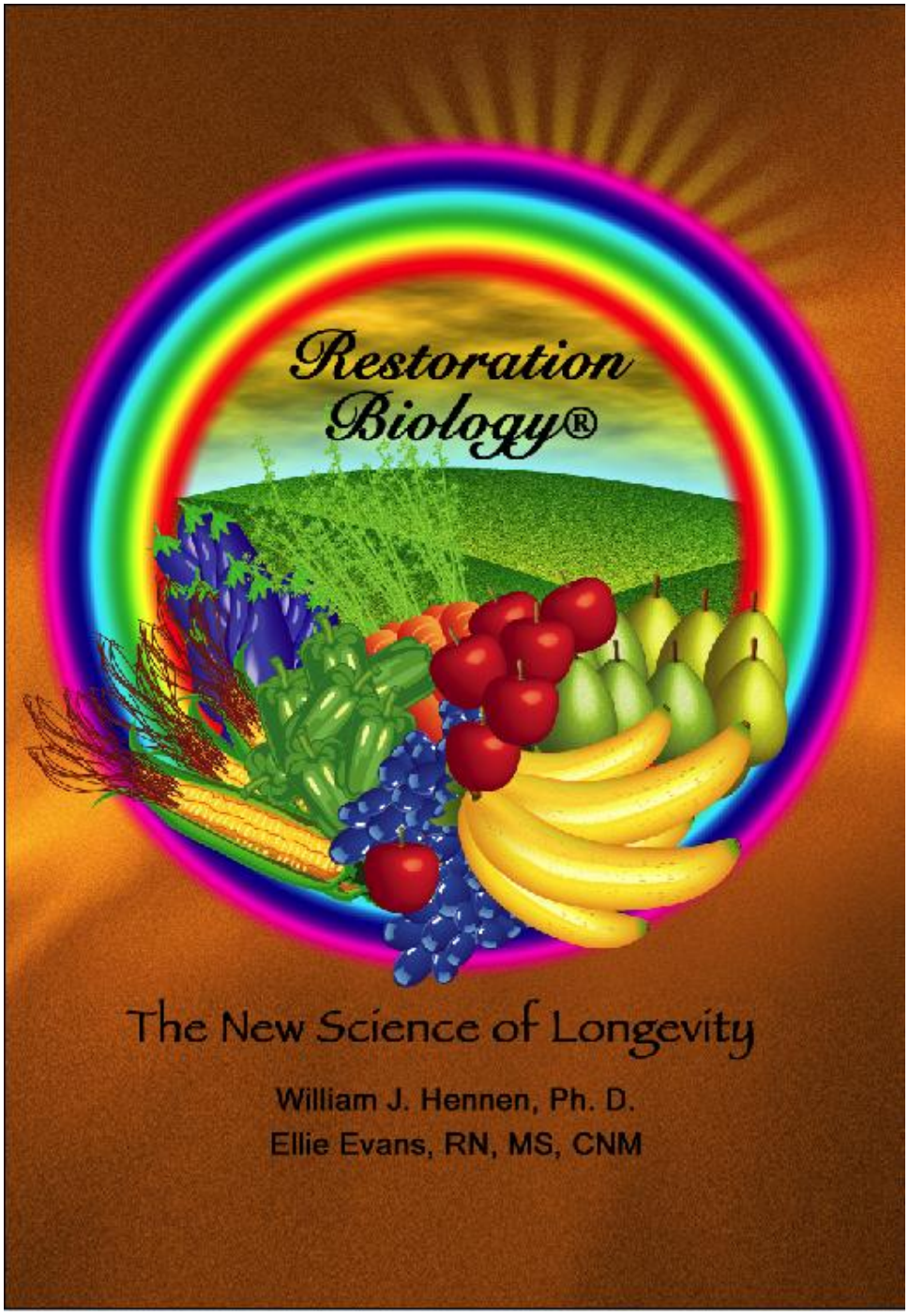
Restoration Biology®
The New Science of Longevity
William J. Hennen, Ph. D.
Ellie Evans, RN, MS, CNM

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Acknowledgement

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We also express our appreciation to Ron Williams, President of ForeverGreen, for his support during the development of the Restoration Biology philosophies and products, and his contributions to the Principles of Health discussed in Chapter 5.

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We express gratitude to all others who have contributed to the ideas contained in this book. We hope that you will enjoy and be benefited by reading it.

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Table of Contents

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Preface

Restoration Biology® has been called a concept of hope because it demonstrates that **whatever our state of health or life circumstances may be today** — whether as a result of genetics, fate, or even the poor choices we've made in the past — **they do not have to irrevocably dictate our future**. We have the ability, through our present and future choices, to make a very significant difference in both our longevity and our quality of life.

How can this be? Consider this example. As adult human beings, we each produce billions of new cells every day for the purpose of replacing the cells that are naturally completing their life cycles. What we choose to consume on any given day determines whether we replace those billions of cells (that will die that day) with healthier, more capable new cells, cells of equal integrity and ability to function, or cells with poorer ability to function. Over time, such choices will dramatically impact how we feel and how long we live.

This illustrated booklet provides a foundation for understanding the *Restoration Biology*® concept, how the basic processes of restoration take place at the varied levels of structure and function within the body, and how we can support and enhance our highest possible level of function at every age. The second half offers considerations and options regarding what to do and how to get started in your experience of *Restoration Biology®* — using selected Principles of Good Health as a framework for action.

We are wonderfully designed for ongoing restoration … and each new day that we so choose, we can make *Restoration Biology*® work for us to enhance our longevity and optimize our quality of life!

Chapter One
What is Restoration Biology?

Restoration Biology® *is an exciting new approach to seeking, discovering and using nutrients with the express purpose of supporting our bodies' abilities to self-restore, function at their highest potential, and support our highest possible quality of life.*

We're all familiar with the restoration of worn or damaged objects, broken relationships, even fire-scorched forests. It's the process of restoring them to their former better state or condition. Restoration can be needed and meaningful in every aspect of life, and it can sometimes result in an even higher-than-ever quality of being.

The word biology is also familiar and literally means the study of life. When we unite these two words in the concept of *Restoration Biology*® within the context of human health, it allows us to focus our attention on the processes within our bodies that are affected by our choices, and provides an exciting new approach to seeking, discovering and using nutrients with the express purpose of supporting our bodies' abilities to self-restore and function as they were designed to do.

With that in mind, and for the purpose of better understanding the concept of *Restoration Biology*® as it relates to human health, the words *restoration* and *biology* are defined as follows:

- *Restoration* is the process of renewal, revival or re-establishment of the body's healthy structure and/or function.[1]
- *Biology* is the branch of science *concerned with overall life processes* essential for, but not limited to, human growth, development, structure and function.[2,3]

Restoration Biology® offers a new way of looking at what we can do to help ourselves virtually roll back our bodies' functional or biological-age clocks to a healthier, more vibrant time. Your body doesn't know your chronological age or how old you are based on birthdays. It only knows and acts your biological age, which is your *real* age, based on your body's ability to function.

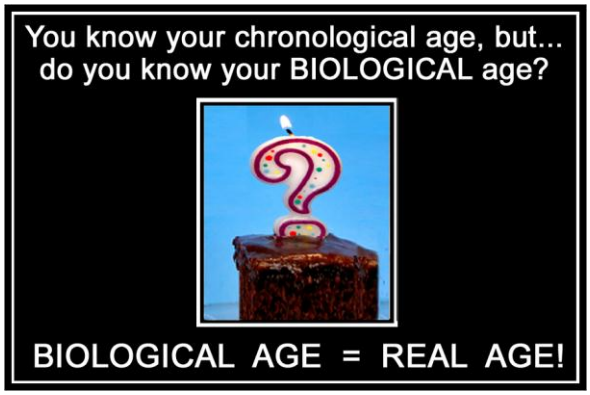


Illustration No. 1.1

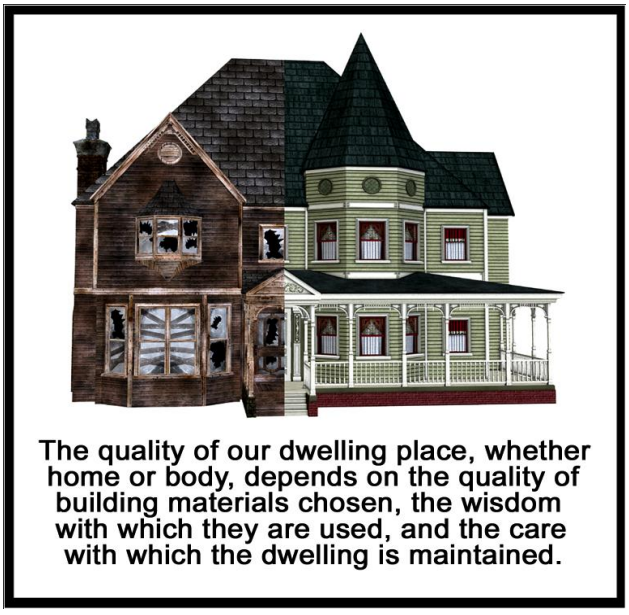
Illustration No. 1.2

A growing number of doctors, including TV's Dr. Oz, are showing people how their biological or real age compares to their chronological age. It's a wake-up call for many who learn they have a biologic age that's 20 years older than their birthday age. This growing health concern involves kids too, with a frightening number being found to have Type II diabetes, which until recently was known almost exclusively in adults. Of equal concern, youngsters are presenting symptoms of premature aging of their cardiovascular systems comparable to those of sick forty to fifty year olds. Did you know that today's parents are the first modern generation expected to live longer lives than their children? What can we do to reverse this trend? *Restoration biology*® offers a viable approach for every individual and family to change their health for the better by simply making better choices: *Restoration Biology*® When we give our bodies the quality nutrients they need, and practice overall health-supporting

behaviors, it will not only help us optimize our current biological age, but it will also support the body's ability to reverse health challenges and aging to varying degrees, and experience restoration of capabilities once thought to be lost forever. These processes are the foundation of *Restoration Biology*® being recognized as the *new science of longevity*.

Our bodies are designed to consume and use foods or nutrients to grow, strengthen, function effectively, self-heal, self-renew and reproduce. These vital life processes can be enhanced or sabotaged by many things. Examples would include the quality of food or nutrients we choose to consume, the purity or pollution of our environment, the degree of our exposure to (and ability to ward off) harmful microbes, our levels of stress, ability to rest, et cetera.

To visualize this, consider the impact of our personal health choices by comparing them to key choices in restoring a house. If we choose high quality materials, effective tools, and skilled construction techniques, we will likely end up with a house of both greater value and livability for years to come. On the other hand, if we choose poor quality materials, install



The quality of our dwelling place, whether home or body, depends on the quality of building materials chosen, the wisdom with which they are used, and the care with which the dwelling is maintained.

Illustration No. 1.3

them with ineffective tools and use haphazard construction techniques, we could end up with a worse situation than that which prompted the restoration in the first place.

Our bodies are our personal, unique dwellings constructed of lots of tiny cells. In fact, adult bodies have somewhere between 75-100 trillion cells. About 60 million of those are dying every minute, but the good news is that we are wonderfully designed to continually self-restore by replacing those cells day by day.

If we provide our bodies with the right high-quality nutrients, we can replace those millions of dying cells with even more capable new ones. When that happens, we can literally experience microscopic miracles by the minute! Healthier, more efficient cells will result in healthier, more efficient organs, which lead to more effective function of the body's many systems. Improved function at all these unseen levels results in the more easily noticed improvements in our abilities to do what we need and want to do, when and how we want to do them! This is *Restoration Biology* ® at the experiential level.

Illustration No. 1.4

On the flipside, if we choose to give our bodies "junk" nutrients, it's comparable to replacing our body's structural building blocks with the equivalent of cardboard. Beyond the fact that hunger will persist because the cells' needs aren't being met, the results will be low-functioning cells with poor integrity and shortened lives. As our cells lose their ability to function, so do our bodies, and we begin to age … period … no matter how old we are based on birthdays.

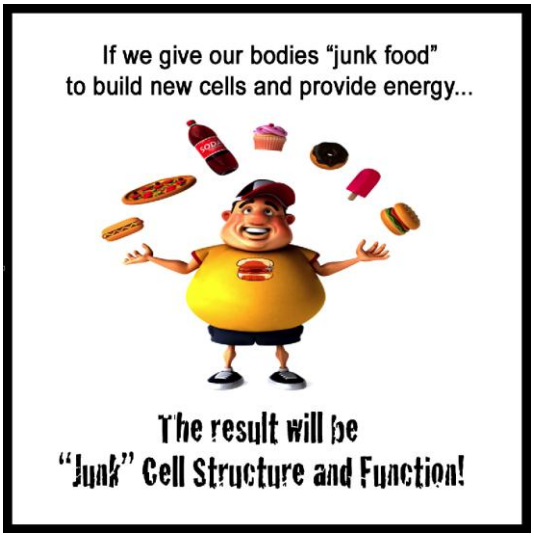


Illustration No. 1.5

The following chapters will provide and illustrate the guiding philosophies, principles and processes involved in *Restoration Biology*.® These are presented with the goal of providing a foundation for growing understanding of the impact our choices make in determining whether our bodies will experience steady (sometimes rapid) decline and aging, or enhanced restoration … and, in many instances, a virtual "rolling back" of our biological-age clocks.

Illustration No. 1.6

Chapter Two
Guiding Philosophies

Restoration Biology,® as the new science of longevity, involves taking a very different approach to how we look at health, aging, and choices that impact our ultimate quality of life at every age.

The first of four guiding philosophies we employ is to work within the context of **Reverence for Nature and Dedication to Science**.
This simply means we acknowledge that nature has been here for a very long time and has accomplished things that we don't fully understand, even with all the scientific research

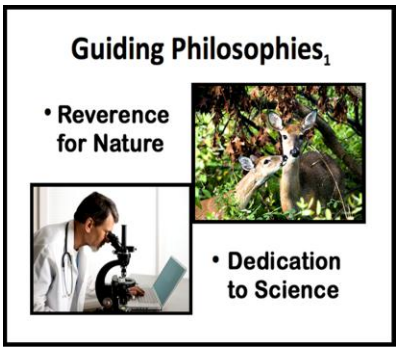


Illustration No. 2.1

that has been done. Nevertheless we know that by understanding nature through the efforts of science, we can maximize nature's ability to benefit us. Sir Francis Bacon adds an exclamation to that premise in his statement, "Nature, to be commanded, must be obeyed."

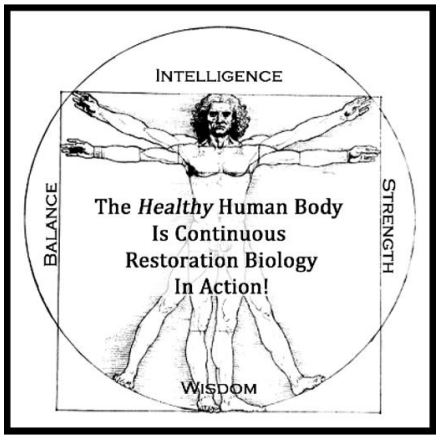


Illustration No. 2.2

DaVinci's *Vetruvian Man* was drawn to bring art and the science of geometry together. It also represents the wisdom, strength, intelligence and balance of the healthy human body in its design to continuously restore itself. In order to do this the body must have the right raw materials. Thus we search for and study nutrients that support the body's intelligence, strength, wisdom and balance.

When we provide optimal nutritional support of our bodies' natural abilities, they can then more effectively express their full potential for healthy, high-quality living.

Our next guiding philosophy or principle is: **The body was designed to be healthy**.

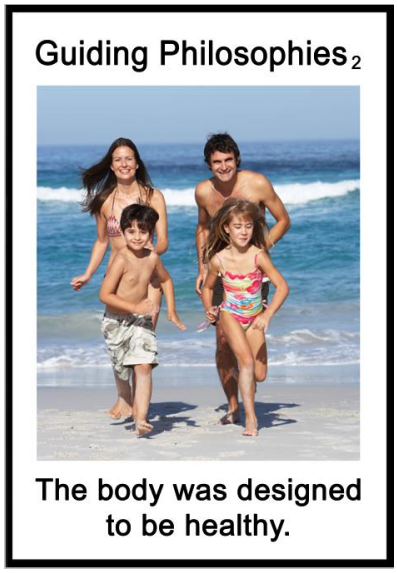


Illustration No. 2.3

This design includes an underlying ability of the "body" to seek and effectively use appropriate resources to keep itself healthy. It's important to note that our physical health is significantly affected by our overall well-being, which encompasses seeking and using resources to stay healthy mentally, emotionally, and spiritually as well.

