

## HealthyLIFESPAN program out-line, show No. 1 February 7, 2004

### What is life Extension?

Life extension is a term that has been in use by gerontologist (aging researchers) for several decades. It is simply, the potential to increase life expectancy through the modification of certain environmental and lifestyle factors...or a *HealthyLIFESPAN*.

These environmental and lifestyle factors include: Diet & dietary supplementation, exercise, stress, sleep, satisfactory work, meaningful societal contribution, regularity and balance of schedule including diet and exercise, unhealthy environmental exposures (toxins or toxicants) in your air, water, and food.

- A. After age 40, health is a result of the interaction of your inherited genetic factors and your environment.
- B. Most common diseases those over the age of 40 if you're not conscious of your individual health needs:
  - a. Coronary artery disease
  - b. Stroke
  - c. Cancer
  - d. Maturity-onset diabetes
  - e. Arthritis
  - f. Alzheimer's disease
  - g. Parkinson's disease
  - h. Kidney disease
  - i. and, Liver disease

### Traditional view of health in our society

- A) The healthcare system's traditional view of health is built on the notion that one is healthy until proven sick.
- B) This concept is incorporated into the diagnosis and treatment model that has lead to the current structure of the healthcare system.
- C) This concept assumes that the diagnosis of a disease in those over 40 years is a consequence of faulty genes, for which little or nothing can be done.
- D) Following this assumption, Medicine's role would be to rescue the individuals from the results of bad genes and bad lifestyle through appropriate interventions.
- E) Although successful in increasing the average lifespan, it's increased the number of unhealthy older individuals who require significant medical services as they age.

### Evidence: Organ reserve

- A) According to Dr. James Fries, loss of organ reserve causes much of the loss of health associated with disease among older individuals.
- B) In youth, we have a reserve of organ function that goes beyond what we need for basic requirements in most organ systems.

- C) As we age, we lose organ reserve and stresses that we could have handled while younger can now go beyond our capacity and result in health crisis.
- D) Scientists tell us that organ reserve is related to biological age. Losing organ reserve causes our biological age to increase making us more vulnerable to disease.
- E) We can change how quickly we lose organ reserve and undergo biological aging through changes in life style, environment, and nutrition.

### *HealthyLIFESPAN Factoid*

- F) Scientific researchers now recognize that 75% of our *HealthyLIFESPAN* after age 40 is modifiable on the basis of such choices.

### **Nature Vs Nurture**

- A) Medelian view or fixed gene theory, it's the view that health after age 40 is predetermined by our genes. This view has been challenged by recent advances in our understanding of the structure of our genome
- B) According to Bishop and Waldholz in their book Genome, "Unmasking the identity of the genes in and of itself does not determine the inevitability of disease. Rather, it defines the risk of disease when an individual is plunged into a harmful environment."

*\*Health choices play a major role in how healthfully we age!*

- C) The healthcare system is built around deterministic nature of genes and how they control health (Nature View).
- D) Scientists are now beginning to recognize, however, that there is considerable variability in the way genes are expressed (Nurture View).
- E) The modification of genetic expression as a consequence of how we treat the genes plays a Key role in controlling our health as we age.

### **Two Gene Types: Constitutional & Inducible**

- A) Constitutional genes encode messages that are expressed in a constant way and are not significantly modified by environmental factors or lifestyle choices.
- B) Inducible genes, however, are sensitive to our environmental, lifestyle, and nutrition factors, and can be either up- or down-regulated in their expression.
- C) How the expression of inducible genes is modified over the course of aging – by environmental, diet, lifestyle choices – Plays a significant role in determining health over the age of 40.
- D) The expression of these inducible factors, which are locked in our genetic inheritance, controls how quickly we lose organ reserve and how susceptible we are to age-related diseases.

## Variability of Gene Function

- A) Genetic research has indicated that there is considerably more variability (polymorphism) at the physiological and cellular biochemical levels than previously recognized.
- B) Although we look similar – 2 eyes, a nose, 10 fingers, and 10 toes – our genes code for vast functional differences at the biochemical level.
- C) Example: from one person to the next, the enzyme functions of the liver that are related to detoxification may vary from 4 to 7 fold.
- D) According to Steventon et al, those who develop Parkinson's or Alzheimer's disease often have genetic impairments in several of their detoxification pathways, rendering them more susceptible to the neurotoxic effects of certain chemicals.
- E) According to Ambrosone et al, women smokers who got breast cancer had defects in detoxification status, making them more a risk to carcinogenic exposures.
- F) According to Lin, notes that over 30 % of enzymes are polymorphic (i.e. they differ from individual to individual based on genetic inheritance) and 7% of all individuals have two forms of a specific enzyme.
- G) Pleomorphism: a variation in phenotype where an individual has two forms of a specific enzyme. One form is expressed under certain environmental conditions, and another is expressed under a second set of conditions.
- H) A person's lifestyle plays a significant role in determining which genes are expressed and how the genotype is translated into the phenotype.

