Fantastic Voyage
Live Long Enough to Live Forever
By Ray Kurzweil and Terry Grossman, M.D.

The Big Idea
Houses last only as long as they're proactively maintained - all damages repaired, dangers successfully confronted, parts replaced, and so on and so forth. The same is increasingly becoming true for our bodies and brains. At this point in time, we fully understand the methods underlying the maintenance of a house, but we have yet to come to an understanding of all of life’s biological principles. However, we’re coming to realize that aging is not a single process but a group of related processes. Groundbreaking new strategies for countering and even reversing each of these individual processes are emerging, such that the next few decades will usher in a new era in human history - a true “fantastic voyage” in every sense of the term.

This book, then, is intended as a guideto living long enough in good health and spirits to take full advantage of the technological breakthroughs that are coming and which will effect revolutionary changes in the way we live life. These include procedures such as gene therapy and the utilization of micro-machines. We need not wait for these new super-technologies to be introduced, say the authors, to start improving our lives; we can do so through the methods they introduce in this book.

Lastly the authors also provide a link to their website, fantastic-voyage.net, for more tips, further details and updates.

Food and Water

Water and Health
Water doesn’t just have to be clean to promote health. Its alkalinity or acidity is also vital. Among other things, alkaline reserves are our first line of defense against deadly free radicals.

A person’s health is exceedingly sensitive to the slightest change in the level of pH (the measure of alkalinity or acidity) of body fluids. Should a body’s fluids’ pH change too much, they won’t be able to perform their proper functions - leading to illness and, in extreme cases, death. Also, cancer cells like acidic environments, and routine consumption of phosphoric-acid containing drinks promotes bone loss.
The natural alkaline buffers in our bloodstream easily neutralize extremely acidic drinks like coffee and cola. However, this means that these buffers can’t be used for their original purpose, to counter the acidic wastes the body generates in digestion, for instance. Calcium can be used to convert these acids to harmless substances, but the resulting substances can also collect in the kidneys and form kidney stones.

We must seek to restore alkaline reserves by:

- Avoiding indigestible acids, such as those found in colas and coffee (orange juice acids are digestible acids and also contain potassium and magnesium which create alkaline ions when mixed with water).
- Drinking alkaline water, which has a detoxifying effect on our bodies.

Two more tips:

- If you can’t get alkalinized water, filtered water will do (better than unfiltered water).
- Try drinking more water - a good average is nine eight-ounce glasses daily.

**Carbohydrates and the Glycemic Load**

Out of the three caloric sources (carbohydrates, fat and protein), carbohydrates are the only one that’s not necessary for survival. Yet our modern diets are dependent on a lot of the wrong carbohydrates.

The body’s drive to manage glucose levels in blood and cells using insulin is very ancient and linked to survival - yet with the vast amounts of sugar available now, this is more bane than boon.

Carbohydrates have powerful effects on the body. Our digestive systems simply can’t cope with the enormous quantities of sugar and carbohydrates in today’s Western-style diet! Constantly eating such amounts can, over time, cause our blood sugar-controlling mechanisms to break down, leading to diabetes.

A high level of blood sugar is bad for a lot of reasons:

- It inhibits the proper functioning of the immune system.
- It increases adrenaline unnecessarily (like revving up your system when it doesn’t need to be revved up).
- It encourages the growth of fungus, yeast and cancer cells.
- It interferes with the absorption of Vitamin C.
- It encourages the cross-linking of protein molecules (major cause of aging).
- It makes food pass through the digestive tract slower (leads to bloating and accumulation of toxins - can cause cancer).

Plus, temporary high levels of glucose can be addictive!
The solution, of course, is to cut high-glycemic index foods (high in simple sugars - although fructose, the natural fruit sugar, isn't so bad) out of the diet altogether. Try to avoid white potatoes, white rice, pasta, breakfast cereal and candy, and go for peanuts, beans, lentils, peas, carrots, brown rice and whole-grain bread.

Regarding alternative sweeteners, none of the artificial sweeteners developed thus far is safe for use. Instead, try Stevia, a natural sweetener which comes from a South American plant. It's nutritious, reduces blood pressure, kills tooth decay bacteria, increases energy and lowers craving for alcohol and tobacco.

**Fat and Protein**

**Fat**
We easily accumulate fat - it’s an ancient adaptation for survival. Fat is a very important source of energy reserve and hormones and other substances which regulate bodily health. However, it’s not as important for insulation and food storage as it once was, especially today.