We have the ability to heal from very significant assaults in all areas of our lives because, in addition to physical intelligence, we have mental and emotional intelligence as well. So, as we consider the body's health, we must consider the entire human being. If we accept the premise that our bodies are designed to be healthy and give them the right "input," then we can actively support our restorative processes and optimize our bodies' abilities to stay healthy.

The third guiding philosophy is: **Cells contain their own control mechanisms or intelligence.**

Currently, *cell biology* deals largely with the components within cells, and *systems biology* with how the components interact. *Whole-cell biology* gets little attention, but it's only when we look at the living cell as a whole…that wonderful realities emerge….[4]

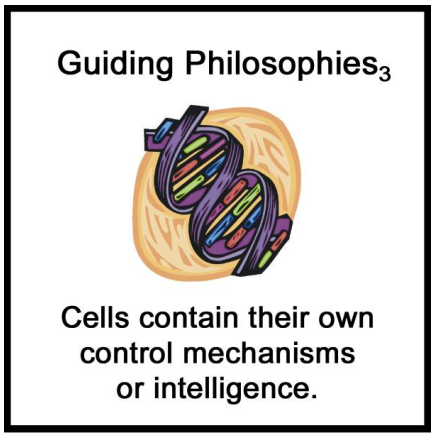


Illustration No. 2.4

Professor Guenter Albrecht-Buehler, PhD, of Northwestern University Medical School, has been considering the likelihood of, and researching, cell intelligence for more than two decades. He challenges the prevailing wisdom of modern biology that presents cells as immensely complex, but rigidly operating chemical machines. One of the reasons for his disbelief is the sheer size of the human body that cells build out of themselves. We humans are 30,000 times larger in length than are the cells from which we began.

Dr. Albrecht-Buehler suggests asking the builders of the Sears Tower in Chicago (*only* 300 times larger than the bodies of its architects) whether an architect that had been rigidly programmed to respond mechanically to the legions of surprise technical problems that occurred in the tower's construction could have built it! It couldn't have been done, of course, so imagine trying to build a structure 30,000 times larger (25 miles or 40+ km tall) with a rigid and mechanically operating robot![5]

Illustration 2.5

On a more practical level, Dr. Albrecht-Buehler wrote the following regarding the next likely quantum leap forward in medicine. "Our guess of the next stage may begin with the recognition that no physician in the history of humanity has ever healed a patient. Only the cells of the patient can heal the patient. Only cells know how to close wounds, understand what to do with insulin and how to destroy pathogens. The best a physician can do

is to move obstacles out of the way of cells (e.g. by surgery), supply materials and weapons to the cells (e.g. drugs and building blocks of life) and leave the fight against disease to the cells." [6]

If cells are intelligent, medical treatment may involve 'talking to cells' rather than to flood the organism with pharmaceuticals as we do today.[7] Guenter Albrecht-Buehler, Ph.D.

There is growing research to support Professor Buehler's statements. Though exploring that research is beyond the scope of this writing, please consider just a few of the behaviors of cells that are considered evidences of their intelligence.

1) Regarding movement: Cells control movement of every part of their bodies, it is not random. They detect objects and other cells by pulsating near-infrared signals and modify their movements accordingly. Some cells move in groups and actually enhance one another's movements.[8]

2) They have a language of their own and communicate with each other.[9,10]

3) They store memory and have the ability to both use it for improved future function, and to convey stored information not only from cell to cell within the body, but from one individual to another as well, as from mother to baby.[11,12,13]

4) They have the ability to organize themselves for, among other things, building human organs, systems and bodies, and for defense and repair of those bodies.[14]

5) They demonstrate problem-solving capabilities.[15]

The preceding examples just scratch the surface, but knowledge of them lays a foundation for understanding the key role our cells play in every aspect of our lives and health.

The fourth guiding philosophy is: **If the body is given the right nutrition, the cells can then effectively restore and maintain themselves**.

"Right" nutrition provides essential information, critical tools, building materials, and energy sources to our cells. Examples of tools would be things like minerals that, among other roles, serve

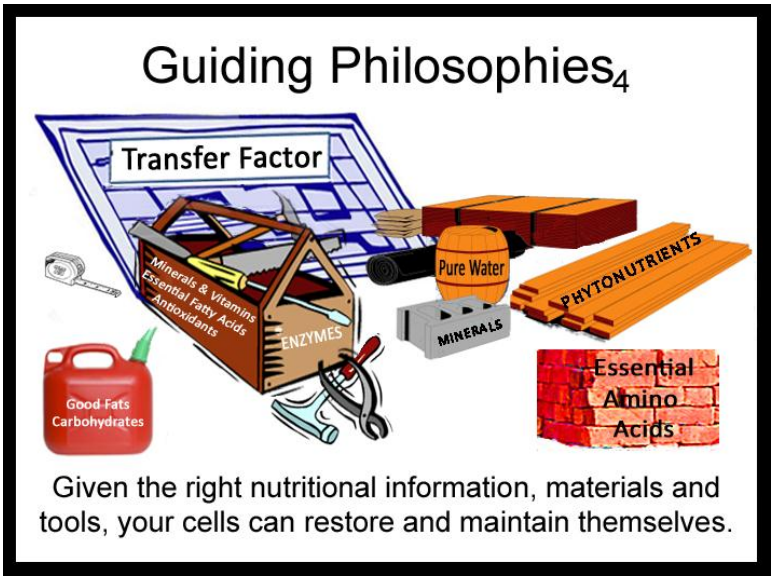


Illustration No. 2.5

as catalysts, along with the many enzymes that play varied roles. Examples of building blocks would be essential amino acids and proteins, minerals, certain important carbohydrates, and essential fatty acids. Energy sources would be all the additional carbohydrates and good fats that serve as fuel. These are just a few examples.

When we provide the body with the right raw materials, it will literally **produce miracles by the minute**! This ability gives us the opportunity to restore better function and more youthful energy to our bodies every day! With our intelligence and understanding of science, we can identify and choose those nutrients that are most needed by the body. The body will use some nutrients directly for energy, others will be broken down and used as building blocks or converted into enzymes that are critical in almost all biological functions. This dynamic, ongoing process of renewal is the basic foundation of *Restoration Biology*,® and the key to being able to turn back our biological-age clocks. The better we nourish our cells, the better our cells function and provide energy, the more energy we have, the better we function overall and … the younger grows our biological age!

Given the right raw materials … the body will produce MIRACLES BY THE MINUTE!

Chapter Three

Restoration Biology® and Your Biological Age

Your body's biological or *real* age depends on its ability to function effectively at multiple levels. Understanding the complex life processes involved is made easier by the fact that the human body is designed with a number of biological hierarchies that can be envisioned as pyramids. All living entities, from single cells to man, operate according to a hierarchy of life processes. At the base of this hierarchy is Survival and Defense".

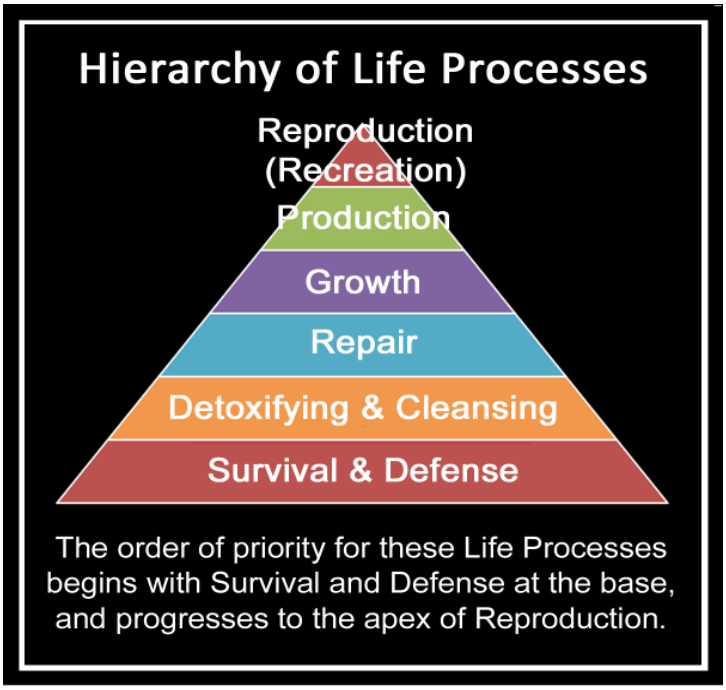


Illustration No. 3.1

Each progressively higher function depends on the adequate completion of each of the lower functions, culminating at the peak in reproduction.

Another important hierarchy to consider within *Restoration Biology*® consists of the body's progressive levels of function, ranging from imperceptible activities at the cell level to intentional high-level accomplishments by the body as a whole. The body's ability to accomplish the work to be done in these interrelated levels determines how effectively it is able to protect, restore, and maintain good health.

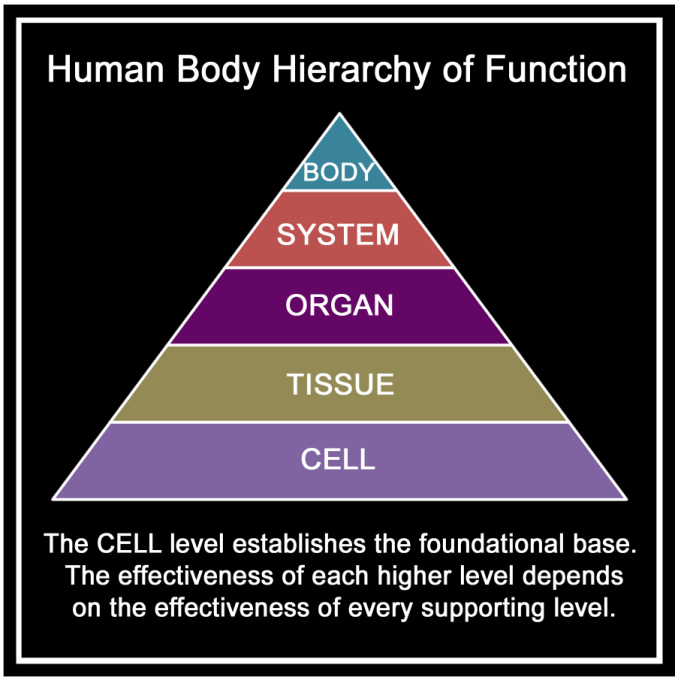


Illustration No. 3.2

These ongoing processes, all part of *Restoration Biology*,® were designed and happen from the inside out and from the cell level up. Each successive level of function is dependent upon meeting the needs of the previous level. Good, strong cell functions are essential for healthy tissues and enable good, strong organ functions. This makes possible good, strong system functions, which make up a healthy, well-functioning body. Life begins at the

cell level. When cell function declines, health challenges and aging begin. When cell function ceases, life processes begin to cease. Our cells are just that important.

Our ability to function well and do what we wish to do, without giving a thought to what's happening at these interrelated levels, depends on our cells being able to:

1) receive, use and produce needed energy,
2) communicate with one another effectively, and
3) accomplish their varied given tasks effectively.

As our cells are able to function better, *we* are then able to function at a higher level both subconsciously and with intent. This is almost always at a more youthful level too, regardless of our chronological age. As restored function enables us to experience abilities of years gone by, it's as though we're turning back our biological clock to a healthier, more vibrant time!

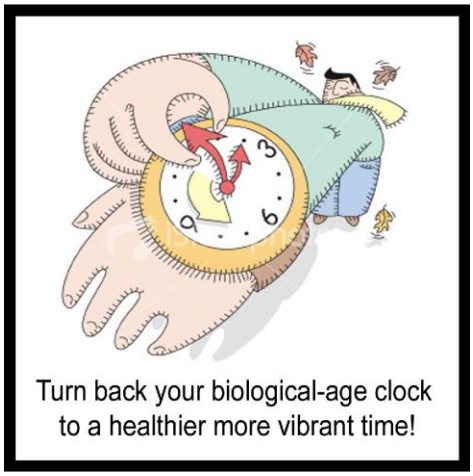


Illustration No. 3.3

Cell Function

As noted earlier, the adult body has between 75-100 trillion cells, depending on a person's size. About 86 billion of those cells need to be replaced every day. Beyond that, the molecules of the remaining trillions of cells are "turning over" all the time.[16] That means that we have both the daily opportunity to replace those billions of cells that are dying each day with healthy, effective new ones, we also have the great opportunity to continually restore our trillions of living cells with healthy molecules.

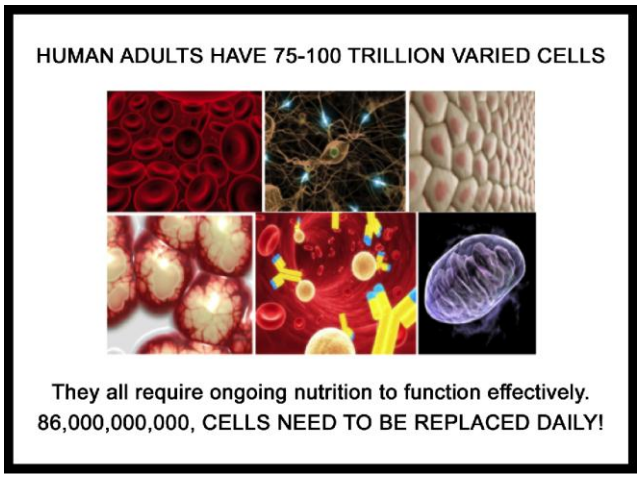


Illustration No. 3.4

Building capable new cells and restoring molecules for the optimal function of long-lived cells requires an intake of high quality nutrients. You and I don't know what each cell needs, but each cell knows. When we eat an apple or an orange or any of the wonderful foods we might choose, we are taking in hundreds and sometimes thousands of different components.

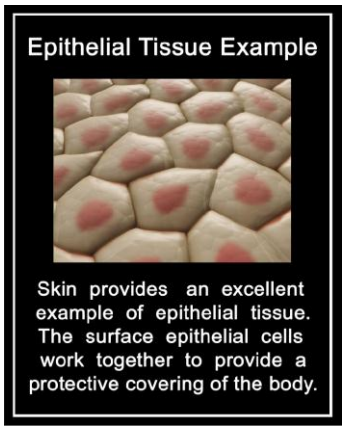
Illustration No. 3.5

This amounts to providing something like a supermarket of choices to our cells. The bloodstream transports the varied nutrients (vitamins, minerals, phytonutrients, proteins, minerals, et cetera) and presents them to the cells. Given these choices, each individual cell will then take exactly what it needs, exactly when it needs it. We don't know exactly how that happens, but our cells know what to do. We simply have to make what they need available.

Fundamental Tissues of the Body

A tissue is a group of like or related cells joined together to form a definite structure. The cells of tissues are not identical, but work together to accomplish specific functions.[17,18] For example, the outer cells on the skin of our face are different from the cells covering the inside of our cheeks, but they all serve the purpose of protecting the more vulnerable structures under them. While there are several hundred distinct cell types, each with its own respective structure and function, all of the human body's organs and structures are derived from four fundamental types of tissues.[19, 20, 21] These are as follows.

1. Epithelial tissue covers the outside of body surfaces and lines body cavities and internal organs. It consists of cells connected to one another to form an uninterrupted layer of cells that offer a protective covering over the underlying layers. The body's epithelium not only covers its obvious surfaces (such as the epidermis of the skin and the linings of respiratory, urinary, and digestive tracts) but also extends into all of the complex invaginations which form lungs, kidneys, sweat glands, digestive glands liver, etc.[22]



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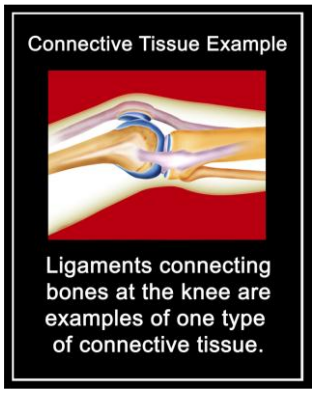


Illustration No. 3.7

2. Connective tissue binds and supports body parts. It consists of several cell types and extracellular products, which together provide essential functions of mechanical reinforcement, immune surveillance, transport/diffusion of nutrients and wastes, and energy storage (fat).[23] Examples would include leukocytes (white blood cells), adipose cells (fat), tendons, ligaments and bone.[24]

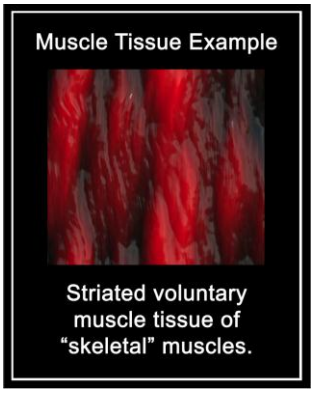


Illustration No. 3.8

3. Muscular tissue enables body parts to move and is specialized for gross movement by means of cellular contraction.[25] The three types of muscle tissue are skeletal, smooth, and cardiac.[26]

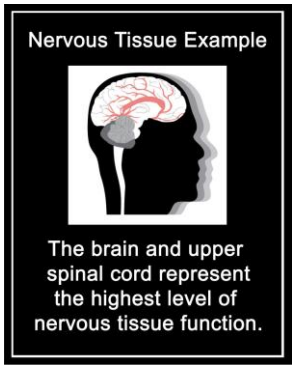


Illustration No. 3.9

4. Nervous tissue responds to stimuli and transmits impulses from one body part to another. It is responsible for rapid long-distance signaling, coordination, and "thinking." Nervous tissue consists of highly specialized nerve cells and support cells. Examples would include neurons, nerves, spinal cord and brain.[27]

All structures of the human body develop from these four basic tissue types. Their health and ability to function effectively are dependent upon the health and vitality of their constituent tissues.

