Anti-ageing Therapy: The Happening Miracle

Gautam Rathod
S.Y.B. (Pharm)

Varun Patel
S.Y.B. (Pharm)

Gautam Rathod : I have studied Pharmacy for one and a half years and am reasonably sure that I love this field. As far as my professional goals are concerned, I want to work for the betterment of pharmaceutical industry and society. My vision for India is to take Indian pharmaceutical industry to global height. I also want to continue my pursuit of becoming a better human being with time, because that is what the true objective of education is.

Varun Patel : I am interested in Drug Delivery Systems and a bit of Biotechnology too. I believe that Pharmacy is a truly noble field as it seeks to resurrect ill humans. Although new diseases crop up as our technology progresses, I wish to find a cure to all diseases that haunt our healthy world. The ultimate aim of my life is to infuse 'Godliness' in myself and the other members of the society. By this, I mean that I want to create medicines that will bestow the gift of immortality on the society.

Abstract

Anti-ageing therapy, a recent medical discipline, aims good health for people in second half of their lives. Advocates of anti-ageing therapy claim that it is now possible to slow or reverse ageing through medical and scientific interventions. Preventive measures make up an important part of anti-ageing program. Careful adherence to nutrition, hormonal and cell based therapies, genetic manipulations, other medications and supplements can increase one's chance of living a healthy life.

Keywords: Ageing, Anti-ageing, Caloric restriction, Antioxidant.

1. Introduction

Today anti-ageing therapy is one of the fastest growing segments of medicine. It is a combination of different therapies used to slow and reverse human ageing. The methods show scientific promise in solving the ageing process and extending the lifespan in mammals.

2. Theories of Ageing

2.1 Wear and Tear Theory of Ageing

Damage of cells, tissues and organs eventually wears them out, killing them and then the body. Telomerase, the cap of DNA shortens with each cell division and reaches critical short length such that cells no longer divide but become senescent. Increased cortisol levels in circulation also support this phenomenon.

2.2 Free Radical Theory of Ageing

Free radicals cause DNA damage, cross linking of proteins and formation of age-pigments. They cause much irreversible damage. Mitochondria also suffer damage, which accumulates and is responsible for derangement of energy production and thus ageing.

2.3 Genetic Theory of Ageing

Life span determined by genes we inherit are called as longevity assurance genes. It includes gene for a protein called apolipoprotein E and certain versions of gene for immune proteins. Long life is tied to three genes-CETP, apo C-III and APM 1. Verification of all these above theories is based on survival, mortality curves, biomarkers of ageing and batteries of biological age.

3. Factors Involved with Anti-ageing Therapy

Fig. 1 represents the anti-ageing pyramid illustrating the various factors involved with anti-ageing medicine. At the base of the pyramid are antioxidants. At the cellular level, antioxidants serve to deactivate certain free radicals in turn helping to decrease inflammation. The best sources for antioxidants are fruits and vegetables. Vitamins, minerals used therapeutically, can be of immense help in fighting diseases and spreading recovery. This is the cornerstone of anti-ageing program. As one gets older one's ability to absorb many vitamins and minerals drop considerably. The problem is compounded in people who eat poorly, drink alcohol, smoke and take some prescription medications. Youthful hormone levels preserve vigor and stave off degenerative diseases. Major hormones that decrease with ageing are human growth hormone (hGH), dehydroepiandrosterone (DHEA), testosterone, estrogen, progesterone and melatonin. Ageing precipitates progressive decline in overall cognitive function. It cases loss of ability to store and retrieve from short-term memory and to learn new information. Potent brain boosting nutrients include antioxidants, pharmacological nutritional, supplements and memory-enhancing nutrient like Gingko biloba, acetyl carnitine and vinpocetine. The percentage of adults who are obese has been rising for a decade. Anti-ageing efforts without with control are irrational.

4. Major Categories of Anti-ageing Strategies: Current Aspects

4.1 Caloric Restriction

Caloric Restriction (CR) i.e. under nutrition without malnutrition, is the only experimental paradigm that has been shown consistently

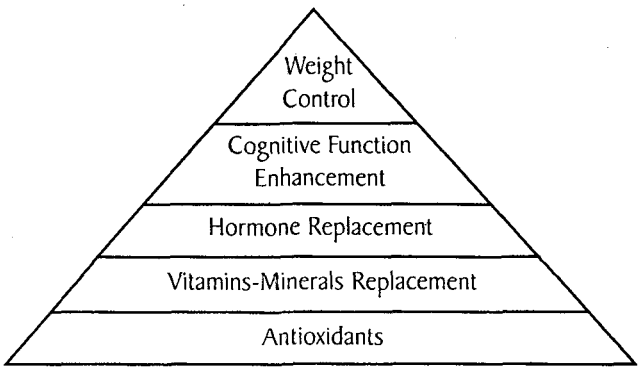

Fig. 1. Factors responsible for antiaging therapy [Ref.]

to extend lifespan and slow ageing in short-lived species. Intramural Research Program of the National Institute on Ageing began a study of CR in nonhuman primates. Emerging data's strongly support physiological response to CR. The possible biological mechanisms that underlie anti-ageing action include attenuation of oxidative damage, modulation of glycemia, insulinemia and hormesis. Caloric restriction may slow down many age-dependent processes and extend life span.

