic acids, omega index, and vitamin levels, that can now give us a far more detailed picture and understanding of nutrition at the cellular level. If we start to integrate some of the more rigorously understood single nucleotide polymorphisms (SNPs), such as MTHFR alongside information such as family history, it is possible to see how we could gain a highly personalized understanding of what an individual’s nutritional requirements for disease prevention and health optimization might look like. This personalization goes far beyond a “healthy” diet and generic multivitamin dosing and may start to tease out explanations for the disparity of results seen in longitudinal studies, such as the recent study that showed an increased incidence of breast cancer in users of multivitamins.<sup>3</sup>

Much has been published about physical exercise and structural balance, but science has provided us with an emerging understanding of just how and why these are important for health. Lack of physical activity is a modifiable risk factor for cardiovascular disease, as well as a host of other chronic diseases, but people remain confused about how much and what types of exercise are best for them.<sup>4</sup> Groups have addressed the genetics of exercise, hypothesizing that an individual’s genetic polymorphisms can determine what metabolic-equivalent task intensity they need to reach for weight reduction,<sup>5</sup> and Ayurvedic typing allows suggestions of what time of day and type of exercise may be best for an individual.<sup>6,7</sup> Integration and translation of these and other emerging theories with measures such as VO<sub>2</sub> max and accelerometer monitoring could, therefore, provide a person with knowledge of what physical and structural recommendations are optimal for him or her personally.

We are being bombarded with environmental exposure to toxins, the load of which is almost so great that we can consider everyone affected; indeed, people arrive into the world on the day they are born already exposed to a spectrum of environmental pollutants. Studies have shown the presence of pollutants in cord blood,<sup>8,9</sup> and others have shown developmental disadvantages correlated with the total cord blood load.<sup>10</sup> Other studies have shown an increased susceptibility in infants with known

polymorphisms in the genes of the cytochrome P450 pathway,<sup>11</sup> yet we can be heartened by evidence that the administration of antioxidants to the mother can reduce toxic burden in the newborn.<sup>12</sup> The “gold standard” test for toxic load in adults is fat biopsy,<sup>13</sup> but this is not practical or clinically useful for health and wellness research; it may be better to assume everyone is loaded with pollutants and identify those people who are particularly susceptible due to genetic polymorphisms in their detoxification pathways. Advice can be given to all people with regard to organic food, mercury in fish, and air and water pollution in the area in which they live, but some people have to be particularly strict in following this advice due to their genetic profile. The same approach can be applied to more “familiar” toxins, namely caffeine and alcohol. We have identified the SNPs for both caffeine<sup>14</sup> and alcohol<sup>15</sup> metabolism, and there may be merit in translating this hypothesis into personalized recommendations for optimal dosing. Indeed, a recent study showed that there was a relationship between coffee intake and coronary heart disease once the polymorphism associated with a slower rate of caffeine metabolism was factored in.<sup>16</sup>

The relationship between sleep and morbidity—in particular, cardio-metabolic pathology—is well documented,<sup>17</sup> yet we know that the majority of Americans sleep less than the optimal 7 to 9 hours per night.<sup>18</sup> Despite this, we rarely see sleep addressed in health promotion and disease prevention programs. There are multiple sleep assessment questionnaires that have been validated,<sup>19,21</sup> and we have well validated biomarkers such as neck circumference<sup>22</sup> and overnight pulse oximetry<sup>23</sup> to screen people who would benefit from further sleep studies for conditions such as sleep apnea. There is even a promising, though early, body of evidence that suggests a genetic susceptibility to sleep deprivation, which may give people very practical advice for how to physiologically adapt to not having enough sleep.<sup>24</sup>

In the 21st century, we are surrounded by people applying the principals of energy medicine every day, although few realize that they are doing it. There has been an explosion of yoga studios, tai chi classes, and qigong groups in Western countries. Many find peace, as well as restoration and healing in these systems, although not all realize that they are moving energy.

Despite the fact that the assessment of an individual’s energy balance remains in the skilled hands of practitioners, the applicability as an intervention that people can do in a self-care model for multiple symptoms and conditions as well as a modality for health optimization is irrefutable and widely documented.