Organ Function

Select healthy, well-functioning cells and tissues assemble themselves into healthy, well-functioning organs. All the DNA of the human body is contained in the cell, but what makes a given cell become one organ over another is determined by which part of the DNA is expressed. It is that expression that results in one cell becoming a heart cell, another becoming a liver cell and still another becoming a lung cell. As we consider the *organ* level of function, it becomes easier to understand how meeting the needs at the cell level supports ongoing restoration and enhancement of our organs' abilities to function.

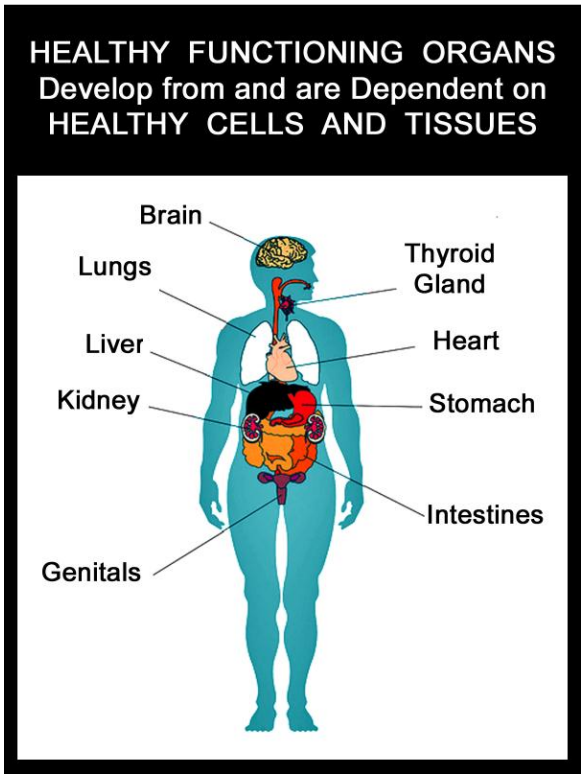


Illustration No. 3.10

Cell lifespans vary from one organ to another. For example, stomach lining cells are replaced about every two days, adult skin cells every 50 days,[28] and bone cells every 25-30 years.[29,30,31] It was long thought that the brain and heart cells that developed during our formative years were the sum total of what we would ever have. Of course, as already mentioned, the molecules of all cells are being continuously restored, but exciting recent research

has revealed that even heart and brain cells are being replaced over time, with real potential for restoration of function! [32, 33]

What we eat today may well be building new brain and heart cells that will last the rest of our lifetime.

One of the most easily observable processes of *Restoration Biology*® is found in our skin. Consider that we carry some 8 pounds (3.6 kilograms) and 22 square feet (2 square meters) of skin. Our skin does a lot more than make us look presentable. In fact, without it, we'd literally evaporate.[34] It is also our first line of non-specific immune defense. This waterproof, insulating protective shield also provides a great example of visible *Restoration Biology*® in action. The next time you have a scratch, burn or blemish, watch the process of your skin healing as your body repairs and restores damaged cells, produces new cells to replace those that were destroyed, and, if it is basically healthy and has the nutrients and support needed, restores the protective function of the wounded area in remarkably short order. Illustration 3.11 documents, over a 20-day period, a wound healing and skin being restored from an injured, exposed area (through which infection could enter the body), to being fully restored and once again protective.

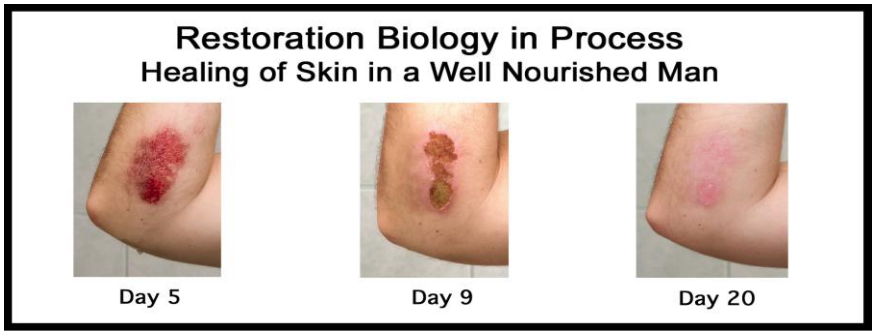


Illustration 3.11

System Function

Our bodies have multiple structural and organ systems. Systems were among the first subgroups used for dividing the very complex bodies we live in into areas of specialization by physicians. We have cardiovascular surgeons, neurologists, osteopaths and gastroenterologists, to name just a few "system" specialists.

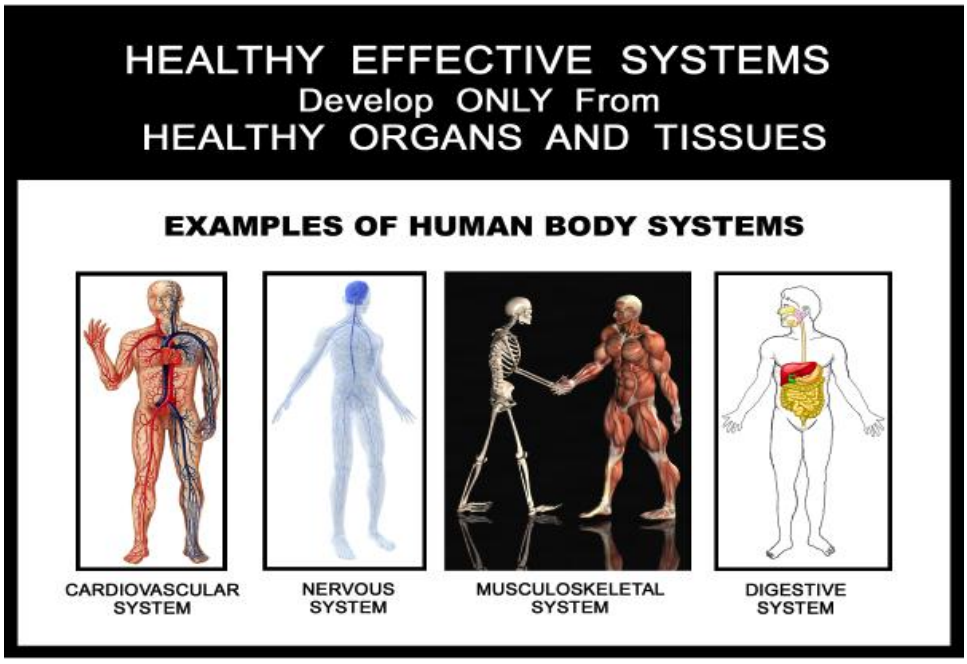


Illustration No. 3.12

While there is value in compartmentalizing the body's systems for study and comprehension, they are quite interdependent in many ways. As we just considered how the effectiveness of each organ is dependent upon the healthy function of the cells and tissues of which it is made, so each system is dependent upon the health of the organs that make up the system. As the body builds from the inside out, from cell to tissue to organ to system to total body, every higher function requires that the lower functions' needs are served

first. In other words, the nation is no stronger than its states and its states are no stronger than its cities and its cities are no stronger than its citizens. It's the same principle.

Body Function

The human body is much more than just an assemblage of cells, tissues, organs, and systems. It is a marvel of engineering, motion, sensory perception, strength, resilience and endurance. Of course our cells, tissues, organs and systems have to be healthy and well nourished for us to enjoy the potential marvels of our abilities, but consider just a few examples of the countless amazing facts about the human body.

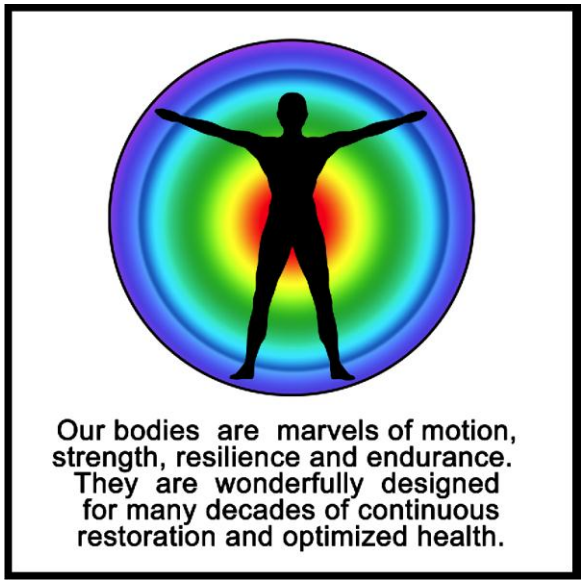


Illustration No. 3.13

The adult body has 213 bones and more than 600 individual skeletal muscles designed as a remarkable combination of strength, flexibility and agility.[35, 36] Each day the resting heart, consisting of specialized cardiac muscle and about the size of two clenched fists, beats an average of 100,000 times and pumps 2,100 gallons of blood through 60,000 miles of arteries, veins and capillaries. In one year, the human heart beats 3 million times. The heart of a 70-year-old has beaten more than 2.5 billion times and pumped at least one million barrels of blood.[37] Talk about endurance!

But the human body is not just a mechanical wonder, it has amazing neuro-sensory capabilities. The skin contains approximately 640,000 sense receptors; there are an estimated five million olfactory receptors for sense of smell,[38] and about 9,000 sensory buds for taste.[39, 40] It's also essential to be able to accurately process the perceived information. More than 99 per cent of all sensory information is discarded by the brain as irrelevant in terms of requiring a specific response — but much of the remainder is stored for future control of motor activities and for use in "thinking" processes.[41]

Beyond the interesting facts, the healthy human body accomplishes literally millions of activities day in and day out without our ever being aware of them. Our gastro-intestinal tract processes what we give it, extracting the valuable nutrients and contending with those things we consume that don't contribute to good health. It, along with our kidneys, liver, lungs and skin work to process, protect us from, and excrete toxins and waste products.

In addition to the work of the well-known organs and the systems they are part of, the immune system stands vigilant, ever working to protect us from dangers within and without. Millions of immune system activities go on every day without a thought from us, as long as our bodies are healthy.

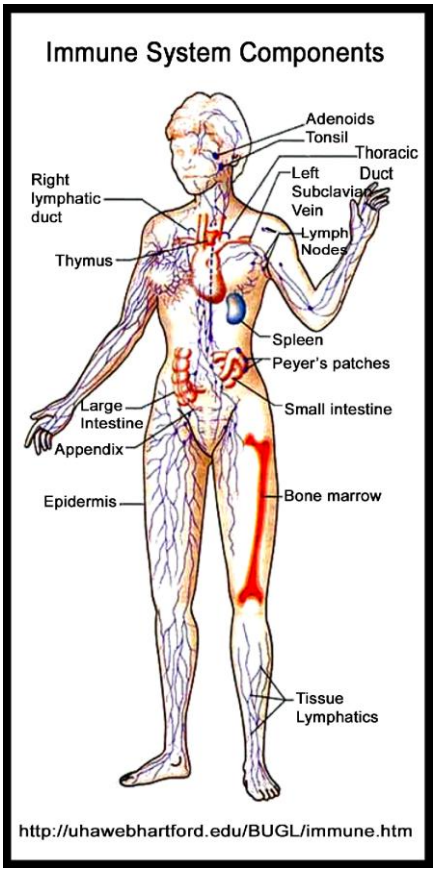


Illustration No. 3.14

At the core of the *Restoration Biology*® concept is an opportunity to understand how we can optimize our health by providing to our bodies those nutrients that will enable them to function at their highest potential ... and for us to enjoy the highest possible quality of life at every age. Our choices can impact those yet to be conceived as well.

Human Life Cycle

The human life cycle begins when a sperm fertilizes an egg to make a zygote. The zygote then develops into an embryo, then a fetus, then a baby, a child, an adolescent, an adult, and ultimately an elder citizen for whom the average life expectancy is about 78 years in the US.[42, 43]

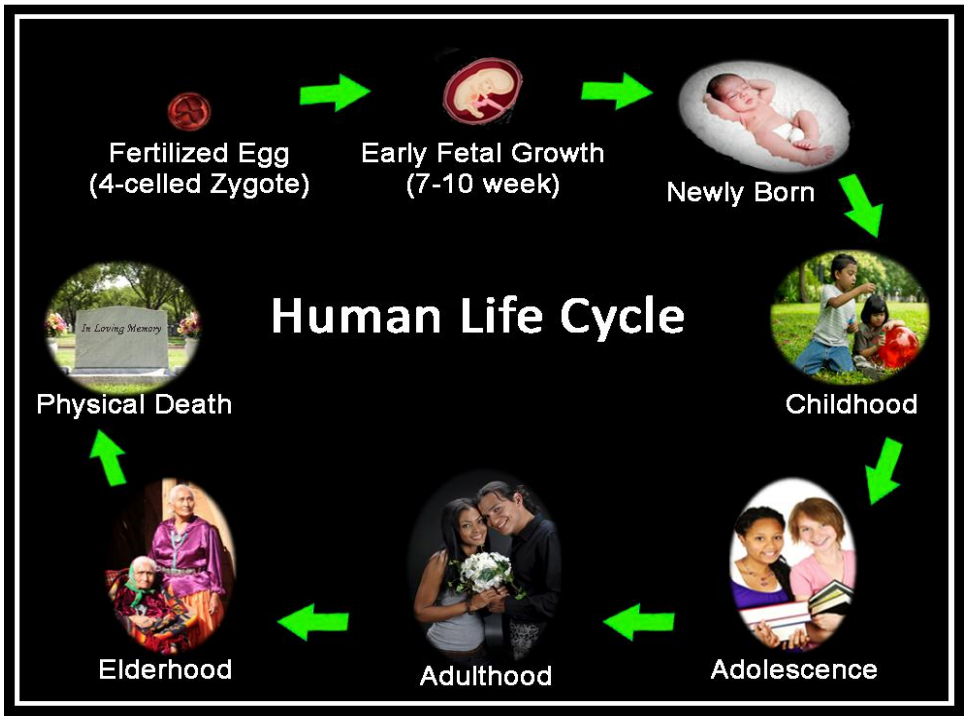


Illustration No. 3.15

Where does *Restoration Biology*® start in this cycle?" Well, because good health of the egg and sperm are essential in the making of a healthy embryo, and a healthy mother is critical to the development and birth of a healthy baby, *Restoration Biology*® starts with the parents.

The mother has the predominant responsibility because the very foundation for the baby's longevity and overall health throughout life are greatly influenced by the environment and nutrition provided to baby by the mother before birth. The importance of her personal health cannot be overstated.

Illustration 3.16

For many years we assumed the baby took priority over the mother and drew from her what it needed, even at her expense. While that is true in some respects, the fetus can't really "fend for itself" if the right nutrients for building and surviving aren't available to begin with. The developing baby is dependent upon the mother to choose the right things to consume, and is significantly affected by deficiency in its developmental nutrition, or pollution of its environment. As an example of nutritional deficiency, it's been clearly proven that inadequate intake of folic acid (one of the B vitamins) is linked to a wide range of defects of the brain and spinal cord. The importance and power of individual nutrients is demonstrated by the fact that when pregnant women simply take prenatal vitamins that include 0.4 mg of folic acid, the numbers of brain and spinal cord defects are dramatically reduced.[44]

There are many nutritional and health-related choices facing expectant mothers that can have an impact on the developing baby's well-being. Even so, many babies who suffer varying degrees of intrauterine deprivation and compromise (if they are provided the right nutrients and needed care after birth) will be able to overcome their challenges, and "catch up" in their ability to function, even achieving developmental milestones in a timely way.

The same thing can be true at any point in life. It's not too late for those of us who are experiencing varying health challenges to experience restoration of a considerably higher level of function and health. It's important to realize that **whatever our history or circumstances may be today** — as a result of our nutrition, development, fate, or prior poor choices — ***they do not have to be our future***. We have the ability and opportunity to make a difference in our longevity and quality of life. Our fate has not been cast in stone by our genetics, or our previous nutritional or health history. We have the ability to choose and to make *Restoration Biology*® a very personal experience.

