

Anti-Aging Medicine: A Primer

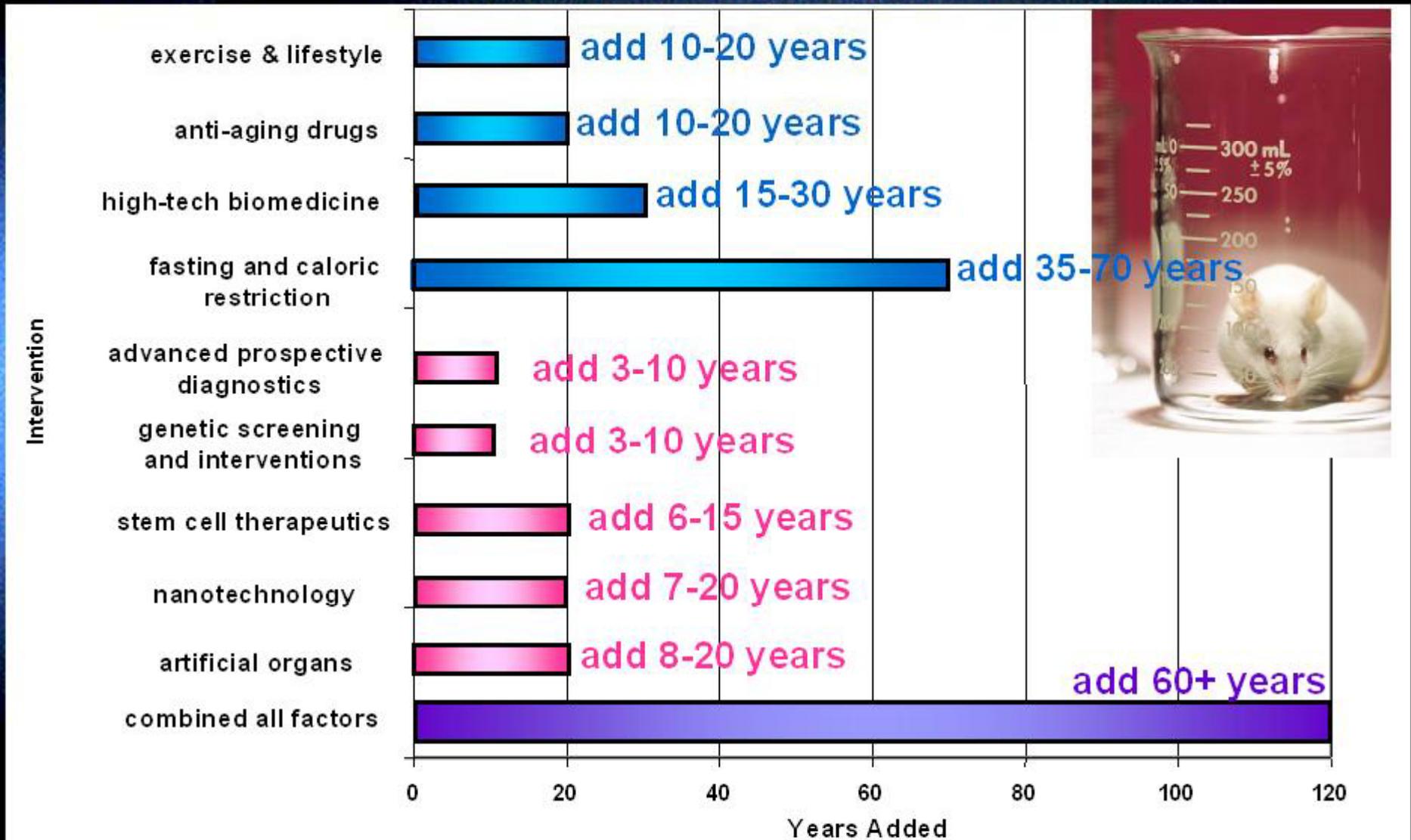


Longevity Studies: Literature Review

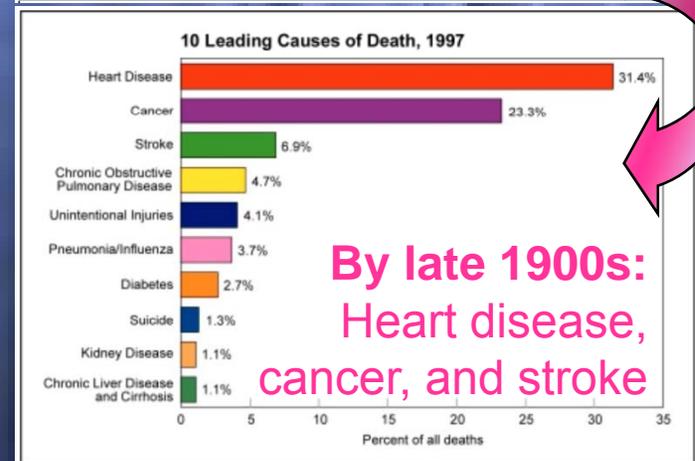
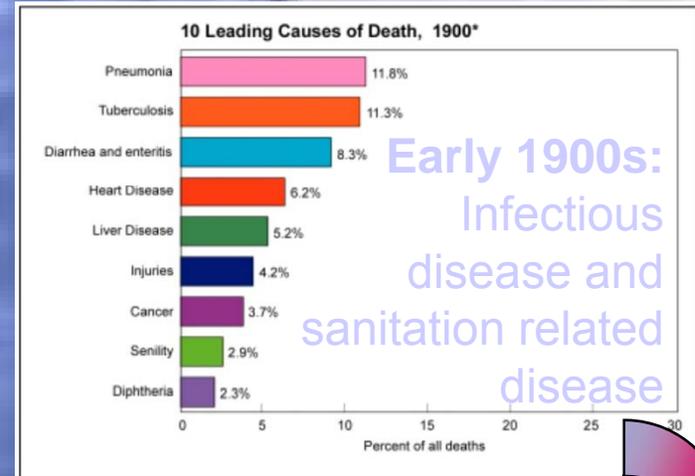
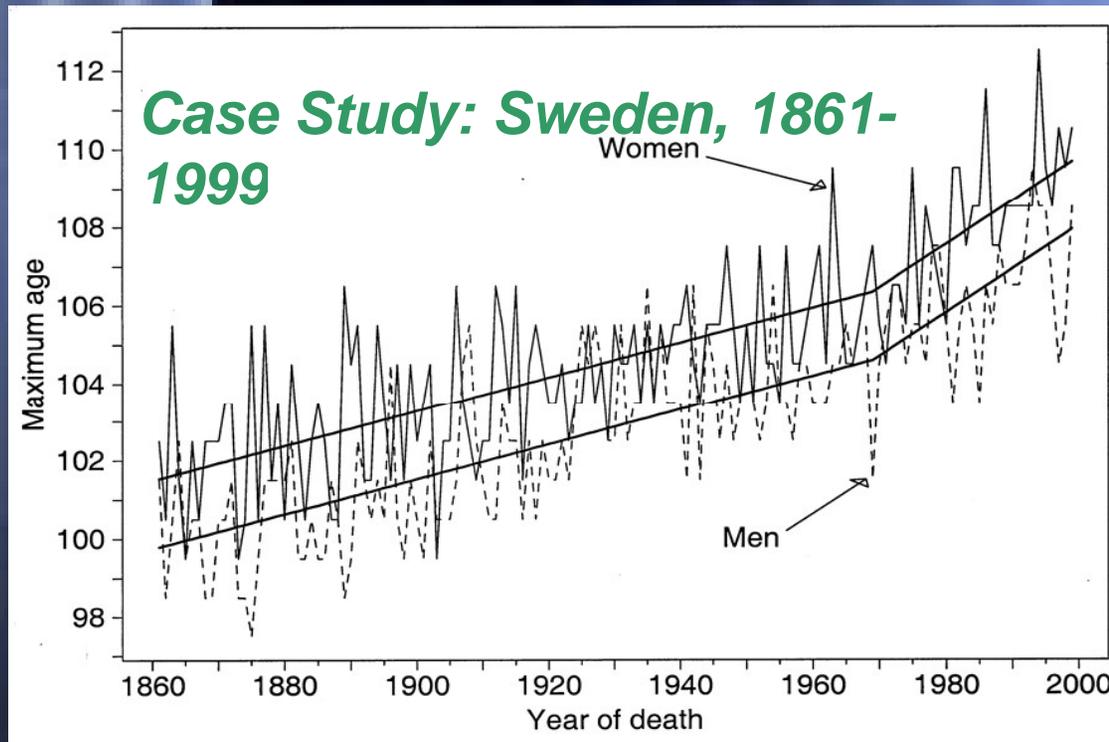
- **“Ten-fold lifespan extension” -- Longest ever achieved in any organism:** Scientists from USC create baker’s yeast capable of living to 800 (yeast years) without apparent side effects [January 2008]
- **25 genes regulating lifespan identified:** Team from University of Wisconsin discovered genes relating to the TOR nutrient response pathway, involved in the effects of caloric restriction, in yeast and *C. elegans* [March 2008]
- **Resveratrol slows aging:** University of Wisconsin team found that low-doses of the compound in the diet of middle-aged mice influences genetics to mimic the life-extending benefits of a calorically-restricted diet [June 2008]



Maximum Potential for Human Lifespan: Existing & Future Technologies



Progressive Shift in Leading Causes of Death Affects Maximum Human Lifespan



INCREASE in maximum age at death:
1860s: 101 yrs ... TO BECOME ... 1990: 108 yrs

EXPEDITED pace of increase:
<1969: 0.44 yr/decade ... TO BECOME ... >1969: 1.11 yrs/decade

Conclude the Sweden study authors: Continued upward trend for 21st century will be a result of ability to "prevent and cure ailments such as coronary heart disease, stroke, and cancer."