Some of the benefits of these energy techniques come from the breathing exercises, being “in the moment,” and the concept of coherence. Meditation encompasses both breathing techniques and mindfulness. Meditation has been shown to be a highly effective intervention for conditions such as hypertension,<sup>25</sup> stress reduction,<sup>26</sup> pain control,<sup>27</sup> and even inflammatory bowel disease,<sup>28</sup> to name but a few. It can be hypothesized that the benefits seen from meditation may be due to the physiological and psychological benefits known to be associated from being in a state of coherence.

Coherence is a state of synchronization, entrainment, and resonance that is correlated with increased balance in the autonomic nervous system with a shift toward parasympathetic activity, heart-brain synchronization, and entrainment in other physiological systems and is measured by looking at heart rate variability (HRV).<sup>29</sup> HRV is, therefore, a noninvasive way of assessing the autonomic nervous system and brain-heart connection, which, when integrated with well-

established, validated questionnaires alongside newer functional assessments such as salivary cortisol,<sup>30</sup> allostatic load,<sup>31</sup> and genetic predispositions,<sup>32,33</sup> can provide a comprehensive assessment of an individual’s stress response and resiliency.

We know that the probability of morbidity increases significantly after retirement and the death of a spouse,<sup>34</sup> that volunteering and gratitude are associated with better health outcomes,<sup>35,36</sup> and that people live longer when there are three generations in the house.<sup>37</sup> We know that you are more likely to be in a coherent state when you are with someone you love, even if that is your dog.<sup>38</sup> A person can live a life without meaning, purpose, and connection, and it can be as detrimental to his or her health as poor diet, stress, and lack of physical activity.<sup>39</sup> There are enough validated questionnaires to assess these things,<sup>40,41</sup> and recommendations can be made independent of religious belief.

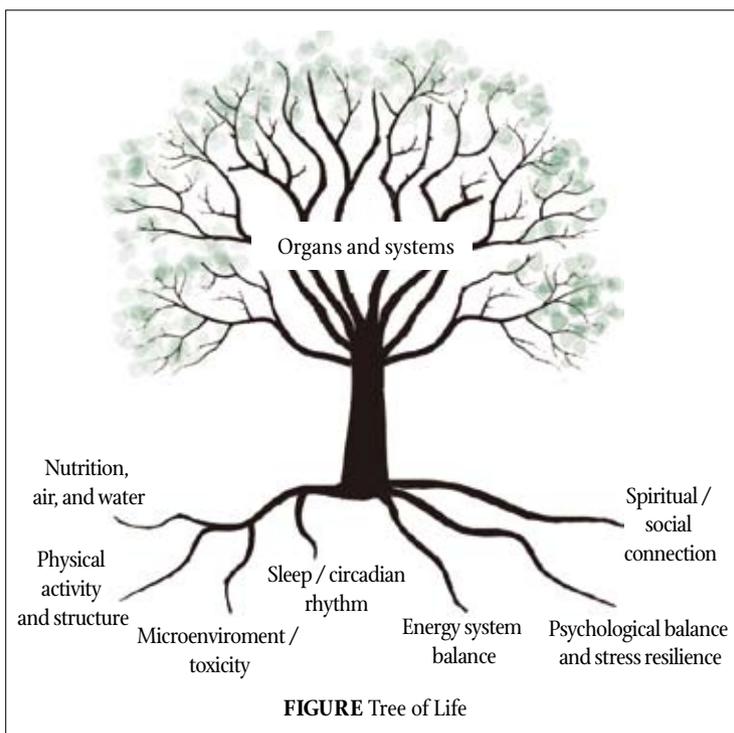


FIGURE Tree of Life

Of course, there is multiple interplay among these “roots,” but this concept provides a framework for thinking about health assessment and when integrated with functional assessment of the state of the “trunk” and what type of ‘tree’ an individual is (by Myers-Briggs type and other, eg, Ayurvedic, assessments), can give the Personalized, Predictive, Preventive, Participatory, or “P4,”<sup>42</sup> recommendations that form the foundations of a new health paradigm.

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