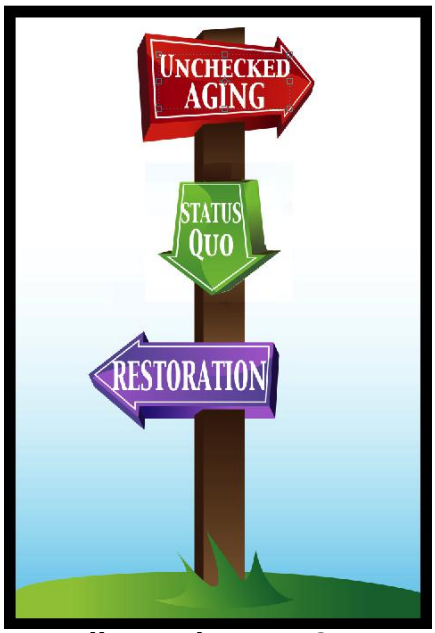


Illustration No. 3.17

Chapter 4

A.I.M. and Restoration Biology®

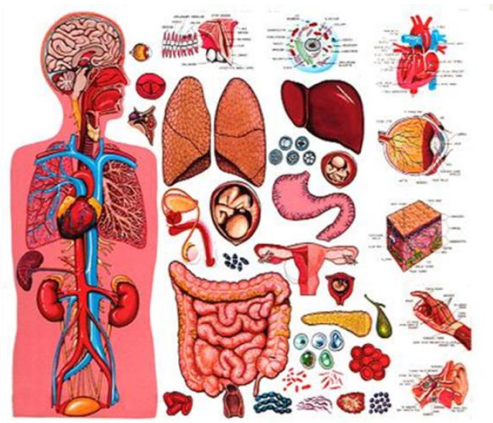
Everything affects our health because we are complete persons. Whether we are talking about nutrients or love we can classify our various health factors as being abundant, sufficient, insufficient, or deficient. The great thing about it is that we can do extra credit and improve our grades. Have you ever been in a class where the teacher seemed to make things harder than they needed to be? In this section we will discuss the A.I.M principles of complementary nutrition and how they help us use Restoration Biology® to improve our health grades.

What is my Health Grade?
Abundant
Sufficient
Insufficient
Deficient

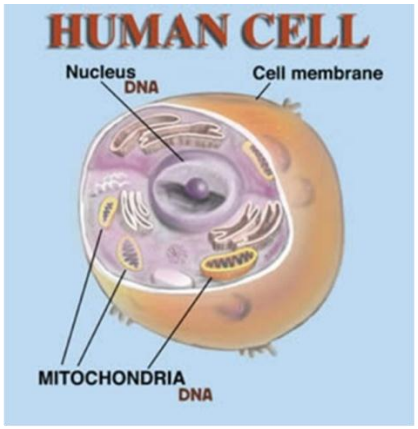
When we began this book we defined Restoration Biology® and discussed the philosophies of Restoration Biology® as we sought to establish a new perspective of life and health. We looked at the differences between chronological age and biological age. We discussed the Hierarchy of Life Processes and examined this at the cell, organ and whole organism levels.

Given that each higher level of organization depends on the lower levels, it is well for us to focus on the health of the Cell, the most basic structure of life.

The human body is incredibly complex – too complex for any one person to fully understand. In order to deal with this complexity modern medicine uses a reductionist approach. In the reductionist approach a complex system, like the body, is dealt with by dividing it into smaller parts. As multiple physicians work on multiple parts of the body, conflicts in treatment protocols can occur.



Conventional Medicine
– take it piece by piece



Restoration Biology
-begin with the cell.

Illustration No. 4.1

In Restoration Biology® we look for unity or in other words for the common functions and needs of every cell. What are the basic needs of every cell? There many lists that could be generated depending on how detailed one wanted to get. For our purposes we would like to focus only on the most basic and general physical needs of the cell and show how this leads to greater overall health.

A Person's Basic Physical Needs

Food

Shelter

Clothing

Illustration No. 4.2

Perhaps we might be able to get a better understanding of the physical needs of the cell by first looking at our own physical needs. Food shelter and clothing are typically listed as the basic physical needs for the human being. When these basic needs are met something very interesting and wonderful happens. The person becomes free!

When basic needs are met…

… Individuality can be Expressed!

Illustration No. 4.3

The carpenter builds, the musician makes music and the artist paints. If the basic needs are not met the carpenter lays cement, the musician drives a cab and the artist starves.

What about the cell? Food at the cellular level would correspond to the ability of the cell to metabolize (burn) fats, carbohydrates and other fuels. Shelter is what protects us from the outside threats in our environment. At the cellular level it is the immune system that protects us from outside threats. Clothing for the person is what protects us at our immediate surface and internally. If we have proper clothing and are exposed to extreme heat or cold, we survive. Without the proper clothing we would be damaged inside and out. At the cellular level, shielding the internal parts of the cell as well as maintaining the integrity of our cell surfaces (membranes) is the function of the antioxidants.

By meeting the basic needs of the cells, the cells are free to express their own native intelligence. When we eat a meal, we don't tell our cells which nutrient to take. The cells make those choices themselves. By meeting the basic needs of the cells, the organs are supported and are able to perform their proper functions; a condition we call health.

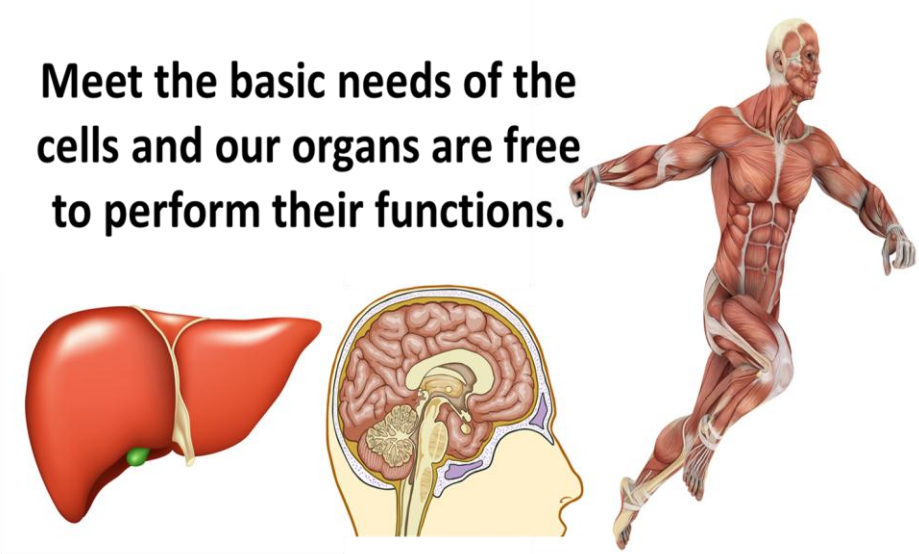


Illustration No. 4.4

As you recall the Third and Fourth philosophies of Restoration Biology® are: "The body was designed to be healthy;" and "If the body is given the right nutrition, the cells can then effectively restore and maintain themselves." The cells will do the best they can regardless of what we eat, but that may be not be anywhere near their potential if we limit them by making poor diet choices.

It has been said that "The first wealth is health. [45] The cost of energy determines the wealth of societies and cells. There are basically three ways to have more energy/wealth: protect your assets, spend less and produce more. At the cellular level these

correspond to antioxidant, immune and metabolic. The antioxidants protect our cells (assets). The immune system is energy demanding. When we are sick we are too tired to move or think as energy is diverted to the immune system. It is a simple choice really, you see it doesn't matter how strong or how smart we are if we are dead! Nevertheless we want the immune system to be laser-sighted and highly efficient (spend less) when it goes after invaders. We don't want the immune system using molecular hand grenades that damage every cell in the vicinity of the infection and causing more energy to be wasted in unnecessary repairs. Finally we want to maintain and expand our metabolic system so we can efficiently convert calories to usable energy (produce more).

Restoration Biology® then stands on an **A**ntioxidant-**I**mmune-**M**etabolic (**A.I.M**) foundation.

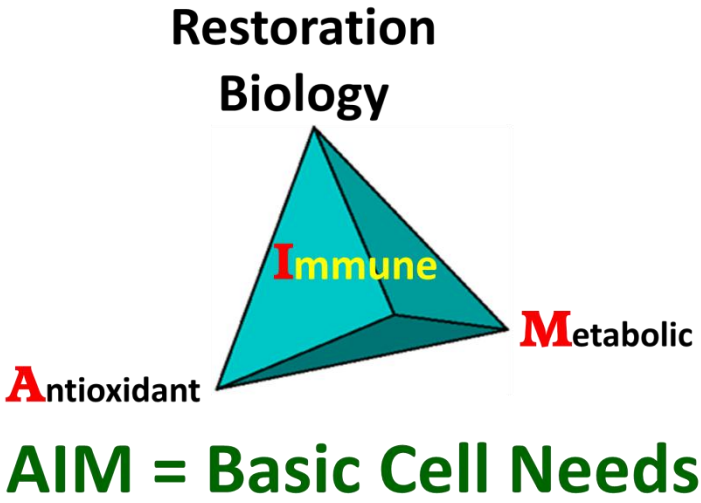


Illustration No. 4.5

This unified approach to our health beginning at the cellular level is the distinction and key to the design of Restoration Biology® products that help us lower our biological age.

Chapter Five
Restored and Optimized Function:
How Old Do You Want To Be?

Many of us have heard of Ponce De Leon, the Spanish explorer in search of the fountain of youth. People have been trying to find ways to stay young for as long as recorded history. We're no different today.

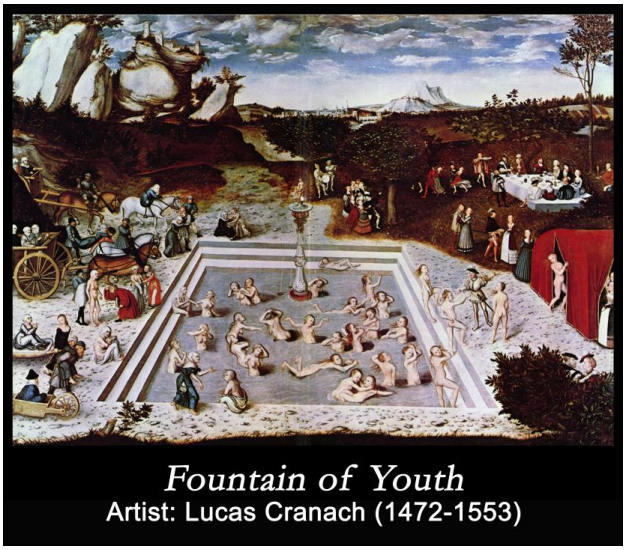


Illustration No. 5.1

What is aging? Aging is a combination of loss of function and accumulation of damage. If we do not have the needed nutrients and energy to repair damaged tissues or restore the billions of cells that complete their life cycles every day, degradation of the various tissues, organs and systems begins. For example, we twist a knee and it doesn't heal, which results in our limping and slowing down. Accumulations of such damage and reduced function are often seen as we age. But remember, our body does not know its chronological or birthday age. It only knows its biological or functional age. One way to assess our biological age is to answer the question, "How well have I restored myself so that I can function?" Again, biological age has nothing to do with chronological age. It has everything to do with our ability to function structurally … and with our having enough energy to function effectively.

Mitochondria within our cells are like little energy transformers. They take the food we eat and convert it into the form of energy that each cell needs. That energy is pumped into our systems and

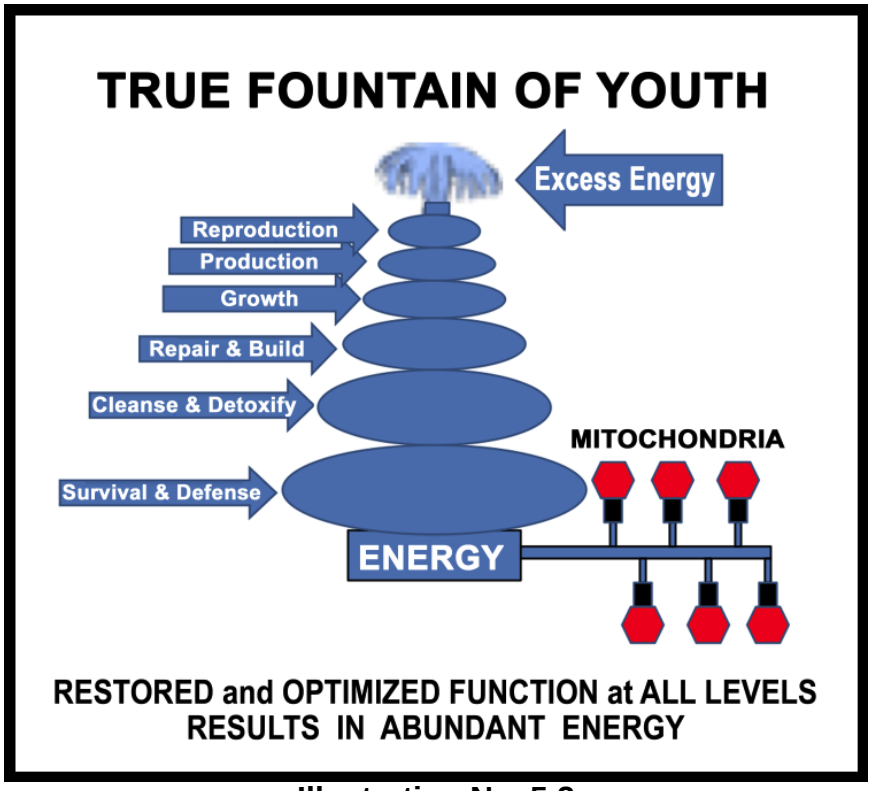


Illustration No. 5.2

delivered in order of the priorities seen above, and noted in the previous chapter. Energy goes first to meet the **Survival and Defense** requirement, then it goes to **Cleanse and Detoxify**, then to **Repair and Build**, and finally to **Production** and **Reproduction**. If we have more energy than we need for basic living, then we experience a fountain effect of excess energy. Having more energy than one really needs describes youth. Being able to expend considerable energy and recover quickly is another key factor in youth.

Illustration No. 5.3

Having abundant energy is what we see in healthy 80 year olds who have the "biological age" of 50 because they have supplied their bodies with the proper nutrients and have kept their body resilient and strong through exercise and good health practices.

We do not have to be slaves of the calendar. We have the intelligence and necessary understanding to be able to bring together the best of what nature has provided for us in such a way that we can consume it conveniently and use it to help our cells rejuvenate and restore themselves. This can be done to a large extent by choosing the best of available foods, which are our *primary nutritional sources*. These serve us best when they are free of known contaminants, fresh and organic when possible.

However, even if we were able to consume ideal foods, it may not be enough to meet the needs. That's certainly the case for those facing known health challenges, and - in our world of high stress, nutrient-depleted soils, environmental pollutants, and growing biological challenges - serious consideration is in order regarding taking advantage of the wonderful *secondary nutritional sources* available to us in high-quality nutritional supplements.

Yes, nutritional supplements are often beneficial, but as important a role as they may play, quality comprehensive nutrition is the critical foundation for *Restoration Biology*.® That's because even if we take the best supplements in the world, but eat junk food, we're going to produce junk cells. Supplements can make a tremendous

difference in our bodies being able to use foods to their maximum benefit – and make up for their deficiencies, but supplements cannot make the nutrient-dense "bricks and mortar" needed for healthy cell structure to appear magically out of "cardboard-quality" junk food. That said, when we consistently give our bodies the right raw materials and nutrients they need to achieve the ongoing restoration they were designed to accomplish, we can truly turn back our chronological clocks, roll back our "real" biological ages … and experience living as healthy and youthful a life as possible for as long as possible!

Illustration No. 5.4

Restoration Biology® is a way to honor the intelligence of the body, where age really is just a number … leaving your biological age up to you. *So … how old do you want to be?*

Chapter Six

EXPERIENCING RESTORATION BIOLOGY®
Where do we start?

Start anywhere you choose! Because our body systems work together in concert, every change that improves what we put into or do for our bodies will enhance our overall health. Each of us will have unique needs, and as we honor those individual needs we will naturally have varied starting places. So, it really doesn't matter so much where we start … as long as we START!

Illustration No 6.1

To choose is also to begin.--Starhawk (Dreaming the Dark)

The foundation for the restorative process is beginning even as we *think* about where to start! Our thoughts play a key role in determining our health and quality of life. In fact, studies reveal our thoughts and words can change our very DNA.[46,47,48] Remember those 86 billion new cells we're making every day? Every one of them contains and is directed by DNA. Just as the quality of foods and nutrients we consume provide the basic foundation for the physical health of our cells, so our thoughts and words will contribute to the quality and nature of the DNA within those cells. We don't yet know the full potential of this empowering discovery, but doesn't it make sense to invest in positive thinking and constructive communication - to optimize the potential of our DNA and overall health?