## Environment

- A) Environment modifies not only expression of inducible genes, but also the posttranslational cellular function. After genes have been expressed and their message has been translated into the manufacture of protein and other cellular materials, the structure and function of these substances can be further altered as a consequence of processes such as oxidation or glycation. Both of these posttranslational influences can affect cellular function in ways that are associated with unhealthy aging.
- B) The combination of environmental effects on both gene expression and posttranslational modification of cellular materials gives rise to symptoms of aging that are well recognized in clinical medicine.
- C) Example: (a) those who smoke heavily appear to age faster and have higher of age-related diseases such as cancer and heart disease. (b) Those who consume excessive alcohol also appear to age more quickly and are exposed to increased risk of liver and heart related problems. (c) Those with poor-quality diets that are high in calories and low in essential nutrients show signs of obesity, poor health patterns, and more prevalent age-related diseases. – These examples demonstrate how environment and lifestyle influence gene expression and posttranslational modification of cellular function, giving rise to increased risk related diseases.

- D) Medicine has focused principally on the diagnosis of these diseases once they occur, and physicians have usually placed less emphasis on understanding genetic susceptibilities and gene expression modifiers.
- E) Life Extension Foundation, through its local affiliate Life Extension Nutrition Center, offers tools to aid you assessing and improving your health before the onset of disease.

### **Biomarkers of Aging**

According to Evans and Rosenberg, they describe various biomarkers associated with decreased function and unhealthy aging, including the following:

- A) Loss of strength
- B) Reduced flexibility
- C) Decreased cardiovascular endurance
- D) Increased body fat
- E) Reduced resting energy expenditure (RMR)
- F) Lower kidney clearance
- G) Reduced cell-mediated immunity
- H) Increased hearing threshold
- I) Reduced vibratory sensation
- J) Compromised close vision and dark accommodation
- K) Reduced taste and smell acuity
- L) Altered hormone levels
- M) Increased auto antibodies

### *\*Testing Available through LEF*

These biomarkers of aging are associated with reduced organ reserve and increased risk of various age-related diseases. They can be modified by application of a lifestyle, environment, and nutritional program tailored to the individual's genetic needs.

Biomarkers of aging represent a loss of organizational energy that results in a loss of the ability to maintain structure and function, or simply – health.

In the past, people commonly believed that loss of structure was a natural consequence of aging. However, research now indicates that the rate at which this organizational structure is loss can be modified on the basis of the environmental and lifestyle factors exposed to our genes.

In a sense, unhealthy aging is an inability to maintain organizational structure of the organs.

### **DNA: Organized energy**

- A) DNA in our chromosomes. Which represents the basis for our genetic inheritance, is an energy information map in which are encoded the “attractors” of matter to build and organize the body.

- B) The matter making up the atoms, molecules, biomolecules, cells, tissues, organs, and organ systems of the body is concentrated and organized through an energy-requiring process based on the genetic template called genes.
- C) Maintenance of this highly organized structure depends on efficient use of energy. Absence of proper control of metabolic energy the natural tendency towards disorganization will prevail. In a sense, unhealthy aging is an inability to maintain organizational structure of the organs.
- D) Factors that accelerate the loss of organizational structure include: Chronic infections, Poor-quality diet, reduced aerobic competency, distress, toxic exposure, trauma, and lack of attention to individual genetic needs.
- E) If the organizational energy driven by metabolism is incapable of overcoming these contributions of disorganization, loss of organ reserve will occur. This loss is associated with increased biological aging as well as an unhealthy aging process.

### **Nutrients affect gene function**

- A) Consumption of cruciferous vegetables (e.g. broccoli, brussels sprouts, cauliflower, and cabbage) has been found to increase the gene expression of certain detoxification enzymes, increasing 1<sup>st</sup> pass drug detoxification and elimination of environmental xenobiotics.
- B) Grapefruit juice, which contains the flavonoid naringenin, has been found to inhibit the activity of the detoxification enzyme CYP-450 A2. This fact has been useful in sustaining the blood levels of cyclosporine, a drug used to help prevent organ transplant rejection. Naringenin from grapefruit is now recognized for its ability to modify blood levels of specific drugs through its impact on gene expression and detoxification enzyme activity.
- C) Diet and specific nutrients – factors associated with healthy aging - can modify gene expression in a way that promotes a *HealthyLIFESPAN*.

Well there's proof for eating your 5 to 9 servings of fruits and vegetables a day along with nutritional supplement support to receive optimal values. So, don't forget to take the right vitamins.

---

What's the evidence?

Six, scientifically documented, *modifiable factors* of unhealthy aging have emerged as a result of research conducted over the last decade.

1. Aging related to altered **mitochondrial function and oxidative stress**
2. Aging disorders as a consequence of increased **protein glycation**
3. Unhealthy aging as a consequence of **chronic inflammation**
4. Contributions of **defects in methylation** to the aging process
5. **Compromised detoxification** ability and the risk of disease

6. Altered immunity related to aging

**Population Facts**

- A. Study: by 2030 – 20 % U.S. population by 65 years old (57 million) or 1/5<sup>th</sup> population.
- B. Studies indicate - expectation of aging “Baby Boomers”:
  - a. Never retire and continue to engage in multiple activities
  - b. Travel the world
  - c. Be physically active
  - d. Engage in exciting new challenges
  - e. Be available as catalysts for social change for social change as they go into their 70’s & 80’s