

**AGI Presidential Oration****Promoting Healthy Aging: A Global Challenge****MK Thakur**

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The elderly population is increasing rapidly and globally. India is the second largest country with elderly population, which is expected to double by 2021. Also the average life expectancy (at birth) which was 32 years in 1947 is presently around 63 and may become 70 in the next two decades. The growing number and proportion of elderly place increasing demands on the public health system and on medical and social services. In India, we don't have efficient health care system for the aged people. Also the joint family system has disappeared. So it has become very essential that elderly have good health and they take care of themselves. This has become a global challenge. As old age is associated with disabilities and diseases, the elderly population is scared of deteriorating health, diminished quality of life, and becoming dependent on others. Almost all diseases associated with old age have a genetic basis. These genetic risk factors interact with environmental and lifestyle factors to facilitate the development of the disease. The mapping of human genome has helped to identify the genes responsible for the pathogenesis of a particular disease. Advancements in scientific techniques and tools have disclosed useful information which was a mystery sometime ago. Although the risk of disease and disability increases with advancing age, poor health is not an inevitable consequence of aging. One can certainly follow a healthy lifestyle to keep good health, though not much can be done with the inheritance of genes. There has been increasing awareness for maintaining a healthy lifestyle and improving the quality of life. Many diseases and disabilities are avoidable through known prevention measures. Key measures include practicing a healthy lifestyle (e.g., regular physical and mental activity, healthy eating, avoiding smoking, and positive attitude) and the use of early detection practices (e.g., screening for cancers, diabetes and its complications, depression and other disorders).

The days are not far when using a holistic approach of healthy lifestyle combined with knowledge and implication of genetic approaches will make it possible to live a happy and healthy life till the last phase of the life span. Let us work together and join the campaign of promoting a healthy aging program designed to broaden awareness of the positive aspects of aging and to provide information and inspiration for adults to improve their physical, mental, social and financial fitness so that the goal of all gerontologists can be achieved.

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**IAG Presidential Oration****Frail Elderly****B. Krishnaswamy**

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Frailty is a state of age related loss of physiological reserve to withstand stress, which can lead to disability and functional dependence. The increase in the number of "old elderly", leads to increase in prevalence of frailty with attendant morbidity and health care burden. Since frailty is associated with multiple geriatric syndromes, the management of frail elderly forms the corner stone of geriatric practice. Though the term frail elderly is often used in clinical practice, it is seldom easy to define frailty. Advanced age, sensory defects, malnutrition, reduced functional status, cognitive decline, poor self rated health are some of the risk factors leading to frailty. Anorexia, decreased food intake, loss of weight, gait abnormality, sarcopenia, osteopenia are some of the clinical markers of frailty, which warrants early identification and aggressive management. The basic patho-physiology of frailty lies on declining neuromuscular, endocrine and immune status, which can lead to cycle of frailty, with an onset of acute illness. Frailty leads to geriatric syndromes like falls, fractures, incontinence, and immobility and later to an irreversible state of "failure to thrive." The management of frailty includes treating the underlying cause, adequate nutrition and resistant exercise to improve muscle power and balance.

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**Prof M S Kanungo Oration**