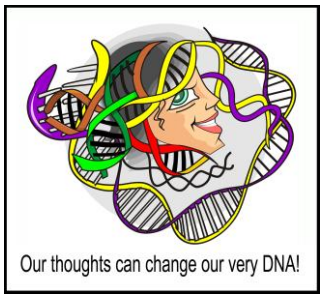


Illustration 6.2

The thought, time, energy and finances we invest in our nutrition and health will pay dividends far beyond what can be imagined. Most of us pay dearly for insurance to provide for care when we're sick. Isn't it worth at least as much to stay healthy … to enable us to enjoy life to the fullest?

"The cost of staying well is infinitely less than the cost of getting well. Millions of Americans have learned this ... the hard way." Paul Harvey

That you're reading this book is evidence you're already investing in seeking knowledge and options for optimizing your personal health. Knowledge, *when applied*, is power!

Principles of Good Health. Fundamental principles of good health have been presented in various formats.[49,50,51,52] The principles we've chosen to consider are not all-inclusive, but they are all foundational to good health. Nature's most common rule, however, is balance. Excessive amounts of anything or significant deficiencies in any area are not beneficial. Everything, including pure water, can have the effects of a poison when taken in gross excess.

It's worth noting that choice is included as a principle of health by some authors. We've opted to integrate choice throughout this book because, with rare exception, it will be our choices that determine our level of success in achieving our goals, whatever they may be. To the extent that we give ourselves only the best of options from which to choose, we will greatly enhance our likelihood of success.

Illustration 6.3

Illustration No. 6.4

Just as the function of our many organs and systems is interrelated, so are the varied principles of good health. ALL of these principles are important, but individual circumstances will determine what would be a higher priority for one person than another. For example, if you're contending with diabetes, then *nutrition-related principles* might take priority. You will know best the right place for you to begin. The most important thing is to get started. If you can partner with someone, it will not only make the process more enjoyable, it will increase the potential for success for both of you!

Principle One: Fresh air.

Breathing fresh air is the most fundamental of the Principles of Good Health. Oxygen is our single most critical nutrient. We can survive several weeks without food, several days without water, but only a matter of minutes without air because brain cells start dying less than five minutes after their oxygen supply disappears.[53]

Illustration 6.5

THINGS WE CAN DO TO OPTIMIZE ACCESS TO FRESH AIR

Improve personal breathing effectiveness. Even perfect air is of limited value if we aren't breathing effectively. We were born abdominal breathers, but nine of ten adults become "chest breathers." We can greatly enhance our respiratory effectiveness through abdominal breathing and other beneficial techniques.[54,55,56]

Improve posture.
The second most common non-medical cause of ineffective breathing is bad posture, which can and does compromise breathing in even those who would otherwise be among the healthiest of us. Bad posture can actually cause a slightly lowered oxygen level, known as mild hypoxia,[10] which can have a significant negative impact on memory,[57] our ability to think, concentrate, make good judgments, maintain coordination and stay awake.[58] By improving our posture we can both optimize breathing effectiveness *and* prevent or remedy multiple other related maladies at the same time! Try sitting or standing up straight and taking a one-minute breathing break at least once an hour. See references for info.[59,60]

Enhance Air Quality.
The American Lung Association's ***State of the Air 2011*** revealed that while air quality in many places has improved, more than half the nation's population suffer pollution levels that are too often dangerous to their health.[61] To check out the "state of the air" in your area, go to: http://www.stateoftheair.org. We have limited personal control over outdoor air, but most of us spend 90 percent of our time indoors, where we do have some control. This is an important consideration because the air within homes and other buildings can be more seriously polluted than the outdoor air in even the largest and most industrialized cities.[62] The good new is, there are things we can do to improve the quality of the indoor air we breathe.

Look for and eliminate or reduce sources of pollution.[63]

- Adjust sources like gas stoves to reduce emissions.
- Seal or enclose areas that contain asbestos.
- Clean dirty air ducts and change air filters regularly.
- Clean, remove havens for dust mites and other pests that contribute to airborne debris.
- Become a serious label reader to avoid introducing hazardous materials into your home.
- Eliminate tobacco smoke.[64]
- Identify potential sources of carbon monoxide and take action as needed. Install a CO alarm that meets the requirements of the current UL 2034 safety standard.[65]
- Test for radon and take action as needed.[66]
- Replace aerosols with "pump-spray" containers.

Improve ventilation when possible.

- When weather and pollution levels permit, open windows and doors for at least 15 minutes daily, using fans to draw in fresh air.

Illustration No. 6.6

- Exhaust fans in kitchens and bathrooms can remove contaminants from those areas.
- Take special care for optimal ventilation when using substances known to generate pollutants, such as paints and glues.[67]

Air cleaners and purifiers: Important points for optimal benefit.

- Effectiveness depends on how well pollutants are collected from the air (efficiency), and how much air is drawn through the filtering element (in cubic feet per minute).
- Know the size of the area involved and level of pollution.
- Find the right unit to meet the need.
- Maintain according to manufacturer's directions.[68]

Household green plants may help.

A **NASA** study published in 1989, entitled *Interior Landscape Plants for Indoor Air Pollution Abatement,* reported that low-light-requiring houseplants, along with activated carbon plant filters, demonstrated potential for improving indoor air quality by removing trace organic pollutants from the air and held promise as a means for alleviating the "sick building syndrome" associated with new, energy-efficient buildings.[69]

Illustration No. 6.7

Diffusion of essential oils has been shown to offer benefits by killing 'biological' airborne bacterial and fungal spore contaminants.[70,71] Essential oils should not be confused with synthetic 'scents' that are added to a multitude of "health" and beauty aids. Although such products are often labeled "aroma-therapy," the aesthetic application of odors is different from the applied use of essential oils.[72]

Principle Two: Clean Water

Clean water is wonderfully refreshing, calorie free, and second only to the air we breathe in its importance to our lives and health! The body of a healthy 160 pound adult man is about 60% water, though the percentage can vary significantly with body type because body fat contains much less water than does muscle.[73]

Illustration No. 6.8

Water is essential in all bodily functions.

Examples include:

- Absorption and use of nutrients.
- Removal of waste products.
- Control of body temperature.
- Base for all the body's chemical reactions.
- Lubricant for delicate membranes as well as joints.
- Cushioning for bodily structures.
- Means of transportation for the trillions of cells that travel through our cardiovascular system, lymphatic channels, nervous system conduits and organ compartments.

The effects of water shortage in the body are measured in terms of underperformance, disease and premature death.[74] Dehydration, the condition that results from such shortage of water, occurs when we lose more water than we take in.[75] Dr. Barbara Levine, Director of the Nutrition Information Center at the New York Hospital-Weill Medical College of Cornell University, states that 75% of Americans are chronically dehydrated.[76] This suggests that many of us don't realize the importance water plays in our health, or how to protect ourselves from the real downsides of dehydration. Let's take a brief look at both factors.

Why good hydration is important. We know that severe dehydration and loss of critical electrolytes can be life threatening, but chronic mild dehydration can lead to multiple serious diseases.[77] Even mild temporary dehydration decreases memory, and increases tension, anxiety and fatigue.[78] A reduction of as little as 1% in body water can adversely effect our ability to think.[79] An all too familiar symptom of dehydration is a headache,[80] and a common remedy is to grab a couple of aspirin or other pain relievers and swallow them with a glass of water. We can be sure that headache wasn't caused by an acute aspirin deficiency, so it's likely that relieving the water shortage contributed heavily to easing the ache.

Illustration No. 6.9

We can maintain good hydration. If safe water is available, and we don't have a health condition that demands otherwise, the solution to the problems caused by dehydration is simple … drink enough good water to meet the body's needs. If we are basically healthy and have an effective thirst regulatory mechanism, thirst is a good indicator that we've lost somewhere between 1-2% of our body weight in water and need to rehydrate.[81,82] The average sedentary adult man needs at least 2,900 mL (12 cups) of fluid per day, the average sedentary adult woman at least 2,200 mL (9 cups) fluid per day in the form of non-caffeinated, non-alcoholic, non-sugared beverages, soups, and foods.[83] Of course if one is exercising, dealing with environmental heat, fever, or other causes of fluid loss, more would be required.

We can check our water safety. If you have concern about your drinking water, it's recommended that you use a state-certified laboratory for testing, which may be found by calling your State Health Department. Another resource for areas in the US is: http://www.epa.gov/enviro/facts/topicsearch.html#water.[84]

What about bottled water. Many people choose to use bottled water. It is convenient and necessary at times, but be aware that up to 40% of all bottled water is tap water, and that controversy and concern exist regarding the leaching of potentially harmful chemicals from the plastic into the water, especially when subjected to heat.[85,86,87] Reading labels for source and content is vital.

We have options. In the US and many countries, we can choose between tap water, bottled water, or perhaps a filtration system of some kind. It's important to note that as we bathe or shower, we are breathing in (and our skin is absorbing) whatever happens to be in the water. An excellent review of effectiveness, type and cost of filtration systems can be found in **Compare Drinking Water Filters.** Best Water Filter Reviews. Updated 7/14/2011.[88]
http://www.waterfiltercomparisons.com/water_filter_comparison.php

Principle Three: Adequate Sunshine

For centuries, doctors and natural healers relied on medical treatment by sunlight, called *Heliotherapy,* to help heal many common and serious ailments.[89] After years of growing fear of exposure to sunlight due to its being proclaimed the equivalent of public enemy number one, there's mounting evidence that the wisdom of the ages still holds true.

Illustration No. 6.10

Sunshine makes us feel better and is often associated with happiness and health! Almost everyone feels better when the sun is shining. It causes people to feel more active, energetic, balanced, strengthened, and less nervous.[90,91] Conversely, the decreased sunlight of winter is associated with depression, increased fatigue, lowered motivation, increased appetite, weight gain, irritability, and isolation. A related condition is known as Seasonal Affective Disorder (SAD). It is treated with light therapy, and often subsides

without treatment – with the arrival of increased late spring-to-summer sunshine.[92] The link between adequate exposure to sunlight and enhanced sense-of-well-being is due to the related increased production of the feel-good brain chemical, serotonin.[93] Additionally, our visual perception of the motion of the sun, from sunrise to sunset, helps establish our circadian rhythms.[44]

Exposure to sunshine is needed for healthy Vitamin D levels. Vitamin D, called the "Sunshine Vitamin," is essential for life itself. Our bodies are designed to produce 90% of their needed vitamin D, but they can only do that through the mechanism of direct sunlight interacting with our bare skin. The alarm that sounded over the link between sun exposure and skin cancer causes many people go to great lengths to avoid the sun, or always use products that block the sun's rays from their skin. As a result, Vitamin D deficiency is epidemic in adults of all ages who always wear sun protection, as is also the case in those who have increased skin pigmentation, and those who limit their outdoor activities.

Widespread vitamin D deficiency is linked to increased risk of some cancers, type 1 diabetes, osteoporosis, cardiovascular disease, and many chronic diseases.[94] It has also been estimated to cost $655 per person in the US, every year. [95]

Here are things we can do to safely benefit from sun exposure:

- **Avoid sunburn**. <u>There is absolute wisdom in avoiding being sunburned</u>. Sunlight is a form of powerful radiation and there is potential for real harm, so common sense and a measure of caution are in order when we talk about sun exposure – especially overexposure to UVB rays. This can be greatly minimized by avoiding

Illustration No. 6.11

avoiding sunburn, not staying out in the sun too long, and eating a healthy diet (full of antioxidants from fruits and vegetables.) The antioxidants we store in our skin greatly affect our potential for being sunburned. The higher the antioxidant level in our skin (the more we've taken in), the lower will be our risk of getting sunburned.[96]


Illustration No. 6.12

- **Start slowly.** For skin unused to the sun, build up tolerance gradually. Start in spring and early summer to prepare one's skin for stronger sunlight later in the year. Early morning is the best time to sunbathe initially, with less chance of burning than later in the day. Build sun-time gradually, spending as little as 10 minutes a day in the beginning, then progressively increase exposure time. The desired length of time will depend on skin type: fair-skinned individuals ≈10-20 minutes of full sun exposure at least three times a week; dark-skinned individuals require 3-5 times more.[6]

- **Get adequate exposure.**
  Exposing only face and hands for a few minutes at a time is not enough for production of vitamin D. For optimal benefit, expose at least 40% of skin to direct sunlight. For those with fair skin, the production of vitamin D equilibrium will occur


Illustration No. 6.13

within about 20 minutes of ultraviolet ray exposure, which results in approximately 10,000 IU of vitamin D. It can take 3 to 6 times longer for darkly pigmented skin to reach this equilibrium. **PLEASE NOTE: UV exposure beyond the minimal dose required to produce skin redness will not increase vitamin D levels any further.**[6] This means that if you stay out in the sun for a longer time, your body will have available the same amount of vitamin D that it would if you had only been out for a moderate time. This makes it virtually impossible to overdose on vitamin D obtained from sun exposure. It also means that after being in the sun long enough to have produced the needed vitamin D, it would be wise to take measures necessary to avoid getting burned. When using sun block preparations, it's very important to read the label. Our skin absorbs much of whatever we put on it. In fact, some things are taken into the body more effectively through skin absorption than the G.I. tract, so we need to be as careful with what we rub on as with what we swallow. The Environmental Working Group provides an excellent annual sunscreen guide for safety and effectiveness. Please see: http://breakingnews.ewg.org/2011sunscreen.

Illustration No. 6.14

- **Some vitamin D is available from foods.** Very few foods in nature contain vitamin D. Fatty fish (such as salmon, tuna, and mackerel) and fish liver oils are among the best sources. Small amounts are also found in beef liver and egg yolks. Foods fortified with vitamin D, including milk and other dairy products, some ready-to-eat-cereals and brands of orange juice are the most common dietary sources.[97]

- **Use supplements when necessary, especially if adequate exposure to sunshine isn't possible.** Earlier recommended daily intakes for vitamin D (200 IU) are now recognized as inadequate. Current recommended daily allowances range from 400 IU for babies to 800 IU for senior adults, though considerably higher doses are documented as safe and appropriate for anyone with deficiency. It's important to note, however, that because vitamin D is fat soluble, there is the possibility of toxicity with excess intake. It would be reasonable to have vitamin D levels checked annually when using supplementation.[5]

In the early 20th century, before the era of antibiotics, the "sunshine cure" was the only known effective therapy for "TB" or tuberculosis. No one knew *why* it worked, just that TB patients sent to rest in sunny locales were often restored to health.[98] We now know that a significant factor was exposing those individuals to sunshine, which resulted in restoration of normal levels of vitamin D production needed for their subsequent restoration of health. It seems clear that adequate exposure to sunshine, even if it were only for maintenance of healthy vitamin D levels, is truly foundational as a Principle of Good Health … but that's only one good reason!

J.N. Adams TB Sanatorium, Perrysburg, NY
From the Michael Just collection.
Illustration 6.15

Principle Four: Primary Nutrition

"The doctor of the future will no longer treat the human frame with drugs, but rather will cure and prevent disease with nutrition." Thomas Edison

A fundamental truth is that the entire human body develops from and is sustained by foods, water, air and light.[99] We've addressed the importance of water, air and light previously, so, the Primary Nutrition we're focusing on here consists of the foods we eat to provide our bodies with the energy and nutrients needed for their healthy structure and function. High-quality foods provide our bodies with abundant energy and nutrients that our cells can easily recognize and use for maintenance, repair and restoration. Poor-quality food doesn't give our cells what they need, and may actually rob them of vital energy required to process or detoxify substances the cells/body can't use.

Illustration No. 6.16

The difference between Food and Nutrition.
Simply put, "foods" are the carriers of nutrients (substances that provide nourishment essential for the body's maintenance of life and good health). A person's "nutrition" is the sum total of nutrients received from the foods consumed in a given time period. Its quality is reflected in the person's resulting state of health.

A variety of factors have brought many of us to the place of consuming too many foods that deliver too few nutrients to provide real nourishment. Historically, to combat starvation due to food spoilage, measures such as drying, salting, and smoking were used, with varying degrees of reduction in nutrient value. Later, foods were "refined" so they would store even longer without spoiling. Unfortunately, as much as 75% of phytochemicals (or *plant* nutrients, phyto = plant) are lost in the refining process.[100,101]

Such refining results in products that can be stored almost indefinitely (because nutrients that would spoil have been removed or altered), but leaves only a fraction of their original nutrients, the ones that won't support life for the spoilage-causing organisms. Sadly, they don't support human life very well, either.

