

## THE 296 SESSION: HEALTHY LONGEVITY & ITS AMBIENCE

*The 296th session of the Xiangshan Sciences Conference was held from last December 19 to 21 in suburban Beijing under the theme of “Research Frontiers on Healthy Longevity of the Aged People and the Influences on It Imposed by the Social, Behavioral, Environmental & Genetic Factors.”*

The three-day meeting was co-chaired by Profs. Yang Huanming and Zeng Yi respectively.

In today's world, more and more national governments and research personages are becoming aware of the fact that, aged population and longer life span are two of the inevitable tendencies resulting from the current soaring socio-economic development. In the current circumstance, however, it seems more important and imperative for us to elongate the human population's survival duration but reduce the proportion of the aged people tribulated by their crippling or poor health. This is to say, our urgent task for the time being is to realize the healthy longevity among the elderly. According to the result from a US research program, due to the improvement of the health state of the aged people in the US, the starting age for various senility-caused chronic diseases will be putting off for five years, leading to some \$50-69 billion of the governmental expenditure to be saved each year. Apparently, the R&D input into healthy longevity is expected to reap a host of rewarding socio-economic returns. In latest one or two decades, therefore, the governments in many country have poured handsome investments in the comprehensive research of the subject influenced by various ambient factors. The CAS-hosted seminar held as an independent session in the Xiangshan conferences is aimed at exploring which of the social, behavioral, environmental and genetic factors are really exerting a recognizable impact on aged people's healthy longevity and how the socio-environmental reasons make mutations on the genetic code. Finally, by making clear the true story of the interaction between endogenous and exogenous factors, we might do something useful in realizing the ultimate goal of healthy longevity for the Chinese people even the whole of the human race.

Under the title of A Study on the Genetic Foundation of Healthy Longevity in the Genomic Era, Prof. Yang Huanming made his keynote report for the meeting. According to his exposition, the on-going aging process of the human population is the most serious challenge for the entire mankind in the 21st century world. In spite of their undeniable relevance to the environmental and behavioral factors, the time limits for an individual life span in the living world are determined by a biological species' genetic legacy. This is the consensus reached by scientists in today's world and the mysteries of longevity lie in the genetic messages which are known by us to be kept in the genomic maps. The enforcement of the human genomic project hosted by the international community leads to the successful mapping of the human race's whole genomic sequence, the first and unprecedented feat of its kind ever achieved in human history. Its completion means the advent of the genomic era. The HapMap project just concluded by a new international consortium enables it possible to make an all-round analysis of all details hidden in the genome-sequencing complexities by providing scores of million units of single nucleotide

polymorphism (SNP). With the booming and further rise of new-generation sequencing and chip-making technologies, the genetic grounds behind healthy longevity will be explored with new tools, new tactics and new thinking approaches.

In the memberships of both US and German national academies of sciences, Prof. James Vaupel with the Max Planck Institute (its name is incomplete. – the translator.) made a round-up report titled “ The Plasticity of Human Longevity, Its Prospects & Genes” in exposition of the seminar’s theme. Based on the research of the aged people in Danmark twins and similar studies carried out in other countries, he stressed that about one quarter of the disparities harbored in human individuals in terms of healthy longevity are caused by their genetic variances while the rest of 75% comes from the interaction with the genetic code as a result of being alternatively affected by social, behavioral, environmental and other factors. In addition, he made a brief introduction, commenting on some gene candidates which are thought having something to do with healthy longevity and brought to light by the frontier studies in today’s world, such as APO-E, IGF-1, MTP, ACE, HFE, mitochondrial mutations, Interleukin-6, WRN, etc. According to his opinion, it is necessary to conduct a comprehensive, multi-faceted, interfacial and interceptive research by joining hands of genetics with social, behavioral, environmental and other influencing factors by taking advantage of the newest methods and latest developments achieved by the multi-element analysis of population statistics, dynamic analysis of fixed characteristics. A special importance has to be attached to the interaction between genes and human behavior or environment. We must have big samples of centenarians or nonagenarians in contrast with the normal people so that a reliable and science-oriented conclusion might be obtained.

Another keynote report was given by Prof. Zeng Yi under the title of An Overview Research on the Social, Behavioral and Environmental Factors Exerting Influences on Healthy Longevity . According to him, the final solution to the problem must be made by the marriage of social sciences with life sciences. Apart from the independent role played by any social or natural factors to be brought into control, our analysis of a single or a group of genes’ contribution to healthy longevity must give a full consideration of its or their interactive effects with social or natural conditions. In addition, he made a detailed exposition on the influences on the micro-, meso- and macro-scales caused by an individual’s socio-economic features, fit-keeping habits and behaviors, marriage & family, communal or natural ambience and genetic characteristics plus other impacts imposed by the interaction between the genetic causes and individuals, families and environmental settings.

Also, the experts came to a consensus on the following itemized topics.

- 1). By scanning the smaller-scope sampled whole-genomic sequence, the genetic points as healthy longevity candidates for China’s aged people have to be positioned;

- 2). The collection of big-sampled DNA data to be conducted in a scientific, reliable and highly effective way;

3). The big-sample research of genetics on healthy longevity. Based on the identifiable data of big-sample verification of genetic types, the genomic data have to be analyzed for furthering our genetic studies so that the reliability and truthfulness of the genetic points as the healthy longevity candidates are to be verified.

4). A long-term tracing investigation is to be carried out on the healthy, social, behavioral and surviving conditions and natural and social settings of the aged people surveyed in the big-sampled collection of their DNA data in representative areas across the land. Based on the multi-element and multi-layered investigation and analysis of the population statistics, various influencing factors and their interactive effects on health longevity are to be exposed.

5) A comparative study on the regions where normal and longevity people reside.

6). A databank is to be built up for collecting related data in the health longevity populations, concerning the fundamental bio-chemical parameters, metabolite routes, gene expression, bio-information, and the resources of longevity cellular strains.

7). The research is to be opened for revealing the inter-relations between health longevity and expressive genetics.

8). A research is promoted for modeling experimental animals on their genetic propagation of health longevity.

9). An interference engineering project at exploring the possible integration of the social, economic, behavioral, genetic factors with bio-medical means.