Wilmoth JR, Deegan LJ, Lundstrom H, Horiuchi S. "Increase of maximum lifespan in Sweden, 1861-1999." Science, Sept. 29, 2000; Healthy People 2010, U.S. Department of Health and Human Services. Washington DC: January 2000.

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Life Expectancy (May 2002) "No End in Sight"

MAY 10, 2002: Dr. Jim Oeppen of Cambridge University (UK) and Dr. James Vaupel of the Max Planck Institute for Demographic Research (Germany) challenge the gerontological establishment's position that the human lifespan is finite. Observing that maximum life expectancy has risen by a quarter of a year, each year, for the past 160 years, Oeppen and Vaupel state, "If life expectancy were close to a maximum, then the increase in the record expectation of life should be slowing. It is not." They predict that the top life expectancy will continue to increase by 2.5 years each decade, thus meaning that the world's top average life expectancy should reach 100 within the next 50 years.



"Broken Limits to Life Expectancy," *Science*, May 10, 2002, 296 (5570), pp. 1029-1031
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Life Expectancy (November 2003)

"25 Year Gain Every Century"

Staying Alive

A century ago, most Americans lived to be about 50. Today people over 100 make up the fastest-growing segment of the population. As some researchers bet that children born today will live to be 150, others say there is **no upward limit on longevity**

By Karen Wright

Photography by Mary Ellen Mark

DISCOVER Vol. 24 No. 11 | November 2003 | Biology & Medicine



James Vaupel of the Max Planck Institute [Germany]:

- “The **number of centenarians** in many industrialized nations is **doubling every decade**”
- “The **average lifespan** in industrialized countries in **2150** will be **122.5 years**”

Demographer Ronald Lee of the University of California/Berkeley expects a continued “linear increase in life expectancy, extrapolating to a **25-year gain every century**”

Wright K, “Staying alive,” Discover, vol 24 no. 11, Nov. 2003.

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Life Expectancy (*Stanford University, February 2006*) "Able to Extend Human Lifespan Significantly"

Dr. Shripad Tuljapurkar of Stanford University (USA) reported to the American Association for the Advancement of Science (AAAS), that:



"...[W]e are on the brink of being able to extend human lifespan significantly, because we've got most of the technologies we need to do it."

Further, Dr. Tuljapurkar estimates that:

"between 2010 and 2030, the modal, or most common, age of death will increase 20 years if anti-aging therapies come into widespread use. This projected increase consequently increases the modal age of death in industrialized countries from 80 years, to stand at 100."

The Anti-Aging Longevity Dividend

The longest-living Americans are **Asian-American women** residing in Bergen County, New Jersey USA. They live longer than any other ethnic group in the United States – to an average lifespan of **91.1 years**.



The shortest-living Americans are **Native American populations** in South Dakota – living an average lifespan of **66.5 years**.



Factors associated with extraordinary longevity (as in the Asian-American women in Bergen county) include:

- high median **income**
- college **education** or better
- **occupations** in management or professional settings
- **diet** emphasizing fruits, vegetables, fish, and green tea
- **lifestyle** including Eastern healing techniques



Secrets of Exceptional Health in Old Age



OCTOBER 2008: Study examined the

the Journals of gerontology
BIOLOGICAL SCIENCES AND MEDICAL SCIENCES

maintenance of exceptionally good health among 2,432 elder Canadians enrolled in the Canadian National Population Health Survey, which tracked participants' health for a ten-year period, 1994 to 2004.

- The most important predictors of excellent health over the entire decade were:
 - Absence of chronic illness
 - Income over US \$30,000
 - Having never smoked
 - Drinking alcohol in moderation
 - Maintaining a positive outlook and managing stress levels were additional positive contributors to health in age
- “Many of these factors can be modified when you are young or middle-aged. While these findings may seem like common sense, now we have evidence of which factors contribute to exceptional health [as we age].”

Kaplan MS, Huguet N, Orpana H, Feeny D, McFarland BH, Ross N. "Prevalence and factors associated with thriving in older adulthood: a 10-year population-based study." J Gerontol A Biol Sci Med Sci. 2008 Oct;63(10):1097-104.

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