AGING: STATE OF THE SCIENCE

James H. Carraway, MD
Eastern Virginia Medical School

There is information available everywhere about every aspect of the aging process. From the news media, we have reports of how healthy certain foods such as "low-fat," high protein, increased omega-3's, whole grain foods, and many others listed can be of help to us in improving the aging process. Government agencies such as the NIA (National Institute of Aging) are wonderful sources of information because of the research that is being funded by this and other groups. However, the NIA received only 3.5% of the $30 billion NIH budget last year. Keep in mind that information on better aging is what helps prevent diseases such as cancer, heart disease, and diabetes. One of the private groups that funds research for aging is the Kronos Longevity Research Institute. There is also the Life Extension Foundation and the Cenegenics' ongoing studies on hormone replacement therapy in the aging population. The Kronos summary for an overall picture of how we can positively affect the aging process is quite a good one, and is backed by many scientific papers and a lot of good opinions. This discussion is about some of the major topics discussed in the summary which will tend to either reinforce your current knowledge about your own aging process or help you look for other ideas in this regard. This information is available on the Kronos Longevity Research Institute web site, and much pertinent information can be downloaded for your study if this is a significant area of interest for you.

We know that the levels of oxidation, inflammation, and insulin resistance are the basis for aging, either accelerated or slowed. Oxidation comes from free radicals that circulate in the body and can be thought of as the by-product of metabolized substances that are filtered through the body, including our food energy sources. Just as a chimney puts out smoke from a fire, our bodies put out a sort of "liquid smoke" containing the free radicals. This can make your cells deteriorate, become sick, and even mutate. This process can be neutralized by antioxidants such as vitamins A, C, E, and a multitude of phytonutrients from plant sources.

Inflammation is a process that is ongoing in the body and can be described as normal or excessive. With certain foods, certain exposure to chemicals, or increased insulin and stress hormones, this inflammation can increase. It can aggravate or cause cancer, arthritis, heart disease, Alzheimer's disease, or other pathological disease processes. It is caused by multiple short-lived hormones called eicosanoids.

The third accelerator of aging is insulin resistance and increased insulin levels. This can be seen with obesity, chronic stress, excessive dietary intake of sugars such as high fructose corn syrup, and other foods. Insulin resistance can be improved by exercise, reduced caloric intake, and reduction of certain foods which promote excess insulin output. You should be aware of the causes of increased insulin production and insulin resistance, as these are critical in the aging process.

Every cell chromosome has a micro-anatomical feature called a telomere, which is on the "tail" of the chromosome. When a chromosome helps to make new cells, a small amount of the telomere is trimmed. If aging is accelerated, the telomeres can become reduced at a faster rate, and cellular repair along with organ upkeep is diminished. Being overweight tends to shorten telomeres because of insulin resistance.

Physical exercise tends to improve aging in those who practice it regularly. One study of a group of people followed for 21 years found that exercising 2 times a week reduced the risk of Alzheimer's disease by half. We don't really know how exercise makes an improvement on the aging process, but we do know that those who do exercise usually eat a healthier diet, take better care of their bodies, and practice a healthier lifestyle.

One mystery in the study of the aging process is how caloric restriction improves aging. We know that by reducing caloric intake in laboratory animals and primates, life span can be increased by 25-40%. We know that caloric restriction improves the body's output of hormones such as HGH, thyroid hormone, testosterone, and other hormones which tend to be associated with a younger age. In one study comparing exercise versus caloric restriction, there was little difference in terms of weight loss, insulin sensitivity, and blood glucose levels. There was also no difference in heart risk factors, even though the "exercisers" were stronger overall. Combined exercise and moderate caloric restriction improves aging to a better extent.

The study also discussed the effect of estrogen and testosterone in the aging process of men and women. We know that beginning estrogen therapy at menopausal age seems to improve protection against heart disease in the aging woman. Natural progesterone may also decrease the risk of breast cancer. However, in one study of a parallel group of women who supplemented with estrogen alone, no increase in breast cancer risk was experienced. Keep in mind that heart disease is responsible for seven times more deaths than breast cancer in postmenopausal women.

Low testosterone levels are seen in Type 2 diabetes, hypertension with insulin resistance, and high serum cholesterol and triglycerides. Therefore, diabetes and coronary artery disease often are predictors of lower testosterone levels in aging men. There are ongoing studies related to the supplementation of testosterone and its effect on these diseases as well as the possibility of increasing the risk of prostate cancer.

An interesting fact is that a study in Germany found that people in general feel about 13 years younger than their actual chronological age. If you feel younger, you tend to act younger in terms of activity, maintaining your body weight, and keeping up social interaction. However, if these study participants had illnesses, inactivity, and less social interaction, they were more likely to feel their chronological age or even older.

One thing that needs to be mentioned is that caloric restriction per se does not have the ability to improve aging unless it is in the presence of a high nutrient-based diet. If you are eating 30% sugar and 30% hydrogenated fat in your diet and you reduce other

components of your diet which have some element of nutrition, you will simply be on a low-nutrient diet which will likely create health problems for you in the short and long run. Exercise, practice caloric restriction, and keep your body weight normal and you will have a healthier and longer life to enjoy.