**Biological Functions of Senescence Marker Protein 30 (SMP30) and its Nutritional Aspects in Ageing**

**Naoki Maruyama**

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We originally identified senescence marker protein 30 (SMP30) decreased with ageing. Its 299 amino acid sequence homology found in bacterial gluconolactonases (GNLs) by using the blast search. Through a biochemical study, we identified SMP30 as the lactone-hydrolyzing enzyme GNL of animal species. SMP30 purified from the rat liver had lactonase activity and no GNL activity was detectable in the liver of SMP30 knockout (SMP30-KO) mice. Thus, we conclude that SMP30 is a unique GNL in the liver. The lactonase reaction with L-gulonogamma-lactone is the penultimate step in L-ascorbic acid (AA) biosynthesis, and the essential role of SMP30 in this synthetic process was verified by a nutritional study using SMP30-KO mice. The AA levels in their livers and kidneys at the time of death were <1.6% of those in wild type mice. In addition, by using the SMP30-KO mouse, we demonstrate that the alternative pathway of AA synthesis involving D-glucuronogamma-lactone operates *in vivo*, although its flux is fairly small. These KO mice, fed a vitamin C-deficient diet, displayed symptoms of scurvy such as bone fracture and rachitic rosary and then died by 135 days after the start of receiving the deficient diet. We observed the moderate deficiency of AA enhances senescence. The presence of morphological hallmarks of senescence (SA-beta-galactosidase and lipofuscin) supports that SMP30-KO mouse is an ordinal senescence model. Since SMP30 is expressed in almost all organs, various types of deterioration were recognized due to SMP30-deficiency. Treatment of sub-lethal amounts of anti-Fas antibody enhanced liver injury in SMP30-KO mice. Smoking is also harmful for the lung of SMP30-KO mice resulted in airspace enlargement and increased apoptosis. These results indicate that SMP30 acts to protect cells from apoptosis. Thus, decrease or deficiency of SMP30 is highly associated with senescence. SMP30-KO, this model represents the first report of a mouse strain that manifests accelerated ordinal senescence after gene manipulation.

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**Prof P V Ramamurti Oration**

**The Dynamics of Elder Care—Current Concerns and Future Perspectives**

**D Jamuna**

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Elder care is of current global concern. In the context of demographic transition and impact of socio-technological changes on people the world over, the care of seniors has assumed proportions never before countenanced. While developed countries are currently facing a crisis of over burden of older people and diminution of the young, the developing countries with appallingly low levels of per capita income, poor literacy and inadequate general hygiene, are threatened by the bleak prospect of managing more than half of the world elderly by 2030. What are the issues involved in this management? What are the options available to tackle them? And what strategic plans are we to draw to catch the problem by its forelock? What policy incorporations are needed to implement the strategies? These are issues in the Indian context that need to be discussed across the board at the highest level. The presentation would modestly dilate on some of these tough nuts.

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**Prof A Venkoba Rao Oration**

**Gender and Longevity**

**Alka Ganesh**

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Women outlive men both in the developed as well as in the developing world. The biological explanation for this well known fact is not clear. Though this may be looked at as a biological advantage for women, in a tradition-bound ancient culture such as India where male preference is the norm, there are immense adverse psychosocial fall-outs of this phenomenon. Data from a survey of 1000 elderly people in Tamil Nadu state has shown a sex ratio of 60:40; F:M in both rural and urban areas. Co-morbidities of hypertension and diabetes were significantly higher in men, as was the use of tobacco and alcohol. Women had higher levels of cholesterol and suffered from more musculo-skeletal disorders. These data appear to ascribe predominantly environmental explanations for the longevity gap. Causes

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of gender inequality of the lifespan may occur because of lifestyle differences or because of genetic reasons favoring women. The use of tobacco, alcohol, exposure to trauma, wars etc may account for increased morbidity in men. Research is showing possible genetic and biological explanations for this phenomenon. Though telomeres shorten universally in both sexes with advancing chronological age, women appear to have longer telomeres than men. Shorter telomeres in men have been shown to correlate with increased arterial wall stiffness indicating a link to accelerated biological ageing. The role of female hormones is being explored and reveals complex effects on the cardiovascular system, delayed development of diabetes, telomere length, and oxidative stress. The explanation of the longevity gap may reside in other current theories of ageing process in which the role of Mitochondrial DNA, immunologic and neuro-endocrine factors are involved. Specific longevity genes have been investigated in French and Italian centenarian cohorts, and there are clues for further research to unravel the gender differences. The health and psychosocial implications of increased longevity in women deserve some scrutiny, especially in the Indian context. Widows are considered inauspicious in most Indian societies; hence older surviving women lead marginalized lives and are subjected to abuse and neglect. Older women have poorer nutrition and health yet have less access to health care. Future laboratory research should try to use the information on longevity to promote health for both genders rather than focus on primarily increasing the lifespan at all costs. If disability and disease can be procrastinated or "compressed" towards the end, people will have longer periods of healthy life.

