

Redefining Healthcare: Towards a Shift in the Medical Paradigm

By Stanley Skollar, M.D.

THE NATURE OF THE HEALTHCARE CRISIS

In the recent presidential campaign, Americans heard much discussion and debate regarding the nature of our healthcare crisis. Much of the focus was on the economic and political aspects of the problem. The general consensus is that political action is required but the economics of the problem is further complicated by the global financial crisis. We are told that the costs of the Medicare program are unsustainable. According to the Congressional Budget office, the total national spending on healthcare has more than doubled in the last 30 years. The projections are, that by the year 2035, healthcare will require more than 30% of our total GDP, 40% by 2060 and 50% by 2082! ¹ It should be noted that this report also points out that more expensive healthcare does not necessarily mean better quality care. It would appear that our conventional medical structure is on a collision course with bankruptcy!

According to the Center for Disease Control (CDC), 70% of all deaths in the United States are accounted for by Chronic Degenerative Diseases. The medical care costs for people with chronic degenerative diseases account for more than 75% of our nations two trillion plus dollars expense for all medical care! ²

As a nation we spend more in total dollars as well as per capita dollars than any other country in the world. The U.S. spends \$6000 per capita on healthcare as opposed to all the countries of the European Union which spend \$2500.³ Despite these facts, we have been ranked 37th in overall performance by the World Health organization in the year 2000 and 72nd in overall level of health.⁴ According to a 2008 study in the British medical journal, the U.S. ranks last in the quality of healthcare among developed countries.⁵ The CIA World Factbook ranked the U.S. 41st in the world for lowest infant mortality, 46th for highest life expectancy and a recent study found that preventable deaths declined more slowly in the U.S. than in 18 other industrialized countries.^{6, 7}

The issues that are responsible for this unfortunate situation are many and complex and require a comprehensive review of our entire healthcare delivery system. What we need are solutions that can bring together the political, economic and scientific forces, each of which has a stake in the resolution of this crisis. Above all, any solution must ensure that the level of healthcare provided to all our citizens, must be improved. It is the purpose of this paper to address the scientific piece of the puzzle and by redefining what we mean by healthcare, to provide strategies that can be added to our existing disease management paradigm that will improve how we address the problem of chronic degenerative disease.

THE NATURE OF CHRONIC DEGENERATIVE DISEASE:

The fact that 75% of our national health expense goes to the care of people with chronic degenerative diseases should dictate that we re-examine our approach to these age related conditions. There are four major categories that comprise the chronic degenerative diseases. Cardiovascular disease which includes heart disease, stroke and peripheral vascular disease is the number one cause of death in the U.S, closely followed by cancer as the number two cause of death. Diabetes has become almost epidemic with an incidence that has doubled in the last ten years.⁸ The last category are the neurodegenerative diseases which include Alzheimer's and Parkinsons disease, ALS and a host of others for which there are no effective medical treatments. Due to the fact that the over 65 age group is the most rapidly growing demographic in our society, the incidence of Alzheimers is projected to double by mid century.⁹ Unless we are are able to implement effective preventive measures, we may be facing a catastrophic health crisis in the next several decades.

The allopathic treatment model has long been the cornerstone of orthodox medical treatment. It has drawn support for over a century from a theory published in the late 1800's by the preeminent scientific authority of that time, Louis Pasteur. Pasteur, a chemist and biologist was able to forward the understanding of infectious diseases by demonstrating the presence of microorganisms as the agents of infection. He is also credited with having invented pasteurization.¹⁰ He generalized his discovery of microscopic agents of infection to attribute the cause of all illness to these germs. His name is most associated with this "Germ Theory" of disease. Although Pasteur is reported to have acknowledged on his death bed, "*the microbes are nothing, it is the terrain,*" germ theory became the major rationale to support the allopathic approach and has been a major influence in medical thinking for the past 100 years.¹¹ Websters dictionary defines allopathy (from the Greek) as "*a method of medical practice which seeks to cure disease by the production of a condition of the system either different from or opposite to the*

condition produced by the disease". In other words, it is an approach of antagonism. Allopathic medicine has seen its greatest success in acute self limited disease states such as infectious diseases where causation may be a single infecting agent. This magic bullet approach, however does not lend itself well to conditions that have complex multifactorial causation, which is the nature of chronic degenerative disease.

The weakness of allopathy in these conditions lies in the fact that removing the symptoms of a disease does not necessarily remove the cause. The use of polypharmacy which is very common in the defacto treatment of people who carry multiple diagnoses, often creates more problems than it removes. Clearly, if you have heart disease, are diabetic and suffer with arthritis, a not uncommon constellation, you would be better served by using substances whose molecular structure is native to the body, would not evoke a host of side effects and would address cause with symptom relief being a welcome secondary consequence.

