Regulation of Body Temperature and NAFLD in Global Population

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ABSTRACT

The Non Alcoholic Fatty Liver Disease (NAFLD) epidemic is connected to diabetes, cardiovascular disease and neurodegenerative diseases. In the year 2050 it is expected that 30% of the world will progress to NAFLD. Recent scientific research indicates that the heat shock gene malfunctions in NAFLD with defective cell mitochondrial fat metabolism and heat production. Blood tests from blood biomarkers do not provide information for mitochondrial survival in NAFLD and chronic diseases with early death of cells in the liver, heart and brain connected to global chronic diseases.

EDITORIAL

Non Alcoholic Fatty Liver Disease (NAFLD) is predicted to rise to between 30-40 per cent of individuals by the year 2050 in the developed and developing world (1-3). The global metabolic syndrome that now includes the developing world indicates that the major endocrine disorder is insulin resistance and NAFLD. These insulin resistant individuals become hypercholesterolemic with lipoprotein abnormalities such as high blood cholesterol levels a major complication. In obese individuals, the classification of obesity is done with regards to body mass index that is greater than 30.0 Kg/m^2. The liver and its disease progression to NAFLD that is associated with defective dietary fat may be responsible for the increased body fat in obese individuals and associated with the metabolic syndrome and diabetes in global populations. Healthy diets and lifestyles are essential to reverse the NAFLD epidemic that is now connected to various chronic diseases such as diabetes, cardiovascular disease and neurodegenerative diseases. Diets that are low in fat and carbohydrate are important to prevent the induction of NAFLD. Scientific research now indicates that human genes that are sensitive to heat/cold stress malfunction early in life with the increased risk of NAFLD and chronic diseases. The discovery of the heat shock gene (4,5) is now important to the current global NAFLD epidemic, with body temperature regulation critical to the prevention of NAFLD. Excessive heat therapy (6) may completely inactivate the heat shock gene with accelerated aging in cells associated with organ diseases linked to NAFLD (**Figure 1**).

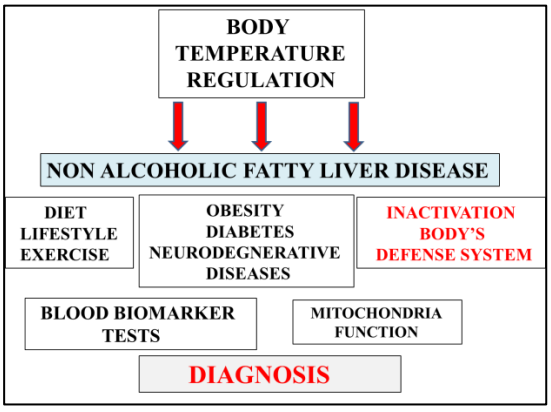

Figure 1. Discoveries in science and medicine now indicate close connections between body temperature, NAFLD and chronic diseases. Excessive heat therapy may inactivate the heat shock gene that is important to cell heat production and maintenance of the body's defense system. Blood tests are needed to indicate critical diagnostic blood biomarkers and cell mitochondria function (heat production).

Diets that are high in fats and glucose switch of the heat shock gene with fat now transported to the adipose tissue, liver, heart and brain to increase body mass referred to as obesity. The brain is important organ for the regulation of the core body temperature. A normal brain temperature is essential to control the liver breakdown of fats to prevent NAFLD. The heat shock gene is important to the immune system (7) and when the heat shock gene switches off the body's defence system called the immune system attacks cells and tissues (**Figure 1**). The mitochondria in cells control the body temperature with heat production in humans and other species. The heat shock gene when turned off allows the immune system to attack the mitochondria with poor break down of fats and heat production.

Exercise can be used to activate the heat shock gene to reverse NAFLD and improve the health of individuals in global communities, but the emerging NAFLD pandemic has raised concerns with relevance to effective diets, lifestyles and exercise regimes to activate the brain core temperature. The brain and appetite control (8) are closely connected with dietary restriction critical to activate liver fat breakdown. Diets that contain heat shock gene activators (9-11) allow effective diets, lifestyles and exercise regimes to improve body metabolism with the prevention of chronic diseases. Inhibitors such as alcohol, drugs, bacterial end products and fats should be avoided to maintain effective regimes to treat NAFLD (3).

Early diagnosis of NAFLD is required to prevent the induction of NAFLD along with measurements of blood lipids, enzymes, biomarkers and inflammatory proteins important to the reversal of NAFLD. The major problem today for the diagnosis of NAFLD is related to the blood tests. Blood tests such as cholesterol, biomarkers and inflammation do not provide information for mitochondria disease (**Figure 1**) with defective heat production. Biomarker tests (12-14) should now include heat shock gene measurements to allow early and rapid diagnosis to prevent various organ diseases and connected to the cell heat producing organelle the mitochondria.

CONCLUSION

The NAFLD epidemic is expected to reach to a range between 30-40 per cent of the global epidemic by the year 2050. Body temperature is connected to liver fat and carbohydrate metabolism with the maintenance of core body temperature connected to the body's defence system and heat production by cells. Healthy diets, lifestyles and exercise activate the heat shock gene essential for the prevention of NAFLD and chronic diseases. Early blood tests that measure various new biomarkers may assist to delay or reverse NAFLD and various chronic diseases.

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