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Healthy Aging Research in India

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Opinion

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How can India Contribute More Effectively to the Field of Aging Research?

Biomedical research in India has predominantly focused on understanding the pathogenesis and treatment of infectious diseases that cause high mortalities. Even in centers and universities in India, the key research programs are predominantly dedicated towards treatment of individual diseases such as cancer, infectious, neurological and eye diseases. In contrast, there are few, if any institutes that are focused on research on the process of aging and preventing or delaying age-related diseases. While an improvement in human health, better medical care and advances in biological research has led to an increase in life expectancy, there has also been an increase in the elderly people that are suffering from multiple morbidities with advancing age. It has been predicted that ~20% (300 million) of the Indian population will be over the age of 60 years in 2050. This demographic change will impose both social and economic challenges, as increase in longevity will not coincide with an improved quality of life for the elderly and families would need to invest a lot towards care of the elderly members. Consequentially, an increasing proportion of the country's economy will need to be allocated towards medical care of aging populations. The government of India is aware of this demographic transition, as is evident from the policies and programs that have been initiated to ensure a safe future for the senior citizens of India, however, there is a lot more to be achieved towards research and development of interventions that can promote healthy lifespan.

Historically, the study of human aging in India dates back to 3000-1500 BC ----the time when the ancient medical system "Ayurveda" originated. Though, this traditional health care system has been utilized for preventing the effects of aging in humans, the molecular aspects underlying aging has been evaluated by relatively few research groups working in isolation. As a consequence, India has lagged behind in the discovery of potential interventions that can target aging and promote health in the elderly.

Advances in the field of aging in developed nations have demonstrated that the rate of aging can be modulated in laboratory model organisms and these countries have initiated collaborative research programs to further advance research in the field with the premise that strategies that delay aging would simultaneously slow down progression of age-related diseases. In the past decade, several studies have elucidated key mechanisms that regulate aging. These studies have also identified interventional strategies that can modulate the rate of aging and extend healthy lifespan in laboratory models.

One of the most reproducible intervention that has been shown to enhance lifespan and healthspan in laboratory models is dietary restriction (DR). This robust intervention has also been shown to be associated with improved metabolic fitness and reduction in disease risk factors. Research in the field of dietary restriction has further advanced into a search for DR mimetics that can provide health benefits without a reduction in food intake. Some of the DR mimetics with promising translational potential to improve the quality of life include mTOR inhibitors such as Rapamycin, Metformin, Acarbose, NAD precursors and sirtuin activators. Though, India has a long way to go towards developing pharmacological interventions to counteract age-related disabilities, there is a lot to be explored in the area of

Indian natural and alternative medicine. However, in order to design and discover new healthy aging interventions, Indian researchers and clinicians need to come together to uncover the molecular and cellular mechanisms underlying the beneficial effects of these pharmacological interventions and to test their efficacy in improving the quality of life.

In conclusion, I would like to emphasize a need for collaborative research efforts in India towards elucidating mechanisms underlying aging that eventually lead to an increased risk of devastating diseases such as chronic respiratory disease, heart disease, diabetes, cancer, dementia and stroke. Some of the initiatives that can be adopted to promote healthy aging for the older population in India are: (1) Encouraging and supporting research on basic mechanisms involved in aging processes to gain an understanding of how age-related human disorders are caused; (2) setting-up of multidisciplinary institutes dedicated towards conducting research on the genetics, biological, molecular, clinical, demographics and behavioral aspects of aging and diseases associated with age; (3) Building databases that store clinical information of elderly population; (4) Increasing research funding dedicated to understanding the aging process and identifying dietary interventions for prolonging healthy lifespan; (5) Promoting start-ups focused on translating research findings towards development of interventional strategies that can prolong lifespan and most importantly; (6) Educating and increasing public awareness to the importance of dietary and/or environmental interventions that can be adopted for prolonging healthy lifespan. Launching of these research initiatives would allow India to not only participate more effectively in the field of aging research but also deal with the challenges of the rapidly increasing older population.

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