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What role does the environment play in longevity? Epigenetic approach

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Abstract

Aging is a risk for numerous chronic diseases such as cardiovascular disease and type 2 diabetes mellitus, affecting the quality of life and lifespan. Epigenetics (acquired or heritable changes in gene function or phenotypes without changes in DNA sequence), has emerged as an important factor in gene expression and disease risk. We focused on epigenetic modifications involving cytosine methylation, which have been shown to be associated with cancer risk and autoimmune disorders such as Lupus. Methylation levels at specific sites appear to change with aging mostly through hypermethylation and we have been the first to show the magnitude, bi-directionality and the genomic context of over million C-G island methylation sites in a rodent model of aging. This has led us to hypothesize that ***the pattern of methylation acquired with aging may be a central mechanism predisposing the elderly to many age-related diseases and affecting healthy lifespan.*** We utilized our Longevity cohort, which assembled a cohort of centenarians (frequency of 1 in 5,000 in the population) and their offspring, and studied their phenotype and genotype (candidate genes, GWAS and EWAS approaches). Our preliminary data shows a dramatic difference between patterns of methylation in centenarians compared with younger subjects. We have used a state of the art technology to achieve significant information on the changes in methylation with aging and also assess the inherited patterns between centenarians and their offspring. Our analysis led to explore the association with age-related diseases, and open the horizons for more specific and functional studies, as previously exemplified by GWAS studies

Biography

Gill Atzmon is our eminent Editor- in- chief for Hereditary Genetics: Current Research, OMICS Publishing Group. He is the Associate Professor in the Department of Medicine, Assistant professor in the Department of Genetics, Faculty Senate representative and also Director of the Genetic Core for LonGenety, Institute for Aging Research and the DRTC, Director of Einstein SAR Research Program in the Albert Einstein College Of Medicine, New York, USA. From 2005- 2009 he was the Director of the Quantitative PCR Core, Institute for Aging Research and the DRTC, AECOM, NY. From 2005-2006 Instructor, 2004-05 Research Associate in the Department of Medicine and was the Fellow in Human Genetics from 2001-04.

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