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Editorial Open Access

Geriatric Medicine and Heat Shock Gene Therapy in Global Populations

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Editorial

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 [1,2]. 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 versus multi gene effects may be responsible for accelerated aging connected to mitochondrial apoptosis [3] and programmed cell death with relevance to insulin resistance and the increased death rate in geriatrics.

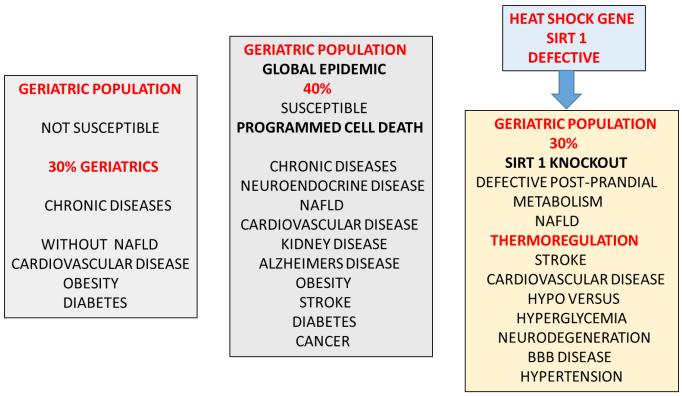

Figure 1: In the United States and the European Union the increasing geriatric population by the year 2060 has raised concern for the increased death rates in 30% of these geriatric communities (30%) and connected to the defective heat shock gene Sirt 1 (human knockout). Major interests in diet and lifestyle has escalated that may activate Sirt 1 relevant to neuron survival and stabilization of chronic diseases with possible reversal in 30 % of geriatric individuals. The global epidemic for chronic diseases in the developing world identifies 40 % of geriatrics as the major population that are at increased risk for programmed cell death with multiple organ diseases linked to Sirt 1 defects.

The United States population is composed of white Americans, black/African Americans, native Americans, Alaska natives, Asian Americans, native Hawaiians/pacific islanders and Hispanic/Latino Americans [4]. The defect in a gene that may cause mitochondrial apoptosis in all these individuals and connected to insulin resistance identifies the heat shock gene Sirtuin 1 (Sirt 1) to be defective in these populations [5]. Sirt 1 is a nicotinamide adenine dinucleotide dependent class III histone deacetylase) that targets various transcription factors involved with insulin resistance, metabolic activity and inflammation [6]. Recent interests in the role of Sirt 1 as a heat shock gene indicates that thermoregulation disorders as the inducing factor with increased risk to geriatrics for the development of Type 3 diabetes, stroke, cardiovascular disease, non alcoholic fatty liver disease (NAFLD), hypertension and blood brain barrier disease [7,8]. Geriatrics in 30% of global communities (Figure 1) that are induced with the various chronic diseases now indicate the heat shock gene Sirt 1 to be defective in these various communities irrespective of racial origin.

Major interests in geriatric medicine has accelerated with diet and lifestyles changes that may stabilize mitochondrial apoptosis [9] and organ diseases in these communities. In the developing world increased plasma LPS levels have raised alarm with relevance to thermoregulation disorders [7] connected to mitochondrial apoptosis relevant to NAFLD, myocardial infarction and various organ diseases [6]. Sirt 1 and the heat shock response involve the transcription factor p53/PGC1 alpha, various heat shock proteins and the heat shock transcription factor 1 important to neuron survival and insulin receptor pathways [7]. Sirt 1 regulation of HSF1 is via PGC1 alpha that is a direct transcription repressor of HSF1 [3,10,11]. Geriatrics and brain temperature regulation may be defective with relevance to Sirt 1 gene repression by LPS [12] and induction of NAFLD with increased transport to LPS to the brain [5].

Diets that contain fat may be metabolized rapidly in individuals (< 65 years) compared with geriatrics with thermoregulation defects and defective fat metabolism [8,13]. Consumption of fats such as palm oil (palmitic acid rich) and virgin coconut oil (saturated fatty acids) [7] that are solid (20-24C) may be sensitive to abnormal body temperature dysregulation with the induction of NAFLD (Figure 1) versus the consumption of olive oil (monounsaturated) that is liquid at a temperature (4C). Dietary fat restriction reduce LPS absorption with relevance to Sirt 1/p53 interactions that are essential for uncoupling protein 1 (UCP1) expression [14] with Sirt 1 activators important to activation of thermogenesis related genes (PTEN, UCP1) [15].

In geriatrics the discovery of the heat shock gene Sirt 1 [3] has become important with relevance to the use of thermoregulation drugs that maintain the thermoregulatory set points in geriartics [16]. Other drugs for depression and psychosis [17,18] may be inactivated with relevance to thermoregulation disorders with increased transport to the brain relevant to defective insulin therapy [19,20] that determines social interaction and behaviour . In geriatrics Sirt 1 is responsible for appetite regulation [6] and its loss from the suprachiasmatic nucleus in the hypothalamus of geriatrics result not only in central neural thermoregulatory dysregulation, circadian rhythm abnormalities but also loss appetite control (anorexia nervosa) [21]. Caffeine consumption [22] in geriatrics without NAFLD needs to be carefully determined to activate hepatic mitochondrial function that may improve post-prandial lipid metabolism (Figure 1) after consumption of meals that contain fat. However global Type 3 diabetes and neurodegenerative diseases may be irreversible with relevance to long term caffeine consumption

in geriatrics. Caffeine may be relevant to accelerated neurodegeneration and critical changes to diet, lifestyles and thermoregulation are required to prevent caffeine induced neurodegeneration. Geriatrics and links to NAFLD [8] now indicate defective caffeine metabolism [23]. Caffeine has been used to improve mitochondrial thermogenesis [24,25] but with NAFLD defective caffeine metabolism over years increases CNS caffeine transport with relevance to p53 mediated mitochondrial death relevant to neuron apoptosis [26,27].

Conclusion

The global geriatric population by the year 2060 is expected to markedly increase and global death rate in geriatric individuals is predicted to rise sharply and associated with mitochondrial apoptosis in geriatric individuals with Type 3/Type 2 diabetes, NAFLD and neurodegenerative disease. The heat shock gene Sirt 1 is critical to geriatric medicine with relevance to appetite regulation, thermoregulation disorders and defective post-prandial lipid metabolism. Fat consumption such as palm oil/coconut oil should be carefully evaluated before consumption in geriatric individuals (thermoregulation disorders) with relevance to delayed metabolism of these fats (solid at body temperature) and the induction of NAFLD. Diet, drug therapy and lifestyle changes are a critical component for thermoregulatory adaptations that allow reversal of accelerated aging in geriatric individuals with the prevention of programmed cell death.

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