To make up for the blandness of the stripped-down refined foods, hydrogenated fats, salt and refined sugar were added. That helped the taste, but further reduced nutritional value, leaving the cells' needs unmet. When our cells needs aren't satisfied, we're not satisfied either, but are left with a sense of hunger. When used as the *primary source of nutrition*, refined foods will – even in significant quantity – ultimately result in *micronutrient-deficiency starvation* at the cell level, which the body responds to by hording the calories from these foods and storing them as fat.[102] This cell-level micronutrient-deficiency-hunger can lead to varied forms of food abuse, and many deficiency-related diseases.[103] It becomes a vicious cycle of hunger, eating refined foods that fill the stomach but leave the cells feeling starved, nutritionless calories being hoarded as fat, inevitable weight gain, potential obesity, the many inevitable health-related problems … and still feeling hungry.

Illustration No. 6.17

An undeniable factor contributing to our reliance on "fast" foods is the reality that convenience and appeal are stronger forces in food marketing than is good nutrition. Our lives are filled with such demands on our time that for many it feels as though the only way to provide a meal is to stop by the "drive through" on the way home, or pick up something at a quick mart, that can be microwaved and and put on the table in minutes.

Eating "junk" food can actually cause biologically-based "junk food cravings." We each exist with some 100 trillion bacteria that populate our gut, and the foods we eat have a great influence on which intestinal flora (bacteria) thrive in our guts.[104,105] An underappreciated but important reason we crave "junk" food is that as we eat it over time, our G.I. tracts create an intestinal bacterial population that specializes in "processing" junk food, and creates a demand for it! Beyond that, these intestinal microbes may have powerful effects on our immunity[106] and potential for obesity.[107]

I am what I ate … *and I'm frightened*!
Bill Cosby, *Why Good Nutrition is So Important*

The good news is that when we shift from eating mostly processed foods to whole foods, the probiotic flora/microbial populations of our gut also shift to those needed for whole foods. There's more good news – as the probiotic microbes that thrive on whole foods increase, our cravings for junk food decrease, and those unhealthy foods lose their appeal. Yet even more good news, as our cells begin to receive the nutrients they need, they - and we - begin to feel satisfied, the body no longer needs to "horde" calories causing increased fat, and we begin to restore normal metabolic processes that help us return to a healthier weight and higher quality of life!

Choosing health-promoting Foods

Whole foods are our best source for quality nutrition because they offer natural, complete, and rich supplies of nutrients that our cells can easily recognize and readily use. The major whole food groups include: vegetables and fruits; whole grains; meat, fish, and eggs; and dairy. Fats and sugars are also recognized as a group.

Illustration No. 6.18

Each group provides varied essential nutrients including: minerals; vitamins; essential amino acids; and essential fatty acids. Our bodies can't produce these "essential" nutrients, so we must consume them for life and health. In addition to the essential nutrients, we also need digestive enzymes, hydrochloric acid and bile to digest our foods, and fiber and friendly bacteria (probiotics) to keep our intestines healthy.[108]

What about carbs, proteins and fats? Carbohydrates, proteins and fats are the three **macro**nutrients in foods that provide energy and sustenance for our bodies. They are also another familiar way of classifying food groups. Between physiologic uniqueness and what we happen to be doing on a given day, our bodies require varying amounts of carbs, proteins and fats to function well. Given in percentage of total nutrition/diet, recommended ranges for daily intake of these macronutrients are: Carbohydrates, 45 - 65 %; Proteins, 10 - 35 %; Fats, 25 - 35%.[109] Specific health challenges may require consideration. These ranges allow flexibility.

• **Carbohydrates** are essential as fuel (glucose) for the brain and nervous system, and are the preferred fuel for many bodily functions. Simple carbohydrates are made of just one or two sugar molecules. They require little digestion and are the quickest energy source. Fruits, fruit juices, honey, corn and milk are examples of foods that contain simple carbohydrates (sugars). In their natural form they provide valuable nutrients in addition to an energy boost. Candies, table sugar, alcoholic beverages and sweetened soft drinks are simple sugar sources that provide calories, but usually no nutrients. Because simple sugars (especially when refined) can cause significant fluctuation in blood sugar levels, and contribute to numerous health challenges [Type 2 diabetes being the most common], they should be a limited part of nutrition. Complex carbohydrates consist of sugar molecules strung together like a necklace. They digest slowly, keep blood sugar levels more stable, are more satisfying, and are often high in fiber, which offers multiple benefits. Found in grains, many vegetables and legumes, they are the body's best source of energy because they are burned in a

constant, time-released manner. They provide sustained energy and can help manage blood sugar irregularities.[110]

- **Proteins**, considered the building blocks of life, are essential for growth, tissue repair, enzyme production and other functions, but are a poor source of energy because protein breakdown creates toxic byproducts. That's one important reason to eat protein in moderation. Of the twenty amino acids that make up all the proteins in our bodies, we must consume eight that are considered "essential" because our bodies can't make them. Any source of protein (meat, fish, poultry, eggs, cereals, legumes) will provide the body with the essential amino acids. When needed, we can produce the remaining twelve from other food sources.
- **Fats** are critical to our health and support many bodily functions. As examples, fats: are a vital part of all cell membranes; provide structural components of brain cells as well as the fatty myelin sheath that surrounds every nerve fiber; are essential for the body's use of vitamins A, D, E and K; are structural components of hormones, and act in regulating production of sex hormones; contribute to healthy skin integrity; and help to regulate body temperature.[111] There are two essential fats (technically called essential fatty acids or EFAs), essential meaning our bodies can't make them and they must be consumed. One is the omega-3 EFA, the other omega-6 EFA. Much insight has been gained regarding *good* fats and *bad* fats, and these are two of the good ones. We can't go into depth on the subject here, but consider what Dr. Udo Erasmus, author of *Fats That Heal Fats That Kill* states: "*The fact is that some fats are absolutely required for health, others are detrimental…. We can reverse diseases of fatty degeneration by making appropriate changes in fat choices, preparation, and consumption, and by supporting these important changes with attention to other nutrients in our food supply."* [112] His number one recommendation is to ensure adequate essential fatty acid (EFA) consumption, with EFA-rich fats accounting for one-third of our total fat intake - no matter what the total fat intake is. He states the best-balanced plant source of both EFAs (omega-3, omega-6) is hemp seed oil. Flax seed provides mainly omega-3, and safflower,

sunflower and sesame mainly omega-6. Fish, like salmon, mackerel, rainbow trout, sardines, and eel contain large quantities of omega-3 derivatives.[113]

How much of each macronutrient is needed? Because we're all unique, the best sources of nutrients to meet our individual needs will vary. The "Metabolic Typing" and "Eat Right for Your (Blood) Type" approaches reflect the importance of recognizing that hereditary and individual physiologic differences play a significant role in determining what works best in meeting individual nutrient needs.[114,115] Some foods boost energy for one person and drain it from another. Some of us do well on primarily vegetarian fare, while others require animal protein regularly. The important thing is for each of us to determine what works best for us.

To optimize the nutrient value of foods, it's helpful to choose those that have been "organically grown" when possible, to avoid pesticides and other chemicals used on fruits and vegetables, antibiotics and hormones in animal products, and heavy metals or other contaminants in fish and fats. The fresher the products, the higher the nutrient value. When quality fresh produce products aren't available, quality frozen ones are often a great alternative because they are usually flash frozen within hours of harvesting, which effectively preserves much of their nutrient integrity.

There is value in purchasing locally grown produce when possible because it's more likely to have been allowed to ripen before harvesting, as compared to "green harvesting" of fruits and vegetables before they ripen. "Green" harvesting allows produce to be shipped with less bruising, but prevents the accumulation of nutrients that occur with access to native mineral sources during ripening, which results in the produce being more nutrient dense, with the highest amounts of vitamins, minerals, phytonutrients, essential fatty acids and fiber - for the least number of calories.[116]

The color of fruits and vegetables reflects their nutrient content. The idea of "eating a rainbow" every day has become an effective way of helping us choose a full complement of essential nutrients.[117,118] The more vibrant the colors, the better!

Illustration No. 6.19

- **Red and pink** vegetables and fruits are colored by the powerful antioxidants lycopene and anthocyanins, and have ellagic acid, quercetin, and Hesperidin. These nutrients are recognized for their importance in maintaining cardiovascular and joint health, and avoiding diabetes, some cancers and some neurological diseases.
- **Yellow and orange** fruits and vegetables contain colorful beta-carotene (turns into vitamin A), vitamins C, E, folate (natural form of folic acid/B_9), bioflavonoids, zeaxanthin, and potassium. These nutrients support immune function, help maintain good vision, healthy bones, teeth and skin, fight harmful free radicals, prevent birth defects, reduce our risk for cancer and support cardiovascular health.
- **Green** vegetables and fruits get color from chlorophyll. They provide fiber, are rich in lutein, zeaxanthin and indoles, as well as calcium, vitamins C and folate. These nutrients support cardiovascular health, normalize digestion time, support healthy vision, fight harmful free radicals, and support immune system function.
- **Blue and purple** fruits and vegetables' color comes from anthocyanins. Their other nutrients include lutein, zeaxanthin, resveratrol, vitamin C, fiber, flavonoids, ellagic acid, and quercetin. These nutrients support retinal health, lower LDL cholesterol, boost immune system activity, support healthy digestion, improve calcium and other mineral absorption, fight inflammation, reduce tumor growth, act as anticarcinogens in the digestive tract, and limit the activity of cancer cells.
- **White** fruits and vegetables are colored by anthoxanthins, and contain nutrients such as beta-glucans, EGCG, SDG, and lignans that provide powerful immune system enhancing activity. These nutrients activate natural killer B and T cells, and balance hormone levels - reducing the risk of hormone-related cancers.

We've just scratched the surface on Primary Nutrition, but hope to

have conveyed information that will encourage taking this matter to heart because every aspect of physical restoration is dependent upon our cells being nourished with the quantity of quality nutrients required to do their jobs of protecting, patching, healing, and replicating. There's no one diet or food formula that will work for everyone. It's also very important to consider quality nutritional supplements to balance our nutritional profile and provide needed/helpful nutrients not otherwise available. That will be covered in the next section. We must each find time to determine what will work best for us. There are many wonderful foods from which we can choose. Have fun exploring and discovering which ones bring joy to both you and your cells!

"Those who think they have no time for healthy eating, will sooner or later have to find time for illness." – Edward Stanley

Principle Five: Complementary Nutrition

In a perfect world our foods would be abundant and fully nourishing, but we don't live in a perfect world. In fact, most of the world's population, including that of the US, is inadequate in one or more micronutrients according to current intake recommendations.[119]

Nutrient	% Deficiency in US Population
Vitamin E	93
Vitamin D*	70
Magnesium	56
Vitamin C	25-31%

Complementary means to complete. Complementary nutrition completes what our primary foods may be lacking. There are approximately 40 essential nutrients we cannot produce for ourselves. These include vitamins, minerals, essential fatty acids and others.

Vitamins	
Vitamin A (provitamin A = Beta-carotene)	Vitamin B1 (Thiamin)
Vitamin C	Vitamin B2 (riboflavin)
Vitamin D	Vitamin B3 (niacin)
Vitamin E	Vitamin B5 (pantothenic acid)
Vitamin K	Vitamin B6
Folic acid	Vitamin B7 (biotin)
	Vitamin B12 (Cobalamin)

Macrominerals	Microminerals	
Calcium	Chromium	Nickel
Chlorine	Tin	Iron
Sodium	Zinc	Molybdenum
Potassium	Vanadium	Fluorine
Phosphorus	Copper	Iodine
Magnesium	Silicon	Cobalt
Sulphur	Manganese	Selenium

Essential Fatty Acids
Alpha Linolenic Acid (ALA) (Omega-3)
Linoleic Acid (LA) (Omega-6)

These nutrients are considered essential because a deficiency condition has been identified for each nutrient.

Other Nutrients
Resveratrol
Co-Enzyme Q10 (CoQ10)
Pyrroloquinoline Quinone (PQQ)
Lipoic Acid
Fucose
Beta-Glucans
Etc.

Some Reasons We May Need to Supplement Our Diets.
Poor Quality Primary nutrition
Diminished Digestive Efficiency
Genetic Error
Loss of Enzymatic Efficiency

Many other nutrients are now being found to be conditionally essential, meaning that though we can produce these nutrients, conditions such as stress and aging may make these components essential for our wellbeing.

The ratio of nutrients is also important. In the case of essential fatty acids our ancient diets would have contained a 1–2:1 ratio of n-6 to n-3 fatty acids.[120] Due to the increased intake of vegetable oils from corn, sunflower seeds, safflower seeds, cottonseed, and soybeans, the ratio of of n-6 to n-3 fatty acids ranges from ≈20–30:1 in Western diets.[121] This altered ratio is linked to many chronic diseases.

Our poor health may not be due to what we eat but rather due to what we do not eat.[122] Only 4% of U.S. adults and children over 12 are consuming sufficient whole grains.[123] Similarly, less than 4% of the population eats sufficient fruits and vegetables to account for minimal Required Daily Amounts (RDAs).

Food production and processing also affects the quality of our foods. Mineral deficient soils produce mineral deficient foods.[124]

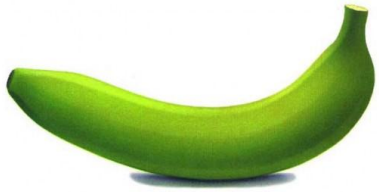


Illustration No. 6.1

Green harvesting (harvesting before fruit is ripe) interrupts the natural biology of the plant before it has manufactured most of the nutrients we should be getting.[125]

Farm-raised salmon contains only one-fourth of the Vitamin D found in wild-caught salmon.[126] Some foods also lead to diminished nutrient intakes.[127] Processed food, excess protein, and refined sugars require most of our mineral stores in order to digest it and remove it.

Illustration No. 6.2

Congenital digestive defects, intestinal disease/resection, drug interaction and chronic alcohol use all interfere with nutrient absorption.[128] About 50 human genetic diseases cause defective enzymes to be produced.[129] During our lifetimes, accumulated free radical damage anywhere along the DNA that code for enzymes can weaken the transcribed enzymes. Inadequate antioxidant nutrition leads to oxidative damage of enzymes after they're formed, resulting in a further loss of activity.[130] Importantly, the use of high doses of the corresponding vitamin cofactor can improve the effectiveness of weakened enzymes to help us recover some of our lost enzyme function.[131,132]

Fortunately Man was designed to live in an imperfect world. The body has multiple compensating mechanisms that help us survive under less than ideal conditions. Nevertheless, limited resources lead to prioritization. The most important priority is survival. Even in survival there are priorities. Survival of the species (reproduction) takes priority over the long-term survival of the individual.[133] The micronutrient deficiencies, that most of us live with, also lead to

selective allocation of scarce cellular resources. In these cases, immediate survival is supported at the expense of maintaining DNA integrity, placing the individual at greater risk for degenerative diseases and cancer in old age.[134]

There are thousands of phytonutrients present in every bite of raw, whole foods. Many of these may yet be identified as essential depending, on what standard we set for our health. Today's standard of "normal poor health" does not require that these nutrients be present in our diets. It is our choice what standard of health we set for ourselves. Because we accept our ignorance and nature's wisdom, inclusion of the most complete whole foods in our diets is a wise choice.

We do not have to be slaves to our genetics or our age. We can take steps to compensate for our environment and our physical imperfections. Complementary nutrition is one of the easiest and most directed actions we can take to improve our health.

Principle Six: Adequate Exercise

For each hour of regular exercise you get, you'll gain about two hours of additional life expectancy....[135] Harvard Alumni, Forty-year study.

The human body is designed to move freely, to walk, run, play, work, dance … and accomplish great things! But if we fail to exercise those muscles at a level sufficient to maintain their health, they will progressively get weaker and smaller, with progressive loss of both their function and structure which … equals loss of ability and aging, no matter how old we are.

Illustration No. 6.22

In times past, the process of living involved a great deal of physical activity, but that isn't usually the case today. Many of us live sedentary lives, and though we all know that exercise is good for us, how many of us understand that its benefits extend far beyond potential weight loss or strength building. Both quality and quantity of life are at stake. In 2006, the American Cancer Society reported that regular exercise may be helpful in preventing breast, colon, prostate, and endometrial cancer, all common cancers of today.[136] A fifteen-year study of 2,478 18-30 year-olds revealed that the participants with low-fitness were up to 6 times more likely to develop diabetes, hypertension, and metabolic syndrome than participants with high-fitness.[137] Regular physical activity can also relieve tension, anxiety, depression and anger. Even modest exercise can make a big difference in how we feel, how we look, how we think and see the world, how we love, and how we age.[138] In fact, for each hour of regular exercise you get, you'll gain about two hours of additional life expectancy, even if you don't start until middle age. Moderate exercise, such as brisk walking for as little as 30 minutes a day, has significant proven health benefits![139]

Even though we know it's good for us, exercise is often dreaded, but if we can find a way to find personal value in it we're very likely to at least give it a try, and once started we're more likely to persist. Those who get the most pleasure from exercise are the ones who've made a choice to approach it with a positive attitude, looking for things to enjoy and expecting real benefits. Getting in shape and gaining energy are expected, but if we choose something we really enjoy doing or at least have potential to enjoy, the benefits will be multiplied. Having a family member or friend to "buddy" with can bring an added level of commitment, mutual encouragement, motivation, and the bonus of shared time to boot.