4.2 Cell-Based Therapies

Cell transplantation continued throughout 20th century. Clinical trials are investigating the effects of differentiated cells such as adrenal cells as auto or allotransplants into the brains of patients with Parkinson's. The recent identification of preneuronal stem cells in primates has raised hope of restoring neurologic function in condition ranging from paralysis to dementia. Steam cells are programmed cells in the human body that can continue dividing forever and change into other types of cells. They have the potential to treat many diseases including Parkinson's. Alzheimer's, diabetes and cancer. Additionally, the scientific methodology known as therapeutic cloning has come under attack. US has tempted to push for a global ban on the therapeutic cloning, fortunately this initiative was defeated in late 2004.

4.3 Hormone Therapy

Numerous hormonal changes occur during human ageing. Andropause, the age-related decline of testosterone production is an area of ongoing research. Production of many other hormones including growth hormone decreases with ageing too. Growth hormone replacement therapy has been approved by FDA. Replacement therapy has resulted in improved muscle/fat ratio, increased lipolysis and bone density changes and improved exercise capacity. Melatonin an antistream agent is a chronobiotic with anti-ageing properties. Melatonin replacement also proves to be an effective anti-ageing strategy. DHEA replacement therapy has attracted considerable attention over recent years. DHEA deficiency includes effects on well-being, energy levels and mood. DHEA exert its action via downstream metabolism to sex steroids. In contrast to other hormones of ageing circulating level of insulin increase in individuals as they age. This occurs because the tissues that respond to insulin to lower blood sugar levels become resistant to its action. This lead pancreas to secrete more and more insulin resulting 'pseudo-diabetes of ageing'. Replacing estradiol, testosterone, growth hormone and reducing cortisol-raising stress are strategies employed to main insulin sensitivity.

4.4 Genetic Manipulations

Ribonucleic acid (RNA) based research is directed at damaged nucleic acid. The cosmetic industry is already marketing skin preparations supplemented with RNA in hope of restoring the RNA content of aged skin. Deoxyribonucleic acid (DNA) based research is directed partly at genes and partly at other chromosomal features such as telomeres, which may serve as a biologic block. More than 60 genes seem to be involved in ageing have been identified. A recent discovery of p21 gene may regulate other genes affecting ageing.

4.5 Other Strategies

A strategy for Engineered Negligible Senescence (SENS) is a detailed plan for curing human ageing. The key to SENS is appreciation that ageing is best viewed as a set of progressive changes in body composition at the molecular and cellular level, caused as side effects of essential metabolic processes. SENS strategy does not interfere with metabolism but to repair or obviate the accumulating damage. Senescence marker protein – 30 (SMP-30) has been proposed as an important ageing marker shown to blunt death caused by intracellular Ca^2+ accumulation. Free radicals aid in development of atherosclerosis and many other degenerative diseases of ageing. Chelation therapy can bring profound improvement to many essential metabolic and physiologic functions of the body. Medical Massage Therapy is therapeutic bodywork delivered in a medical setting and effective treatment for a number of conditions like sprain, osteoarthritis, neck pain and insomnia. ProCyte Corporation has come up with a new patented technology for anti-ageing skin care. Its NeovaTM copper peptide therapy utilizes collagen and elastin promoting capabilities of copper to revive dull, lifeless skin, remedy fine lines, wrinkles and restore moisture and firmness.

5. Conclusion

Since recorded history, individuals have been and are continuing to be victimized by promises of extended youth or increased longevity by using unproven methods that allegedly slow, stop or reverse ageing. Research in genetic engineering, stem cells, geriatric medicine, and therapeutic pharmaceuticals hold promise for postponement of age-related diseases and extension of the period of healthy life which is the great contribution for human welfare & healthy people can lead healthy nation to healthy future.

6. References

1. Lupien, SJ, Wan, N., Trans R. Soc. Lond. B. Biol. Sci., 2004, **359, 1413-26.**
2. Gruber, C., Huber JC., Gynakol Geburtschilfilche Rundsch., 2003, **43, 71-4.**
3. Greenwald DA., Amer. J. Med., 2004, 117 8S-13S.
4. Smith TP, Kennedy SL., Fleshner M., J. Appl. Physiol. 2004, **97, 491-8.**
5. Bourre JM., J. Nutr. Health. Ageing., 2004, **8, 163-74.**
6. Miller RA., J. Gerontol. A. Biol. Sci. Med. Sci., 1999, 54, **B297-307.**
7. Ahmed A., Tollefsbol T., J. Am. Geriatr. Soc., 2001, **49, 1105-9.**
8. Wallace DC., Noavartis Found Symp., 2001, **235, 247-63.**