

Short Commentary

Biomarker Tests and Ageing Science

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Short commentary

Major interests in geriatric medicine have accelerated with diet and lifestyle changes that may stabilize mitochondrial apoptosis [1,2] and organ diseases in these communities. Geriatrics are susceptible to the global increase in chronic diseases with diabetes and neurodegenerative disease predicted to effect and determine the increased death rate of the geriatric population in the next 40 years. A defect in a single gene [3] versus multi gene effects may be responsible for accelerated ageing connected to mitochondrial apoptosis and programmed cell death with relevance to insulin resistance and the increased death rate in geriatrics. In the United States and Europe the geriatric population (> 65 years) is expected to double by the year 2060 with the death rate in the European Union in the geriatric population to be greater than 80% when compared with individuals < 65 years [4,5].

The science of ageing has become of critical interest [6] and the anti-ageing market now relevant to geriatric medicine with nutritional diets and lifestyles changes that may stabilize mitochondrial apoptosis [7] and organ diseases in these communities. The assessment of healthy ageing has created several difficulties with interpretation from various biomarker studies that biomarker analysis may not necessarily translate to diagnosis. Comprehensive review of the literature have been conducted with biomarkers that may be relevant to five age related domains and include physical/cognitive capability, physiological/musculoskeletal, endocrine and immune functions [8]. The comprehensive assessment of these biomarkers may allow interpretations of the science of ageing but may not allow the diagnosis of programmed cell death with mitophagy as the inevitable defect in the geriatric population. Biomarkers that may allow diagnosis of various mental health conditions have become of major importance in psychiatry [8] but still present a major challenge to psychiatry research. Extensive analysis of biomarkers [8] now hypothesize that both genetic and non-genetic factors determine the different patterns of ageing and extensive new biomarker tests are required to interpret healthy ageing from accelerated ageing science [8].

Environmental factors such as stress, anxiety and depression are important to consider in many communities with the global increase in chronic diseases [12-14] and brain metabolic diseases

associated with malfunction of the gene Sirtuin 1 (Sirt 1) that regulates immunometabolism [15]. Analysis of biomarkers may indicate immunometabolism disorders [16] with epigenetic alterations and autoimmunity disorders (Figure 1) that may supersede the connections between plasma biomarkers related to accelerated ageing in geriatric disease [17] and ageing science. The stress sensitive gene Sirt 1 [14] may be completely repressed in these individuals with the defective immune system related to heat shock protein (HSP) metabolism, autoimmunity and mitophagy (Figure 1). Stress and HSP are closely connected to cell survival [18,19] and Sirt 1 repression leads to an elevation of plasma HSP in man [7,20]. Sirt 1 may be the major gene that has malfunctioned under various genetic and stress conditions associated with autoimmune disease [21-24] and mitophagy [7,25] connected to geriatric disease and ageing science.

In the developing world the projected cost for chronic disease [26] is predicted to increase to 100 billion dollars by the year 2020 with the increased involvement of diseases such as diabetes, cardiovascular disease and neurodegenerative diseases. The developing world is a model for the assessment of the stress sensitive gene Sirt 1 with the importance of plasma Sirt 1 biomarker analysis connected to various chronic diseases. In these individuals the increased plasma bacterial lipopolysaccharides (LPS) levels may repress Sirt 1 [27] with reduced plasma Sirt 1 levels [28-29] and increased HSP levels [7,18-20] in these individuals connected to programmed cell death.

Conclusion

Ageing science has now become important to geriatric medicine with nutritional diets and lifestyles changes critical to maintain mitochondrial survival with the prevention of various chronic diseases. Healthy ageing assessment require billion dollars in cost for the treatment of future chronic disease and interpretation from several plasma biomarker analysis that do not diagnose immunometabolism defects have created problems with uncontrolled accelerated ageing connected to the global chronic disease epidemic.

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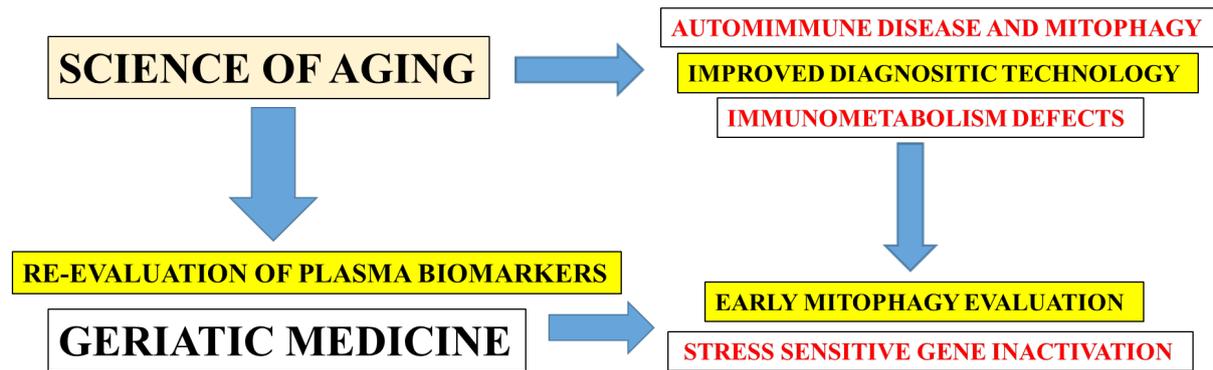


Figure 1. The science of ageing requires improved diagnostic technologies to determine biomarkers for autoimmune disease and mitophagy. The stress sensitive gene Sirt 1 is one of the major gene defects that is related to programmed cell death and accelerated ageing with the analysis of other biomarkers insensitive to the progression of early chronic disease.

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