There are different kinds of fat, which are as follow:

- Unsaturated - liquid at room/body temperature (present in nuts, fish and seeds).
- Saturated - solid at room/body temperature (present in butter, beef and pork and contribute heavily to heart disease, diabetes and obesity).
- Pathological - not formally a family but must be considered separately. Most commercial cooking oils fall into this category (they contain trans-fatty acids that contribute to degenerative disease).
- Cholesterol - not a fat but its metabolism is related to fat. It’s the primary risk factor for atherosclerosis. It’s made primarily in the liver and can only be eliminated through the body’s solid wastes.

Recommendations regarding fat:

- Limit saturated fats to around 7% of total calories consumed.
- Get dietary fat from nuts, fish (especially salmon), extra-virgin olive oil, flaxseed oil, vegetables, tofu and lean meat.
- Avoid saturated fat (fatty meat), commercial cooking oils, hydrogenated fat (present in butter and margarine), and deep-fried food.

**Protein**
Proteins are the foundation or “building blocks” of all life. They carry out all functions of living creatures.

All sorts of proteins are necessary for health, but it may be best to get the bulk of one’s protein from vegetables if possible (less concentration of chemicals, pesticides and hormones than meat), and/or from animal sources such as egg whites, lean meat and fish.
Digestion

The importance of digestion cannot be underemphasized. After all, the nutrients in the food one eats can only be made good use of if digested properly. Also, as the ideal diet varies from person to person, so do their digestive habits. This means that one needs to properly assess one’s digestive processes (through stool sampling and hair examination) to be able to get a good gauge of one’s health.

For good digestive health, consider eating or drinking the following:

- Organic whole foods or unprocessed foods (unpolished and unprocessed grains, fruit, fresh organic vegetables).
- A great deal of vegetables, including freshly processed vegetable juices.
- Tea (instead of coffee, soft drinks and alcohol).
- Dietary supplements such as vitamins and minerals.

Other tips:

- The food one eats must also be as varied as possible.
- Never skip breakfast! It’s an excellent start to the digestive system.
- Avoid unhealthy snacks (high-fat, -cholesterol and -sugar snacks).
- Plan ahead if going to a party or traveling - bring whatever you need to eat with you.

Change Your Weight for Life in A Day!

First things first - the first good component of an effective diet is determining the maintenance number of calories that one should consume to maintain health (going over this number will simply contribute to weight gain).

Some tips for healthy and permanent weight loss:

- Don’t change foods radically (the anxiety to return to the initial diet will be very high).
- Make health the goal, not weight loss.
- Don’t rush weight reduction.
- Exercise as much as possible to increase metabolic rate.
- Practice caloric restriction - this prolongs life.
- Decrease carbohydrates and fats.
- Eat lots of vegetables and fiber.

And, just as important, part and parcel of each and every lifestyle change must be accompanied by a change in attitude in order for the change to be a lasting one. In this case, instead of thinking of a diet change as temporary deprivation, think of it as a long-term commitment to healthy eating. This can spell the difference between success and failure!

The Problem with Sugar and Insulin

Any healthy diet or weight-loss program must begin with the elimination or, at least, the reduction of sugar. It’s a proven fact that sugar shortens life expectancy.
Sugar also causes considerable damage by increasing insulin levels in the bloodstream, as was discussed in preceding chapters. In relation with this, there is now a disease known as TMS (The Metabolic Syndrome), which results in an inability to properly process dietary sugar (insulin resistance).

A simple test for the possibility of insulin resistance: Get the circumference of your hips at their widest point and use it to divide your waistline measurement (waist measurement divided by hip measurement). If the ratio is less than 0.8 (for a woman) or 1.0 (for a man), you may have TMS.

If you find you already have TMS or Type 2 diabetes, the following are recommended:

- Weight loss, pure and simple.
- Proper diet.
- Resistance exercise (with weights - this increases tissue sensitivity to insulin).
- Supplements and medicine as per doctors’ instructions.

The Promise of Genomics

Genomics is the study of the composition of genetic material - the DNA in genes and chromosomes. To make effective lifestyle changes, one needs to know what genes one’s body contains, and what diseases/conditions one is predisposed to have as a result of such. (It’s important to note that almost all genes express predisposition only - people’s lifestyle choices have a larger role than genes do in determining their health. However, working on one’s genes is still important.)

Personal genomics technology became available in 2002 - this allowed people to find out what genes they carried. While we presently don’t have all the tools to remove bad genes and/or insert good genes into ourselves, we will ultimately have the capacity to do so.

Currently, genomics is able to modify the expression of genes by controlling how our metabolic pathways affect proteins, enzymes and hormones. In simple language - live well and eat well through diet, nutrition and lifestyle choices, such as those enumerated elsewhere, until the genetic revolution really arrives.

Inflammation - the Latest “Smoking Gun”

When a body’s normal state of balance is disrupted by illness or injury, different bodies respond with different reactions to restore balance - our immune systems come into play. This often manifests as inflammation and is necessary for survival. As a result, we have diseases and disorders like acne (inflamed skin), arthritis (inflamed joints), and asthma (inflamed airways).

