Reversing Physical Aging: Scientific evidence

References showing that hormone and nutritional therapies reverse aging by improving markers of aging

1. <u>Hormone therapy reverses the aging physical appearance: Firmer body, younger outlook</u>

Physical appearance, body morphology improvement with growth hormone treatment

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2. <u>Inner body: Skin thickening, body composition improvement, bone density increase</u>

REVERSING SKIN ATROPHY

Skin atrophy: the improvement with growth hormone treatment

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Skin atrophy: the improvement with topical thyroid hormone analogue, triiodothyroacetic acid

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Skin atrophy, poor in collagen: the improvement with female hormone treatment

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Skin atrophy, skin poor in collagen: the improvement with topical estrogen treatment

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REVERSING AGE-RELATED BODY COMPOSITION CHANGES

REVERSING LEAN MASS LOSS

Lean body mass: the improvement with GH treatment

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Lean mass, physical appearance, cachexia, excessive thinness, insufficient fat: the improvement with insulin treatment

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Lean body mass: the improvement with estradiol (as well transdermal as oral) treatment

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Lean body mass in women: the improvement with testosterone treatment

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REDUCING FAT MASS

Obesity: the improvement with melatonin treatment

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Obesity and visceral adiposity: the improvement with growth hormone treatment

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REVERSING SARCOPENIA

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REVERSING OSTEOPOROSIS

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4. Short telomeres of the chromosomes: Lengthening them again

DISEASES ASSOCIATED WITH SHORT TELOMERES

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NUTRIENTS AND HERBS THAT MAY ATTENUATE TELOMERE SHORTENING

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Progressive telomere shortening: the protection with antioxidant treatment in endothelial cell cultures

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Progressive telomere shortening: the attenuation with multivitamin treatment in women

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HORMONES THAT MAY STIMULATE TELOMERASE ACTIVITY

Progressive telomere shortening: GHRH may stimulate telomerase and telomere lengthening in cell cultures

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Progressive telomere shortening: the prevention with estradiol treatment in in human normal hepatic cultured cells and carbon tetrachloride induced rat liver fibrosis

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Progressive telomere shortening: **the stimulation of telomerase activity and elongation of telomeres with danazol (testosterone derivative) may in patients with telomere diseases (2-year trial)**

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HORMONE THAT MAY REDUCE TELOMERASE ACTIVITY IN CANCER CELLS

Melatonin reduces telomerase activity in cancer cells

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5. Reduction of free radical damage

HORMONE DEFICIENCIES THAT MAY TRIGGER FREE RADICAL FORMATION AND DAMAGE, AND HORMONE TREATMENTS THAT MAY REDUCE THE FREE RADICAL LEVELS

Higher levels of free radicals in elderly persons

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Antioxidant activity of melatonin

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Excessive free radical formation: the reduction with growth hormone treatment in rats

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Excessive free radical formation: **the reduction with oxytocin**

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Excessive free radical formation: the reduction by thyroid hormone stimulation of antioxidant (enzyme) activity

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Excessive free radical formation: the reduction by DHEA's antioxidant activity

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Excessive free radical formation the reduction by IGF-1 stimulation of antioxidant (enzyme) activity

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Excessive free radical formation: the reduction by glucocorticoid stimulation of antioxidant (enzyme) activity

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EXCESSIVE FREE RADICAL FORMATION: THE REDUCTION BY ESTROGEN ANTIOXIDANT ACTIVITY

Estrogens

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Progesterone and estrogens

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Testosterone and estrogens

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EXCESSIVE FREE RADICAL FORMATION: THE REDUCTION BY TESTOSTERONE ANTIOXIDANT ACTIVITY

Testosterone and estrogens

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Testosterone

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Dihydrotestosterone

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6. Higher (serum) hormone and nutrient levels

Malabsorption of important nutrients: Thyroid hormones improve macronutrient uptake

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Malabsorption of important nutrients: Insulin improves macronutrient uptake

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7. Functional parameters: Eyesight, hearing, memory, etc. improvements.

EXAMPLE OF MEMORY IMPROVEMENT

Memory loss: the improvement with nutritional therapies

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Alzheimer's disease: the improvement with nutritional therapies

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MEMORY LOSS: THE IMPROVEMENT WITH HORMONE THERAPIES

Memory loss and Alzheimer's disease: the improvement with melatonin treatment

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Memory loss: improvement with oxytocin treatment

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Memory loss: the improvement with vasopressin /desmopressin treatment

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Memory loss and Alzheimer's disease: the improvement with thyroid treatment

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Memory loss and Alzheimer's disease: the improvement with IGF-1 treatment

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Memory loss: the improvement with pregnenolone treatment

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Memory loss and Alzheimer's disease: the improvement with insulin treatment

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MEMORY LOSS AND ALZHEIMER'S DISEASE: THE IMPROVEMENT WITH

Estrogen treatment

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Estrogen and progestogen treament

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Memory in women: the improvement with testosterone treatment

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Memory loss and Alzheimer's disease in men: the improvement with testosterone treatment

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8. <u>Sports and professional physical performances: Improvements</u>

Examples:

Nutritional therapies that improve "exercise performance and reduce post-exercise fatigue

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Fatigue and work performance: the improvement with pregnenolone

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9. Longer life = reduced mortality

HIGH DIETARY MICRONUTRITIONAL INTAKES ASSOCIATED WITH LONGEVITY

MINERALS

Drinking magnesium-rich water may prolong life in general and help survive cardiovascular and stroke