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### ***Prof VS Natarajan Oration***

#### **Long-term care: growing need for our country**

**Arvind Mathur**

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Health care for older persons consists largely of addressing the problems associated with chronic illnesses. A proportion of older patients will require substantial long-term care, a range of services that addresses the health, personal care, and social needs of individuals who lack some capacity for self-care. These services may be continuous or intermittent but are delivered for sustained periods to individuals who

have demonstrated needs, usually measured by some index of functional incapacity. Long-term care is certainly not the exclusive purview of medical profession; it requires a synthesis of medical and social attention. In fact most of the long-term care is provided by a host of individuals loosely referred to as informal support. These persons may be family, friends, or neighbors. Informal care has been and remains the backbone of long-term care. Ideal would be to keep older people at home, relying on family as first line of support and bolstering their efforts with more formal assistance to provide professional services and occasional respite care. Migration of younger generation, lack in the family, insufficient housing, economic hardship and break up of joint family have made the old age homes seem more relevant even in the Indian context. Studies have revealed that though basic needs of institutionalized elders in old age homes are met with, the medical, psychological and financial needs are not adequately fulfilled. In west, nursing home care has emerged as touchstone of long term care. Nursing home care is needed by at least five distinct groups of patients who are: i) actively recuperating or being rehabilitated, ii) with physical dependencies, iii) with primarily severe cognitive losses, iv) receiving terminal care, and v) in a permanent vegetative state. Various types of community long term care programs practiced are: home care (home nursing and home making), adult day care, adult foster care, assisted living, geriatric assessment, hospice/terminal care, telephone reassurance, caregiver support, congregate housing, home repairs, meals (congregate and in-home), respite care and emergency alarms. The physicians caring for elderly patients must have at least a working acquaintance with the major programs that support older people. There is an increasing need for developing these services in India.

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### ***Jodhpur Oration***

#### **Immunosenescence-clinical significance**

**I S Gambhir**

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Significant changes in the immune system occur with apparently normal aging described as immunosenescence. Various notable changes are decreased thymic function, defective macrophage activation, decline in proliferative capacity of T lymphocytes, decreased production of specific

antibodies and diminished primary as well as secondary responses to vaccination. All these factors add together to have increased susceptibility and incidence of infectious disease as well as increased mortality/morbidity. Immunosenescence in association with organ dysfunction is responsible for increased incidence of various infections particularly Influenza, pneumonia, UTI, skin infections, Herpes, Tetanus and unusual organism infections. Because of altered immune response, there is difficulty in diagnosis as well as treatment. It is very important for clinicians to understand these changes of immune system as they affect the pattern, presentation and severity of various infectious diseases. As immunosenescence also has a bearing on response to immunization, it is imperative to understand the role of vaccines in preventing various infectious diseases in elderly.

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### ***Trivandrum Oration***

## **Fluid and electrolyte disturbances in the elderly**

**Sandhya Kamath**

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Professor, Department of Medicine, TN Medical College, Mumbai

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Fluid and electrolyte disturbances are common findings in the ill elderly. Aging alone is not associated with any change in the normal range of serum sodium, potassium or plasma osmolality. However, subtle changes do take place in most especially during illness. Elderly people appear to be particularly vulnerable to the development of fluid and electrolyte balance when subjected to stress such as infection, cardiac failure, unusual water or electrolyte loads, drugs, etc. The aging kidney is characterized by reduced glomerular filtration rate, loss of tubular volume, and narrowed homeostatic control of water and electrolyte balance. It is unclear whether these physiologic changes represent normal aging or sub clinical disease. With aging, there is an increased risk of hyper- or hypovolemia. Both fluid overload and plasma volume depletion are commonly associated with changes in serum sodium concentration, which in turn is often linked to serum potassium. Sluggish control of potassium concentration also makes hyperkalemia more common, particularly when the patient is using certain drugs. Water metabolism is particularly vulnerable in older patients, resulting in a frequent tendency toward dehydration and hyperosmolality. It is very important to identify and recognize the conditions that may predispose to the

development of fluid and electrolyte disturbances so that they can be prevented. The organ function in these people is already suboptimal and fluid and electrolyte imbalance may cause irreversible damage to the vital organs. Management of fluid and electrolyte disturbances in the elderly can pose a challenge. Trying to correct one factor may disturb the other. Accurate knowledge of the homeostatic mechanisms is essential. Fluid and electrolyte disturbances in critically ill patients above 60 years were analyzed. These will be enumerated; their causes discussed and how they were managed will be described.

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