However, another sort of inflammation can be going on in people’s bodies, invisibly and for years, and if overactive can lead to various conditions such as cardiovascular disease, Alzheimer’s disease, and cancer.
A new tool for measuring this “silent inflammation” has been developed, known as the high-sensitivity C-reactive protein (hs-CRP) test. CRP is a protein made in the liver and released into the bloodstream in response to any sort of inflammation. Other tests also exist, but this one is best at determining silent inflammation.

Some effective ways of decreasing all sorts of inflammation:

- Avoid foods that increase inflammation (red meat, eggs, sugar, coffee, alcohol, pastries, pasta).
- Eat foods that decrease inflammation (cold-water fish, herbs and spices like turmeric, rosemary, hot peppers and ginger, green tea, whole grains, green vegetables).
- Lose weight (fat cells are powerful inflammation generators).
- Exercise more (at least 30 minutes a day).
- Reduce stress.
- Take special medication.

**Methylation - Critically Important for Health**

Methylation is a chemical process in which a group of one carbon atom and three hydrogen atoms (a methyl group) becomes attached to other molecules. It’s a simple reaction but it can have devastating consequences for sufferers.

Defective methylation processes can interfere with toxin removal and lead to genetic damage. For instance a major methylation process converts the dietary amino acid methionine into homocysteine - a toxic by-product that accelerates aging and causes disease.

These defects can easily be detected with the right test - measuring the level of homocysteine in the blood (homocysteine stress test).

Methylation can be dealt with by changing one’s diet in the following ways:

- Take greater dosages of nutritional supplements - Vitamins B, B6, B12, folic acid, zinc, magnesium and TMG or trimethylglycine (even if blood levels of these appear normal).
- Reduce the amount of red meat and poultry you eat.
- Emphasize vegetables, fruit and fish.

**Cleaning Up the Mess - Toxins and Detoxification**

Every system in the body has a unique method of detoxification (mostly this is the liver’s job). Over time the toxins in our environment which we inadvertently consume - running the gamut from air, water, to even electromagnetic pollutants - take their toll on our health. Our bodies are often hard-pressed to get rid of them. Sometimes even our own bodies manufacture toxins (misformed or malformed proteins).
To deal with toxins:

- Undergo testing to determine the level of exposure.
- Make use of detoxification processes to maintain health and slow down aging. Chelating agents, for instance, remove heavy metals.
- Try to limit or avoid exposure to sources of toxins or pollutants.
- For malformed proteins, coenzyme Q10, NADH, carnitine, the B vitamins, magnesium and manganese can help.

**Heart Disease and How to Prevent It**

Heart disease is a major killer - many people have heart disease and quite a few of those afflicted die from it.

Doctors now understand that the main cause of heart disease is not the hard calcified plaque that collects in arteries, but the more volatile and inflammatory soft plaque. It turns out that hard plaque is actually more stable and less prone to cracking, while soft plaque is more fragile and can suddenly rupture, leading to a blood clot (and thus a heart attack).

The good news is that soft plaque can be dealt with easier than hard plaque (although the two are related and should both be treated as diseases):

- Diabetes and high blood pressure are risk factors for heart disease - treat them and you treat heart disease.
- Low-dose aspirin can reduce the risk of heart attacks by reducing inflammation and clotting at the same time.
- Silent inflammation also leads to the formation of soft plaque, so look for it as well.
- Seek to reduce weight if overweight.
- Treat cholesterol levels with supplements such as policosanol, gugulipids, Vitamin E, plant sterols and phosphatidylcholine.
- Reduce stress.
- Improve diet - less fatty foods, more healthier foods.
- Exercise!

**Prevention and Early Detection of Cancer**

People don’t catch cancer; it occurs within our bodies as a result of exposure to radiation (X-rays, bright sunshine), toxins and excessive stress, among other things.

Cancer can now be detected earlier than ever before by new early-detection tests. In addition the risk from cancer can be dramatically reduced with the right diet, nutritional supplements and lifestyle choices:

- Eat more organic plant-derived foods - consider vegetable juice.
- Try a Mediterranean diet (low in red meat, high in whole grains, fish and fresh fruits and vegetables) or a Japanese diet (high in soybeans and soy-based foods).
- Some supplements can help - Vitamin C, Selenium, coenzyme Q10, curcumin, melatonin, folic acid, EPA, DHA, beta carotene (not for smokers, though, as it increases the incidence of lung cancer in smokers).
Avoid sugar - cancer cells apparently love sugar.
Lose excess body weight.
Avoid tobacco.
Once again, exercise!