To accomplish the goal set out by the title of this paper, we will have to challenge some of the most established tenets of our existing medical paradigm. We will question the absoluteness of the "diagnosis". We will redefine our understanding of healthcare and we will introduce the concept of one treatment approach for many conditions.

THE EXISTING MEDICAL PARADIGM:

The reality of clinical medical practice is that health and disease are treated as if they were step functions. If one is on the step, one is sick and if one is off the step, one is healthy (normal). The dividing line becomes the holy grail of medicine, the "diagnosis." How is a diagnosis determined? In order to qualify a diagnosis, a requisite number of both signs and symptoms must be reached. Signs are findings produced by physical examination and laboratory testing. Symptoms are the subjective experience described by the patient. If you attain the minimal threshold numbers of both signs and symptoms, you are awarded with a diagnosis which is often necessary for insurance to reimburse for your treatment. If you fall short of the requisite numbers, you have no documentable disease and are put into the category of "normal". While there may be some exaggeration in this description, it does describe the practical reality of this paradigm. The fallacy in this system becomes obvious when given thoughtful consideration. Health and disease are not separated by some arbitrary threshold point, but rather, can be viewed as existing on a straight line continuum. On this Healthline, one end is represented by optimal health and the other by death. (see *fig. 1 below*) Most of us lie somewhere in the middle and a more rational approach would be to determine where we are on this continuum and design strategies to move our position closer to optimal health.

We need, then, to examine more closely the nature of the diagnosis. Implicit in the importance assigned to the necessity of correct diagnosis, is the premise that by identifying the required numbers of signs and symptoms, you are naming a disease which is discrete, unique and totally distinct from any other named disease. The diagnosis then becomes the prime dictator of the ensuing treatment which usually involves one or more drugs which target specific symptoms.



Figure 1

This premise and the treatment strategies it engenders are thrown into serious question by the emerging molecular science which describes phenomena that are at root cause for both aging and chronic degenerative disease.¹² The facts suggest that all chronic degenerative diseases share the exact same molecular pathology, that this pathology exists in the pre-diagnosis state and is the major contributor to the end stage diagnosis. These facts should give us pause to re-examine the manner in which we understand and respond to these challenges.

THE COMMON MOLECULAR BIOLOGY OF CHRONIC DEGENERATIVE DISEASES

The past two decades have provided an explosion of information delineating the understanding of the molecular pathology common to both normal aging and chronic degenerative disease. This pathology includes; oxidative stress,¹³ inflammation,¹⁴ glycation¹⁵ and defects in methylation.¹⁶ Additional factors include declining levels of hormones and neurotransmitters, essential fatty acid imbalances and dysinsulinemia. The consequences of these factors include disruption of mitochondrial energetics, reduced immune function, DNA mutations and dysfunctional calcium dynamics. Together, in varying degrees of vector force, these are found in virtually all chronic degenerative diseases.

It is not the purpose of this paper to provide an exhaustive review of all these factors but it is useful to provide a brief description to enable the reader to better understand the paradigm shift which will be proposed.

■ Oxidative Stress

Denham Harmon proposed the free radical theory of aging in the late sixties, drawing a parallel between the effects of ionizing radiation which generates so called "free radical molecules" and the creation of these same unstable molecules in the normal course of metabolism.¹³ His thesis was that the accumulation of damage done by these free radicals over time, is a major

contributor to both aging and degenerative disease. In the simplest terms, a free radical is a molecule that has one or more unpaired electrons which creates an unbalanced electrical charge. Free radicals seek to steal an electron from a nearby stable molecule, setting off a chain reaction whereby the now destabilized molecule does likewise to its neighbor, creating a destructive cascade. This cascade may become destructive of critical protein structures, DNA and lipids, creating a pathway to dysfunction and disease. We humans are designed, as is our system of government, to have built in checks and balances. To balance the generation of free radicals, we have both endogenous anti-oxidant enzyme systems as well as exogenous anti-oxidant nutrients. Many research papers have described in detail the role of oxidative stress in the development of degenerative disease.^{17, 18, 19, 20} According to Nair et al in a paper published in the journal, *Mutagenesis* (2003); *“Understanding the common insult of oxidative stress to the different target molecules of DNA, lipids and proteins in different tissues in the context of different diseases, illustrates that there are common pathways in the natural history of a number of chronic degenerative diseases. Understanding these underlying pathways and having appropriate biomarkers would provide a rationale for developing preventive measures.”*¹²

■ Inflammation

Inflammation, like oxidation, serves a vital role in the preservation of health. In this sense these processes are double edged swords and are governed by an overriding principle of human physiochemistry, that of balance. Inflammation plays a major role in the defense against the dangers of invasion by bacteria, viruses, toxins or cancer cells. Under such conditions, certain chemicals known as pro-inflammatory cytokines are signaling molecules which trigger the inflammatory response. When the invaders have been destroyed and healing has proceeded, the normal course of action would dictate that anti-inflammatory cytokines would assume dominance and signal the cooling down of the inflammatory state.²¹ When inflammation is sustained at a high level over time, it becomes a destructive force contributing to cellular degeneration, This can happen as a result of poor dietary choices, environmental toxins or nutritional deficiencies, especially the common imbalance between omega 6 and omega 3 fatty acids.