Whatever exercise is chosen, look for aspects to appreciate. If you enjoy being outside, look for anything and everything beautiful as you're walking or biking. Maybe you'll choose to take photos, or

prepare for an event like a walkathon or marathon and savor every step of progress toward supporting the purpose being served. Whatever your approach, consider keeping a journal to capture the steps of your journey, the pleasant surprises, challenges, victories and progress toward your clearly defined goals. Now, to START!

> ***Don't let what you cannot do interfere with what you can do!***
> **John Wooden**

There may be some reading this book who are not well enough to take up a new activity or even go for a walk, but if a person is able to flex any muscles at all, those muscles can be exercised. Coach John Wooden's words, quoted above,[140] are very meaningful in this regard. All of us have things we can't do, but we shouldn't let them interfere with what we can do. If it's work to lift an arm or leg off the bed, then working toward building strength to be able to do that easily and grow from there is a great 1st goal! Set true, but realistic goals. Most athletes know their options. We hope to present a range of possibilities that offer choices for almost everyone.

Suggested approach to beginning and exercise options.

There are numerous ways to begin, but consider these general steps for starting an exercise program.[141]

Step 1: Assess your fitness level. You probably have some idea of how fit you are. Please consult your physician if you have health challenges requiring clearance. This is a great time to use your journal, to have bench marks from which to measure progress.

Step 2: Design and write down your fitness program. Have a definite plan that fits your lifestyle. Start with something "do-able" and look for areas in your daily routine in which to incorporate activity.

Step 3: Assemble your equipment. Comfortable shoes and clothing, appropriate to the activity, are essentials for almost all exercise programs. Other items will vary.

Step 4: Get started. Start slowly and build gradually. The American Heart Association recommends 30-minutes of moderate activity, but

notes three quality 10-minute periods of activity are almost as beneficial to your overall fitness as one 30-minute session.[142] Do what you can, but not to the point of exhaustion, and never past it!
Step 5: Monitor your progress. Keeping a journal will truly help.

Stretching *is* great exercise for all ages. We're all familiar with a good stretch while yawning or maybe before exercising, but stretching is often overlooked for broader health benefits. It can increase flexibility, range of motion and joint comfort, improve circulation, increase oxygenation, enhance posture, relieve stress, promote relaxation, enhance coordination, and lower the risk of injury during daily activities of living. Studies also show stretching can enhance the metabolism of carbohydrates and lower elevated blood sugar.[143,144]

Illustration No. 6.23

Stretching is important because muscles tighten up with inactivity, and they become laden with lactic acid accumulating during strenuous activity (which contributes to soreness). Stretching muscles enhances circulation and allows the muscles to relax when they're tight and return to their normal, pre-exercise length. It also helps remove the lactic acid as needed. Space doesn't allow us to go into details of specific techniques here, but references are provided, usually through endnotes, within each section.

General guidelines for stretching.[145]
1) Stretch muscles evenly on both sides of the body.
2) Avoid over-stretching, evidenced by discomfort.

3) Stretch slowly and evenly, holding stretch static 15-30 seconds when appropriate.
4) Never bounce or jerk, which could cause injury.
5) Remember to breathe while stretching.

Selected Stretching Options

- **Wake-up stretches**. These can be done before even getting out of bed to give our metabolism a kick-start and give us an energy boost. These top-o-the-morning stretches are meant to be movement-focused (no static stretching) to help get joints moving, blood flowing and energy rising.[146]
- **Stretches for stress relief and re-energizing while seated or standing**. Take a couple of minutes several times a day to de-stress and reenergize. Give attention to stretching all major muscle groups, being very mindful of circulation in the legs. Remember to breathe slowly and deeply while stretching.[147,148]
- **Stretching before exercising**. Studies have raised questions regarding benefits of pre-exercise stretching. All authorities agree on the importance of warming up well, but some suggest repeated slow-motion movements of the activity while warming up, rather than aggressive stretching. Gentle stretching to enhance blood flow is fine, but consider holding the serious stretching until after exercising.[149] Again, choose what works best for you.
- **Stretching after exercising**. The goals of stretching after exercise are to relax the muscles involved, restore good blood flow to facilitate the process of clearing lactic acid and other accumulated toxins. Stretching at times not related to exercise is also beneficial toward prevention of injury.[150]
- **Stretch before sleep**. The goal of bedtime stretching is relaxation and better sleep. Focus on major muscle groups: legs, hips, lower back, neck and shoulders. Stretch each only as far as comfort allows, hold 15-30 seconds, then completely relax.[151] This will make a difference in quality of rest.

Walking

For those who are able, walking is one of the very best forms of exercise to be found. It is a natural, well-balanced, total body exercise that tones muscles, induces proper breathing, and burns calories. It can clear the mind, brighten the spirit, increase our mobility, improve muscular coordination, enhance endurance, and it facilitates all natural bodily functions. Walking fits all sizes, benefits all ages, and for many it can be a near zero-cost exercise choice.

Illustration No. 6.24

In addition to the health benefits just mentioned, walking's enhancement of immune function goes beyond even the earlier mentioned cancer prevention related to physical activity in general. Many of us have heard evidence regarding regular walking helping to improve our immunity and prevent colds and flu,[152] but an almost mind-blowing example of walking helping those already desperately ill was reported this summer (2011) by Duke Cancer Institute. The study involved 243 patients with advanced recurrent gliomas, lethal brain malignancies with an average life expectancy of less than six months. The patients who reported participating in regular, brisk exercise -- the equivalent of an energetic 30 minute walk, five days a week -- had significantly prolonged survival, living a median 21.84 months vs. 13.03 months for the most sedentary patients. [153]

If walking is that beneficial for even the most gravely ill, imagine what it can do for immune systems and overall health in most people.

Walking is man's best medicine! Hippocrates

There are numerous guides to beginning a *walking for exercise* program, but www.thewalkingsite.com appears to be a good source of info on most aspects. One thing not mentioned on their "Beginner" page is a pedometer, which can be a motivator, an encourager and a way to help us be accountable to ourselves. In essence, by counting our steps it measures the distance we walk. Knowing the number of steps taken is of value. There is actually a 10,000 Steps a Day Program that has been used by many people in their achievement of health goals.[154] These steps are counted above the usual steps in activities of daily living. A step-related article, **How many steps per day are enough? For older adults and special populations**, offers alternative numbers of steps for those in varied circumstances.[155] Regardless of whether or not the number of steps taken are part of a "program" chosen, seeing the number of steps walked in a given day can be greatly encouraging … or evidence that we need to refocus on our goals.

Rebounding for Health

Illustration No. 6.25

A number of years ago, one of this books' authors was ill to the point of not being able to walk any distance. Having contended with a number of serious chronic infections, complicated by lymphangitis for several years, her lymphatic drainage was obstructed, with many swollen and painful lymph nodes. It was suggested she try using a "rebounder," a small (3 ft.) special mini-trampoline, that provides low-impact, but potentially high-energy expenditure exercises. Concern about her poor balance was relieved by learning rebounders are available with an optional bar to use for stability. As it happened, the improvement in balance would be as important

as the lymphatic drainage benefits she experienced through rebounding. Her overall wellbeing was also improved.

An amazing fact is that you can experience a significant workout without ever bouncing off the rebounder surface. Although one can walk-in-place, jog-in-place or jump freely if desired, just bouncing to the extent of coming up onto the toes' tips involves the entire body. This makes rebounding something that everyone can benefit from, from serious athletes looking for an effective way to run or jog with less impact to joints to even the seriously ill. The potential for serious exercise is real. A 150-pound person can burn 410 calories an hour when rebounding as compared to 355 while running.[156]

Rebounding can be as fun and invigorating as are many popular exercises. It boosts circulation and cardio-respiratory function, can facilitate pain relief, improve agility, enhance balance, and is easier on joints than many other forms of exercise.

Rebounding is particularly good for supporting detoxification. The rhythmic bouncing is great for enhancing lymphatic circulation. This is especially critical for those who haven't been getting much physical activity because, unlike blood that's pumped throughout the body by the heart, lymph fluid (which circulates throughout the body as well) is moved to a great extent by a person's activity. Periodic "pumping" contractions of the lymphatic vessels play a role too, but during periods of inactivity and rest, lymph flow is sluggish, almost zero. With exercise, however, the lymphatic pump becomes very active, often increasing lymph flow 10-to-30 fold.[157] This is highly significant for everyone, but especially those dealing with any form of toxicity. Because rebounding actively promotes circulation, both of blood and lymph, and thus aids cleansing of the body at a deep level, it is sometimes referred to as "cellular exercise."[158] If we're not active enough to move lymph fluid, which carries out dead microbes and accumulating toxins, our cells are left to struggle in them and their own waste - which can result in a host of health challenges even before the inevitable degenerative diseases

they will cause to develop. The good news is, we have a choice! Rebounding is only one of many exercises from which to choose.

The benefits of adequate physical exercise can not be overstated, nor can the potential harm of inactivity. Search every aspect of your life to find opportunities to integrate physical activity into your daily routine. Find activities that you can feel good about … **get moving** and watch for the benefits and blessings along the way.

Whatever form of exercise you choose, the most important thing is to START and make exercise a permanent way of life!

Principle Seven: Adequate Rest

"If you could do less and become healthier, more productive and successful, would you do it? You can, if you know how to rest." Matthew Edlund, M.D.[159]

The word *rest* is the root word of restoration, as in restoration biology – the amazing process through which our bodies continually renew and rebuild themselves day by day. It is during rest that the majority of the restoration process takes place most efficiently. Without rest, our cells don't reconfigure and regrow, rebuild, and regenerate themselves, so the degree to which restoration can take place depends on our choices and actions regarding rest. Restoration occurs during not only physical rest, but also mental, social and spiritual rest. Sleep is an example of *passive* rest that impacts all these areas, and will be the first form of rest considered. Passive, in this instance, doesn't mean idle by any stretch, it just means that the processes during passive rest occur without our having to think about them.

Illustration No. 6.26

Sleep is not optional. The number of hours we each need may vary, but the consequences of habitually getting less sleep than needed can range from compromised interpersonal relations, to struggling to make it through the day when we're feeling the weight of the world, to major work and health crises.

Why sleep is so important. A great deal of restorative work is done at the cellular level as we sleep. Two of the busiest sites are the liver and the brain. Our livers carry out their best restorative processes in darkness, from 9:00 PM to 3:00 AM. Sleep disruptions during this time can negatively impact that process, which is critical to immune function, glucose metabolism, blood detoxification/purification, and metabolism of nutrients for starters.[160] Sleep is essential for a healthy liver, and therefore critical to every aspect of our well-being.

Adequate sleep is also crucial to proper brain function, including memory and learning. Our brains are continuously rebuilding and rewiring as we learn new things through doing. It is during sleep that the brain sorts, sifts, stores and integrates this new information. Lots of complex learning is being archived during deep sleep, and disruption can result in failure of that memory process.[161] Any amount of sleep deprivation will diminish mental performance. One complete night of sleep deprivation is as impairing in simulated driving tests as a legally intoxicating blood-alcohol level.[162] With chronic deprivation, metabolic and endocrine changes mimic many of the hallmarks of aging and may not only hasten the onset but could also increase the severity of age-related ailments such as diabetes, hypertension, obesity, memory loss .[163]

Illustration No. 6.27

Most people need 7-8 hours of sleep. A recent survey found a growing number of people are sleeping less than six hours a night, and as many as 75% of us have sleep difficulties at least a few nights per week.[164] Insufficient sleep results in decreased immune function and increased potential for infection, increased stress hormone production, insulin resistance, weight gain, cardiovascular disease, depression, increased pain and pain syndromes like fibromyalgia, [165,166,167] and reduction of medication's analgesic effects.[168]

Measures to enhance sleep.

1. Make sleep/rest a priority.
2. Stick to a regular schedule based on your biologically preferred time of sleep.
3. Get adequate exercise during the day – regular exercise is best, but avoid strenuous exercise right before sleep.
4. Limit caffeine to early in the day. Read labels.
5. Avoid big meals at night and limit rich foods to two hours before bedtime. Also avoid foods to which you're sensitive.
6. Try to avoid eating close to bedtime, or have a light snack.
7. Avoid alcohol before bed.
8. Read uplifting material, focus on relaxing, avoiding worries.
9. Develop a ritual that will facilitate your being ready to fall asleep at the time you've chosen.
10. Ban the Blackberry!
11. Make your sleeping area conducive to sleep. Have comfortable bedding and bed. Avoid restrictive clothing. Adjust the ambient temperature for sleep comfort, When possible, eliminate disruptive noise, light, electro-magnetic fields.
12. Quit smoking. Nicotine is a stimulant that interferes with healthy sleep, as does nicotine withdrawal.
13. Seek advice from a sleep or EENT specialist as indicated for: persistent insomnia (difficulty falling or staying asleep);

Illustration No. 6.28

persistent daytime fatigue or falling asleep inappropriately; snoring with pauses in breathing; unrefreshing sleep; frequent morning headaches; physically acting out dreams during sleep or inability to move on waking; persistent laryngitis or persistent heartburn that's unresolved by standard forms of treatment.

A word about snoring and sleep apnea. Though most with obstructive sleep apnea snore, about 3% of those with sleep apnea do not snore appreciably. Airway obstruction is silent for them, but no less serious. If any of the symptoms in number 12 above strike home for you or a loved one, please don't ignore them. Sleep apnea often involves significant oxygen deprivation to the brain many times a night. Besides feeling exhausted all the time, there is grave danger of serious neurological, cardiovascular, and systemic damage being done. It can be life threatening. Please seek help.

The value of naps. Studies show naps can reduce sleepiness and improve cognitive performance. Brief (5-15 min) naps provide almost immediate benefits that last 1-3 hours. A notable study done by NASA demonstrated that when pilots were allowed a nap during night flights (with co-pilot flying the plane), their performance improved by 34 percent, and physiologic alertness improved 54 percent compared to the no-nap condition.[169]

Active or Intentional Rest can also greatly enhance health. Rest, the restorative, renewing processes our bodies carry out, involves much more than just stopping exertion or finding time to sleep. It includes intentionally relaxing, refreshing ourselves and recovering strength for the whole person. Dr. Matthew Edlund, in his book, **The Power of REST: *Why Sleep Alone Is Not Enough …*** has identified and explored four kinds of "Active Rest" that can take our ability to benefit from rest to a new level.[170] They are briefly summarized, with adaptation, as follows.

Active Physical Rest – is a conscious, intentional and directed way to use our bodies' basic processes, like breathing, to calm, restore and relax both body and mind. We can choose to use related techniques at any time, some of which can produce benefits in less than a minute. Examples include: deep breathing; poses that enhance posture, conditioned relaxation; and things that help us relax at will. [171]

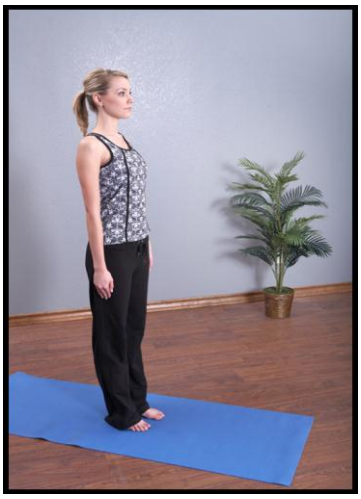


Illustration No. 6.29

Mental Rest – is the intentional, intelligent focusing of our minds on something beyond our body in a way that stops other thoughts, slows the mental chatter, and provides a sense of renewal. Our focus can be on something we look at or listen to in our environment, or we can use visual imagery with our eyes closed. Mental rest is learning to concentrate and rest at the same time, while reconfiguring our minds to quickly experience a sense of relaxed control – if even for seconds at a time. It can lower blood pressure and heart rate, train the eye, help us calm ourselves in the midst of chaos, and regain a sense of purpose. [172]

Social Rest – is based in our interconnectedness with others, which is an option pretty much wherever we are with people who provide a sense of belonging and feelings of comfort, purpose and love. Our social integration directly impacts our survival. Building meaningful "connectedness" with family, friends, coworkers, neighbors, can greatly enhance health. [173]
(Continued in "Meaningful Relationships" section.)

Spiritual Rest – "is the practice of connecting with things larger and greater than ourselves that provide fellowship and meaning in life – factors many people hunger for like food."* It can impact how we think, what we can do, how we interact with others, and how we see the world.[174] (More on this under the Principle Nine - "Spiritual Foundation" section.)