The Brain: The Power of Thinking and Ideas

The brain represents more than half of our biological complexity and is continuously rebuilding and reorganizing itself. Our understanding of this remarkable organ is growing all the time, especially with new technologies that allow us to get a closer look at it in action.

It’s important to keep the brain busy to keep it healthy. Maintaining intellectual activity can help prevent cognitive decline in old age. It’s suggested that thinking about bodily and brain health and engaging in research can help too. In addition, it’s exceedingly vital that we make the commitment to apply our own mental powers to improve our own well-being, which will exercise our brains and apply our thinking to a goal that’s both worthwhile and very achievable.

It’s also important to keep the brain healthy nutritionally, of course. Try non-prescription nutritional compounds such as vinpocetine, phosphatidylserine, ginkgo biloba leaf extract and acetyl-L-carnitine.

Hormones of Aging, Hormones of Youth

Two kinds of hormones exist:

- Anabolic hormones cause tissues to build or grow and keep people youthful - they are the “Hormones of Youth”. These are testosterone, estrogen (in women), progesterone, growth hormone, melatonin, insulin (in small amounts) and DHEA.
- Catabolic hormones cause tissues to be broken down – these are the “Hormones of Aging”. These are cortisol, insulin (in large amounts) and estrogen (in men).

A decrease in hormone levels is associated with aging. Aging results when the hormones of youth decrease and the hormones of aging increase (or decrease at a slower rate).

The sex hormones - estrogen, progesterone, testosterone - have powerful youth-promoting effects. But hormone replacement therapy (HRT) is said to be dangerous as it involves chemically altered hormones.

There are methods to maintain a healthy balance of hormones as one ages. If bio-identical hormones (the same hormones found in the body) are utilized, the benefits of HRT can be acquired without the risks.

Aggressive Supplementation

It’s been established that people need to take supplements to avoid illness and stave off damage from free radicals (molecules that are missing an electron in their outer shell and which compensate by stealing electrons from other molecules - damaging DNA greatly, which may lead to mutation). But FDA-suggested amounts may not be enough for some people.
There are 13 essential vitamins, 17 essential minerals and 2 essential fatty acids that we need to take to ensure health. They are essential because our bodies can't make them on their own. Aside from these there are also what are termed as supernutrients - nonessential but highly desirable nutritional supplements that optimize body functions and slow aging.

An optimal program combines genomics testing to diagnose individual metabolic requirements to restore healthy balance and maintain optimal health. It might be best to have oneself tested to know exactly what one’s body needs and how much of it would be necessary.

**The Power of Exercise**

The evidence is simply overwhelming: exercise enhances every one of the bodily systems and reduces the risk of just about every degenerative disease. A great number of today’s degenerative diseases exist simply because people today are excessively sedentary.

Both aerobic exercise (active exercise) and anaerobic exercise (resistance exercise) are exceedingly beneficial to the body.

Exercise works hand in hand with a healthy diet and other such lifestyle choices to enhance well-being and prevent disease. People going to exercise should consider the following:

- You may need to consult a doctor if you have a medical condition of some sort (take an exercise stress test if you are over 40 and/or have coronary risk factors such as male gender, family history, cigarette smoking and the like).
- Begin slowly (don’t overdo it at the start) and build up gradually.
- Try not to exert yourself too much.
- Use the right equipment - shoes and clothing.
- Always remember to stretch, warm up properly and cool down afterwards to stave off injury.

Lastly, exercise can never substitute for a good diet - dietary and exercise recommendations work together; one can never substitute for the other.

**Stress and Balance**

Stress is the arousal of the body and mind to demands and challenges. It in itself isn’t bad; as it’s critical to be able to confront danger, and the human body has a built-in mechanism to do so. But if this mechanism is over-activated, it may lead to increased blood pressure and cholesterol, immune-system suppression and heart disease.

Oftentimes physical symptoms accompany a failure to deal with stress, such as high blood pressure, headaches, rapid heartbeat and muscle tension. Long-term damage can easily result.

Two important points regarding stress and stress management:

- We simply can’t avoid stress entirely, as we need challenge, commitment, curiosity and creativity - four constructive reasons to achieve a set of goals (and for which we could and should risk experiencing stress)
Compulsive eating, nicotine, alcohol, overdosing on caffeine and taking sleeping pills, as well as illegal drugs, are false stress relievers.

There are 12 ways to manage stress and, in effect, live better:

- Eat better.
- Avoid addictive drugs.
- Exercise.
- Get adequate sleep.
- Properly balance work, family and friends.
- Work on good time management.
- Take vacations.
- Talk and share your intimate feelings with someone.
- Learn to listen to other people.
- Get regular massages to help you relax.
- Have a life partner.
- Evoke a relaxation response by doing yoga and/or other forms of meditation (this lowers heart rate and blood pressure and helps you focus and concentrate better)