

Public Abstract

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The human genome is adapted for daily physical activity (85). Thus, a sedentary lifestyle is capable of promoting detrimental consequences to human health. The linkage between lack of sufficient physical activity and the development of modern chronic disease began to evolve only in the second half of the 20th century. This relationship was initially documented in London where men, who were more sedentary at work or during leisure time, had higher rates of coronary heart disease (242; 243). A multitude of other published reports have since confirmed the health hazards of maintaining an inactive lifestyle (40; 329). In addition, modern chronic diseases attributed to physical inactivity now represent a major burden on direct health care costs in the United States which totaled 83.6 million dollars in 2000 (55; 102). The importance of physical activity has become more apparent and it is now recommended by the US Surgeon General that "every U.S. adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week" (264). Furthermore, physicians are also being recommended to prescribe regular exercise to sedentary patients as a measure to reduce chronic health conditions (40; 42). However, more experimental investigations are necessary to elucidate how exercise delays or inhibits the development of chronic diseases, including hypertension, obesity, and type II diabetes. Understanding the mechanisms that regulate such conditions may lead to a scientific basis for therapy and cure. The following studies were done to investigate: Part I) the regulation of cardiac structure and function by exercise in the hypertensive (mREN2)27 rat, and Part II) the effects of voluntary exercise on skeletal muscle lipids in an obese OLETF rat. Lastly, Part III (supplemental) provides a brief discussion on the effects of caloric restriction in obesity.