Easy-to-understand consequence of failure to rest: A lecturer raised a glass of water and asked, "How heavy is this glass of water?" Varied answers were called out. The lecturer replied, "The absolute weight doesn't matter, but how long one tries to hold it does. If I hold it for a minute, that's no problem. If I hold it for an hour, I'll have an ache in my right arm. If I hold it for a day, I'll need an ambulance! In each case, it's the same weight, but the longer I hold it, the heavier it becomes." He continued,

Illustration No. 6.30

"And that's the way it is with our burdens. If we carry any given one all the time, sooner or later, we won't be able to carry on. As with the glass of water, every burden must be put down for a while so we can rest before picking it up again. When we're rested and refreshed, we can once again lift it and carry on." [175]

It's a simple principle. We are designed to require rest – physically, socially, mentally and spiritually. Entirely new levels of possibility open up to us when we choose to learn how to take advantage of the varied forms of rest and put what we've learned to work for ourselves. Dr. Matthew Edlund's book, **The Power of Rest,** is one source from which to learn techniques that can help us maximize the possibilities.[176]

Principle Eight – Meaningful Relationships

We are born unique and complete individuals, but totally dependent on others for almost every need. Among them is the need for caring relationship, which is as essential to survival in infancy as is food and shelter. The importance of such a relationship was documented as early as the 13th century by Franciscan monk Salimbene di Adam as he chronicled an experiment done by the Holy Roman Emperor Frederick. Frederick dictated "foster-mothers and nurses to suckle and bathe and wash the children, but they were to in no ways prattle or speak with them." Frederick did this because he wanted to learn what language they would ultimately speak on their own accord naturally. Salimbene later noted that Frederick, "labored [in] vain, for they could not live without clappings of the hands, and gestures, and gladness of countenance, and blandishments."[177] These babies had all their physical needs met, but couldn't survive without meaningful relationships with their caregivers. We are born to relate with others. Our lives and health depend on it.

Illustration No. 6.31

Studies show that social relationships have short and long-term effects on health, for better and for worse, and that these effects emerge in childhood and cascade throughout life to foster cumulative advantage or disadvantage in health.[178] As we grow, we become more and more independent, but even at the peak of adult independence, we live in interdependent relationships at every level. The quality of those relationships has a significant impact on our overall wellbeing and longevity. Do you have relationships in which, when you're with certain people, you feel energized, encouraged and empowered? It's easy to understand that such relationships enhance our quality of life and provide the active social rest considered in the last section. They can also help

us cope, encourage more healthful lifestyles, provide stability, build self-esteem, and help us function at higher levels. Building these types of meaningful relationships can literally change not only our quality of life, but also our length of life! Social relationships – both their quantity and quality — affect mental health, behavioral health, physical health, and mortality risk.[179] An excellent example of potential benefit in meaningful relationships is given in a recent (2011) study that demonstrated a consistent survival advantage for married over unmarried men and women, and an additional survival "premium" for the married men.[180] A longterm, comprehensive study of 6,928 young-to-middle-aged adults revealed the relative risks of death for those who were identified as socially isolated were 2.3 times greater for men and 2.8 times greater for women as compared to those more connected.[181] Our meaningful "connectedness" with others is life-and-death important.

Illustration No. 6.32

Considerations for building meaningful relationships.

1. Be open to making new relationships; investing in existing ones; and working to restore valuable broken ones.
2. Optimize communication skills. Consider the following:
   - Communication styles vary. For example, in some cultures verbal communication is boisterous and assertive, while in others much is communicated in the spaces between the words. If such differences aren't considered, the boisterous person may feel ignored and the reserved one yelled at.
   - Listening communicates interest and caring.
   - Letting others speak without interruption communicates respect.
   - Watching for non-verbal cues can facilitate understanding the words spoken.

- Clarifying what the person is saying before responding communicates a real desire to understand and prevents misunderstanding and saying something to regret. Making assumptions is a good way to torpedo a relationship.
- Expressing appreciation for the other person's thoughts, opinions and feelings communicates that he or she is valued.

3. Look for things in common to build on.
4. Be trustworthy and trusting (to the extent possible).
5. Be honest.
6. Be dependable.
7. Be realistic and careful with time spent in relationships that are energy-draining or negative. Seek counsel, if needed, to determine if the relationship can be saved or should be ended.

Remember, relationships have great power for both positive and negative effects on our health and lives. The good ones are like jewels and can magnify our joys, cushion our sorrows, restore our energy and enhance our health and longevity. The negative ones may yet hold potential for healing and great good, but caution, patience and wisdom are key requirements to experience the best outcome for all involved.

Principle Nine – Spiritual Foundation

The spiritual search for meaning and hope in life is integral to human existence.[182]
Marek Jantos and Hosen Kiat

In today's world, the meaning of spirituality ranges widely from a basic belief that the universe must hold something greater than self all the way to devotion of one's life to serving the Creator of the universe. For the purpose of considering it as one of the principles of good health, we're going to look briefly at just a few aspects of spirituality that have application to the concept of restoration and to enhancement of good health.

We are spiritual beings living in physical bodies, which would help explain why some scientists argue we are hardwired to be spiritual.[183] That would be consistent with the fact that we humans are always searching for meaning beyond ourselves. Mario *Beauregard* and Denyse O'Leary, in their book ***The Spiritual Brain: A Neuroscientist's Case for the Existence of the Soul***, state, "The transcendental impulse to connect with God and the spiritual world is one of the most basic and powerful forces in Homo sapiens."[184]

Illustration No. 6.33

Census findings in 2001 revealed that 74% of Australians and 96% of Americans believe in a higher power; and there is growing evidence that certain spiritual beliefs and the practice of prayer are associated with improved coping and better health outcomes.[185] For example, one publication identified over 1200 studies that had examined the relationship between aspects of religious/spiritual belief or behavior and varied indicators of health, and concluded that most studies found a positive association between religion/spirituality and physical and mental health. [186]

Spiritual factors can play significant restorative roles in health and quality of life. As we briefly consider a few of these factors, we will share both evidence of their importance to health and options to consider for application in our lives.

Love is a powerful health promoter. From a scientific standpoint, love activates areas in the brain responsible for emotion, attention, motivation and memory (i.e., limbic structures), and it may further serve to control the autonomic nervous system, i.e., stress reduction. This specific CNS activity pattern appears to exert protective effects, even on the brain itself.[187] Researchers at Yale University found that love protects our hearts.[188]

The benefits of meaningful relationships were addressed earlier, so our focus here is on love that involves chosen, intentional, decisional actions that put what is right and best ahead of personal feelings or wants.

- While it might seem contrary to what's just been stated, this begins with healthy love for self. You might ask if that isn't selfish, but when we consider the Biblical admonition to, "love your neighbor as yourself,"[189] we can see that loving our neighbor is contingent upon loving ourselves. It's clear that this love calls us to value others, and we know love calls for our best efforts. So, isn't it logical that we must care for ourselves in the best way we can as well – to have our best to offer? This brings to mind the instructions we're given on every commercial flight we take: "If you see the oxygen mask drop down, put your own mask on first, and then that of your child (or others who need assistance)." It's a good example of loving ourselves, which better enables us to help others … and optimize our potential. We've already identified many loving things we can do for ourselves, like giving our bodies good nutrition, adequate rest, fresh air and such. Something else to consider is what we say to ourselves when we make a mistake. Remember, our thoughts and words can change our DNA. Calling ourselves (or anyone else) stupid or clumsy or hopeless is not a loving thing to do, and can actually do harm. Try replacing such self-talk with something like, "I usually do better than that." Being human, none of us are perfect, which helps keep us humble. True humility is good.
- Another example of decisional love is volunteer service to others. That's not to say we don't experience great feelings through serving others, but our decisions to show up to serve – or stay to serve – are made even though there may have been multiple legitimate reasons to have chosen to be elsewhere. Such service provides multiple benefits to both the served and the server. Quantitative analysis demonstrated a significant decrease in stress and identified three main pathways through which volunteering affected quality of life favorably: perceived

Illustration No. 6.34

health benefits, sense of purpose and usefulness, and relationships.[190] Other studies have shown that helping others contributes to longevity, better mental health, boosting the immune system, reducing stress and diminishing the effects of physical maladies.[191] A study done by Emory University found that helping others activated the same parts of the brain as occurs when people receive rewards or experience pleasure.[192]

- Another aspect of love is the "Golden Rule," which is both a combination and a continuation of the first two examples of decisional love. Found in one form or another in almost every religion, Confucius says it most succinctly, "Do unto others what you want done unto you." Examples: practice random acts of kindness, show appreciation, affirm at every opportunity, communicate that you care in word and deed. It's love in action.

Forgiveness offers benefits to both the forgiven and the forgiver. Many think the benefits of forgiving others are primarily for the one needing forgiveness, but that's not true. It's been said that not forgiving is like taking poison and expecting the other person to die. Obviously, the one hurt most would be the person who drank the poison. In fact, chronic and intense unforgiveness are health risks themselves.[193] On the other hand, in the Fetzer Institute article, *Health Benefits of Love & Forgiveness*, it's noted that forgiveness is associated with emotional, mental, and physical well-being. Research has also shown that forgiveness can reduce grief, depression, anxiety, and anger in the forgiver. At the same time, it can increase self-esteem, hopefulness, and positive attitudes toward the offender, as well as a desire for reconciliation and restoration of the relationship.[194] It does not free the offender of consequences for bad acts, but it's always good to forgive.

There are numerous guides to forgiving others and ourselves, one of which is provided in an abbreviated format. For the complete guide see: http://www.exploringwomanhood.com/mindbodysoul/forgive.htm.

7 Simple Steps to Forgive Others and Yourself
by Connie Bennett, C.H.H.C.[195]

F -- Face the facts.
O -- Oust the anger.
R -- Remember the offenses..
G -- Give the benefit of the doubt.
I -- Imagine what forgiveness feels like.
V -- Value the experience.
E -- Embrace forgiveness.

Forgiving won't change the past, but it will enlarge the future!
Paul Boese

Gratitude is a wonderful framework for abundant life! One of the authors served for several years as a medical missionary in remote, undeveloped areas of Guatemala and West Africa. It was there the true meaning of living in 'an attitude of gratitude' came to life. Most of the people served lived in dirt-floored, thatch-roofed huts. Closets weren't needed, because their "spare" clothing could be neatly hung on a few pegs. No electricity. No running water. Their living conditions would be considered below poverty in much of the world. And yet, their attitude was one of total gratitude for what they had. It was a rare sentence spoken that wasn't followed by, "Gracias a Dios," (thanks be to God). They were homesteaders, and they framed every day in the context of being thankful for what they had rather than being saddened by what they had not. It wasn't that they had no ambition or desire to improve things, they were working hard to make a better life. Nor was it a matter of their not having suffering and

sorrow. In spite of those realities their contentment, or being happy in the present, was based in finding a way to experience joy in what they had rather than missing the blessings along the way by longing for what they wanted.

Dr. Robert Emmons of UC, Davis, reminds us that throughout history, philosophers and religious leaders have extolled gratitude as a virtue integral to health and well-being; and that professionals taking a close look at how such virtues like gratitude can benefit our health have seen promising results. "Grateful people – those who perceive gratitude as a permanent trait rather than a temporary state of mind – have an edge on the not-so-grateful when it comes to health. They take better care of themselves and engage in more protective health behaviors like regular exercise and a healthy diet."[196] In other words, they try to steward well what they have.

Gratitude research is beginning to suggest that feelings of thankfulness have tremendous positive value in helping people cope with daily problems, especially stress. Grateful people tend to be more optimistic, which researchers say boosts the immune system. This is important because effects of stress on regulation of immune and inflammatory processes have the potential to influence depression, infectious, autoimmune, and coronary artery disease, and at least some (e.g., viral) cancers.[197]

Cultivating an attitude of gratitude. Here are a few ideas to help us grow our gratitude. Many are taken and/or adapted from articles by Elizabeth Heubeck and Claudia Wallis.[198,199]

- Keep a gratitude journal. Each day, or at least once a week, write down three things for which you're most grateful.

- Count your blessings. Make a list of every blessing you can think of. Consider very basic things, too: Can you take a deep breath with ease? Can you see a loved one's smile?
- Reframe difficult situations by looking at them from a more positive perspective. Dr. Sam Quick gives the example of choosing to see his 6-year-old daughter as a tired little girl who needs rest rather than a cranky, irritable and troublesome child.
- Use optimistic, creative, encouraging, appreciative self-talk.
- WATCH FOR THE BLESSINGS ALONG THE WAY!

We are, indeed, spiritual beings. We have many ways to measure health in our physical bodies – and remedies for many maladies, but if our spirits are sick or wounded, those remedies may or may not help to restore health. Our spirits, our souls need care and restoration, too. We've not even scratched the surface of this subject, but hope to have provided a place to start.

Principle Ten – Passion and Purpose

Without passion man is a mere latent force and possibility, like the flint which awaits the shock of the iron before it can give forth its spark. ~
Henri-Frédéric Amiel, Journal, 17 December 1856

Illustration No. 6.33

The word "passion" has more than one meaning, but as a Principle of Good Health, we are defining passion as the life-enhancing energy and joy brought to working toward fulfilling a given purpose, or living life to the fullest. This has application to our health and restoration biology for at least a couple of reasons. First, our passion – as is true for our bodies – will be daily restored and optimized

to the extent it is nurtured by the choices we make and the actions we take that allow it to flourish. Secondly, as our passion and purpose grow, assuming they are constructive, our overall health and lives will be enhanced.

Much has been written about the importance of passion in achieving success – of any kind**,** including the fact that embracing and pursuing any true purpose in life can make a positive difference toward better health. For example, studies have shown that the risk of death from stroke, cardiovascular disease, and all causes is lower in those with a strong sense of purpose.[200, 201] A recent study found that the degree to which individuals had a sense of purpose in life was the single most important factor in determining mental health outcomes after serious trauma. Another study revealed elderly people with a strong sense of purpose in life are almost 2½ times less likely to develop Alzheimer's disease.[202]

Passion and purpose come in different sizes and shapes, but to the extent that we are able to find meaning and value in what we do, whether it's caring for our family or searching for the cure to a dread disease, it will benefit our health and longevity.

There are other benefits to living with purpose and passion.
Here are a few examples.

1. Positive energy being generated flows into all aspects of our lives.
2. We grow more able to shape our lives by design rather than default!
3. We tend to relate to whatever we do with a greater sense of freedom.
4. Our overall sense of purpose and ability to achieve our potential grow.
5. We have a mounting sense that we are living up to our potential.
6. Our motivation stays high and becomes contagious.
7. We become more productive and successful – by our definitions of success!

Many have a hard time discovering their "life" purpose and passion. If this is true for you, you're part of the 75% of the population that don't know theirs' either. If you'd like to discover yours, there are excellent resources that can be found in libraries, or, most easily,

through an Internet search on the subject of "finding your passion." For an already sorted list, check out http://findingyourpassion.org/. We'll share a couple of simple examples here for starters.

1) In Tips in Finding your TRUE Passion, it's noted that asking a number of questions may help us figure out what we "were born to do." Details for each of the questions below may be found at: http://www.christinedwyer.com/tips-in-finding-your-true-passion/.[203]

1. What puts a smile on your face and makes you HAPPY?
2. What comes EASY for you?
3. What gets your CREATIVITY flowing?
4. What would you do for FREE?
5. What do you like to TALK about?
6. What makes you UNAFRAID of failure?
7. What would you REGRET not having tried?

2) One of three suggestions given in Mary DeMuth's **Find Your Passion in Three Steps** is to ask several friends (she pasted the question on FaceBook) the question, "What is my one thing?" She was amazed by how willing those who responded were to help her, and how insightful and similar the responses were.[204]

Purpose and Passion **-** We don't have to have a single passion-driven purpose in our lives to be happy and fulfilled, but we will benefit in many ways from finding purpose and joy in what we do. The important thing is to look for purpose – in both small and grand places – that will evoke passion. Even if it's very limited to begin with, the critical thing is to START looking … and we're sure to find (or restore) purpose and passion in our lives – that will likely enhance both their quality and duration.

CONCLUSION

The Concept of Restoration Biology® is a new perspective on health and longevity that gives us hope for the future. The focus on meeting the basic **A**ntioxidant-**I**mmune-**M**etabolic (**A.I.M**) needs of the cell give us direction in supporting this incredibly complex home we call the body. The discussion of the Ten Principles of Good

Health provides us a unified wholistic picture of health that allows us to choose many effective ways to improve all dimensions of our health.

In the end, the purpose of this book is to give hope, understanding and courage to others by sharing what we have learned in two lifetimes of pursuing our own health and assisting others in regaining and maintaining their health. Thank you for letting us share our experiences with you.

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