521. Marque S, Jacqmin-Gadda H, Dartigues JF, Commenges D. Cardiovascular mortality and calcium and magnesium in drinking water: an ecological study in elderly people. Eur J Epidemiol. 2003;18(4):305-9
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The consumption of potassium-rich foods prolongs life in patients with stroke

525. Khaw KT, Barrett-Connor E. Dietary potassium and stroke-associated mortality. A 12-year prospective population study. N Engl J Med. 1987 Jan 29;316(5):235-40
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Low calcium in the diet increases the risk of dying

527. Kobayashi E, Okubo Y, Suwazono Y, Kido T, Nishijo M, Nakagawa H, Nogawa K. Association between urinary calcium excretion level and mortality in inhabitants of the Jinzu River basin area of Japan. Biol Trace Elem Res. 2002 Nov;89(2):145-53.

Dietary calcium and calcium supplements reduce coronary heart disease mortality

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WATERSOLUBLE VITAMINS

Intake of foods rich in folic acid and folic acid supplements may modestly help patients with disease to live longer

529. Medrano MJ, Sierra MJ, Almazán J, Olalla MT, López-Abente G. The association of dietary folate, B6, and B12 with cardiovascular mortality in Spain: an ecological analysis. Am J Public Health. 2000 Oct;90(10):1636-8.
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Intake of vitamin C-rich foods may lower the mortality by coronary heart disease and breast cancer

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532. Jain M, Miller AB, To T. Premorbid diet and the prognosis of women with breast cancer. J Natl Cancer Inst. 1994 Sep 21;86(18):1390-7.

A study where vitamin C did not seem to bet helpful to improve lifespan

533. Ono K. The effect of vitamin C supplementation and withdrawal on the mortality and morbidity of regular hemodialysis patients. Clin Nephrol. 1989 Jan;31(1):31-4. Ono Geka Clinic, Fukuoka, Japan.

FATSOLUBLE VITAMINS

Consumption of foods rich in carotenoids reduces the risk of dying from cancer, especially from colorectal cancer and breast cancer

534. Rock CL, Saxe GA, Ruffin MT 4th, August DA, Schottenfeld D. Carotenoids, vitamin A, and estrogen receptor status in breast cancer. Nutr Cancer. 1996;25(3):281-96.

Consumption of foods rich in beta-carotene reduces the risk of dying from cardiovascular disease, while only the consumption of foods rich in beta-carotene appears to reduce the global risk of dying

535. Heinonen OP, Albanes D, Virtamo J, Taylor PR, Huttunen JK, Hartman AM, Haapakoski J, Malila N, Rautalahti M, Ripatti S, Mäenpää H, Teerenhovi L, Koss L, Virolainen M, Edwards BK. Prostate cancer and supplementation with alpha-tocopherol and beta-carotene: incidence and mortality in a controlled trial. J Natl Cancer Inst. 1998 Mar 18;90(6):440-6.
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A high intake of polyunsaturated fatty acids reduces the risk of dying by cardiovascular disease

538. 59. Salonen JT, Salonen R, Penttila I, Herranen J, Jauhiainen M, Kantola M, Lappetelainen R, Maenpaa PH, Alfthan G, Puska P. Serum fatty acids, apolipoproteins, selenium and vitamin antioxidants and the risk of death from coronary artery disease. Am J Cardiol. 1985 Aug 1;56(4):226-31

A high intake of linoleic acid prolong life in elderly persons

539. Double Fortes C, Forastiere F, Farchi S, Rapiti E, Pastori G, Perucci CA. Diet and overall survival in a cohort of very elderly people. Epidemiology. 2000 Jul;11(4):440 .

Intake of omega-3 polyunsaturated fatty acids may lower the risk of dying by coronary heart disease

540. Rodriguez BL, Sharp DS, Abbott RD, Burchfiel CM, Masaki K, Chyou PH, Huang B, Yano K, Curb JD. Fish intake may limit the increase in risk of coronary heart disease morbidity and mortality among heavy smokers. The Honolulu Heart Program.Circulation. 1996 Sep 1;94(5):952-6.

TRACE ELEMENTS

Eating foods rich in zinc may protect alcohol drinkers against dying from cardiovascular disease

541. Lee DH, Folsom AR, Jacobs DR Jr. Iron, zinc, and alcohol consumption and mortality from cardiovascular diseases: the Iowa Women's Health Study. Am J Clin Nutr. 2005 Apr;81(4):787-91. Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, MN, USA.

DIETS ASSOCIATED WITH LONGEVITY

Longevity: improvement with the Mediterranean diet (high intakes of vegetable oils, pasta and rice, sauces, fish, and wine)

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LONGEVITY ASSOCIATED WITH HIGH MICRONUTRITIONAL LEVELS

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TRACE ELEMENTS

Life-threatening danger of copper deficiency in rats, when sugar is supplemented to the diet

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Higher copper levels

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NUTRITIONAL THERAPIES TO LIVE LONGER

MULTIVITAMIN PREPARATIONS

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LONGEVITY ASSOCIATED WITH HIGH HORMONE LEVELS

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Higher mortalities for childhood-onset deficient adults who only received growth hormone during childhood

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Mortality: the association with excessive thyroid hormone levels in overt hyperthyroidism
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HORMONE TREATMENTS TO LIVE LONGER

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Longevity, survival: the improvement with vasopressin treatment

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