THE OXIDATIVE STRESS INFLAMMATION CASCADE

It has been shown in research studies that free radicals, also known as “reactive oxygen species” (ROS) can stimulate signaling factors which turn on the arachidonic acid cascade.²² Arachidonic acid is oxygenated via two major pathways, the Cox2 pathway and the 5 Lipooxygenase pathway, the end results of which are highly pro-inflammatory prostaglandin E2 and Leukotriene B4. In the course of these reactions there is further generation of more ROS, thus a cascading of potentially destructive molecules continues to feed off one another contributing to a degenerative progression.

■ Glycation

*“Glycation is the non enzymatic addition or insertion of sugar molecules into proteins, DNA and lipids that occurs in a biological environment.”*²³ It has been known for 100 years that if you heat proteins in the presence of sugars, you form new cross linked chemical bonds. What has been a more recent discovery is that this reaction damages these proteins, DNA and lipids in ways that are felt to be of significance in the aging process and in the generation of chronic degenerative disease. These glycated proteins progress to form what are known as Advanced Glycation end products (AGE’s) on the surface of these proteins. A cascading effect is created as these AGE’s further react with adjacent proteins forming more cross links and producing more free radical activity as well as promoting inflammation. This cross linking process contributes to a stiffening and loss of elasticity of tissues and may also cause DNA mutations via the glycation of nucleic acids. Glycation has become accepted as a major contributor to biological aging as well as degenerative disease.²⁴

■ Methylation Defects

Methylation is the biochemical process in which certain molecules transfer or donate a methyl group (CH3) to other molecules. Larger molecules such as methionine and S-adenosyl-methionine (SAME) become the methyl donors and they transfer their methyl group to methyl acceptors which are smaller molecules. This is done with the necessary participation of so called methyl carriers which are primarily folic acid and vitamin B12. Methyl acceptors include DNA, nucleic acids, proteins, phospholipids and biological amines. If methylation is dysfunctional these methyl acceptors do not function well and cellular damage can be the result. Methylation is a ubiquitous process occurring in every cell so that tissues of any type can be impacted. A particular area of concern is DNA where abnormal methylation can affect gene expression and lead to the development of cancer. Methylation status is easily measured by determination of the blood level of homocysteine. If methylation is defective then methionine having donated its methyl group is not efficiently remethylated and it remains as homocysteine. Elevated levels of homocysteine have been determined to be a risk factor for heart disease and a growing number of other conditions.²⁵

CHANGE: THE BATTLEGROUND

The distinction between aging and the diseases of aging has become a political straw man. Aging is a complex multifactorial physiochemical process that begins at the molecular level, extends to the cellular level and to tissue, organ and organ system levels. The FDA has taken the position that aging is not a disease and therefore can not be the object of research directed towards treatment. The reality, based on the science that has emerged in the last two decades is that the molecular pathology of

aging and the molecular pathology of degenerative disease are identical and distinguished only by the level of degree. The FDA, by its own admission has acknowledged its inability to keep up with the explosion of basic science research.²⁶ Countless research studies attest to the fact the molecular processes of oxidation, inflammation, glycation and defective methylation are major factors in the biology of aging.^{20, 27-32} Countless other studies attest to the fact that these same molecular processes are accepted as major underpinnings of cardiovascular disease, cancer, diabetes and the neurodegenerative diseases.^{17, 19, 33-42} The lack of recognition of these facts and implementation of effective treatment strategies has many causes that reflect economic and political issues in our society but have little to do with scientific truth.

There is another obstacle to change that has historically affected all of our institutions whether in the arts or sciences. This phenomenon has to do with resistance to change by established institutions. This phenomenon is best described by the term, latency period. The latency period is the time between the emergence of new information, its acceptance and finally, its transference into actual practice. The consequences of the latency period are nowhere more significant than in the field of medicine, where this lag time has often been more than 20 years, and where the issues hanging in the balance are those of life and death.

The combination of the traditional medical paradigm, dominated by a politically and economically powerful pharmaceutical industry and the delay in translating new findings into clinical practice have blocked what is dictated by the reality of the science. Multifactorial diseases which develop slowly over long periods of time, invite a multi- targeted approach, put into place before a diagnosis can be made. This approach would require a paradigm shift from our disease management model which treats symptoms to a preventive approach directed at root causation, which affords the possibility of a cure. We need to redefine what we accept as healthcare and make the necessary paradigm shift, hopefully with the ability to persuade the political and economic forces that this is an important step towards addressing the crisis in our healthcare system.

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