Increased Heart Rate During Exercise & Maintaining Homeostasis
By VERNEDA LIGHTS, Last Updated Mar 15, 2011

People who have sedentary lifestyles have an increased risk of obesity, hypertension and diabetes. These diseases are associated with life-threatening ailments such as stroke, heart attack and kidney failure. Since insulin resistance, hypertension and diabetes are closely related to sedentary lifestyle, the importance of exercise in health maintenance and disease prevention is readily apparent. During exercise, your heart rate increases to maintain a state of balance, known as homeostasis.

Definition of Homeostasis
"Homeostasis" means balance or equilibrium. How your body works to maintain equilibrium is reflected in how your vital signs vary with activity. Heart rate, blood pressure and respiration are lowest during periods of rest and sleep. During exercise, blood pressure, pulse and respiration increase to meet the increased demand for oxygen and nutrients by your musculoskeletal system. The adjustment of vital signs to match your body's level of physical activity is an example of homeostasis in action.

Metabolism
Metabolism is the rate at which cells of your body consume oxygen and nutrition. The increased demand of muscle cells for oxygen and nutrients during exercise is a state of increased metabolism. Homeostasis is maintained when your heart can provide the rate of blood flow necessary to meet your body's increased metabolic demand for oxygen and nutrients.

Homeostasis, Cellular Nutrition and Waste
Exercise increases the production of cellular wastes such as carbon dioxide and lactic acid. Your cardiovascular system maintains homeostasis between the delivery of oxygen and nutrients and the removal of cellular wastes by increasing your heart rate. Your increased heart rate speeds up delivery of oxygen and nutrient rich blood to your musculoskeletal system while increasing the rate at which blood is taken away from tissues and delivered to the lungs to receive oxygen.

Homeostasis and Blood Flow
The total amount of blood in a human body remains the same during exercise. To maintain homeostasis, your body redistributes blood flow. During exercise, blood flow to the nervous system, gastrointestinal tract, kidneys, brain and spleen decreases, while blood flow to the musculoskeletal system increases.

Temperature Homeostasis
Metabolic processes generate heat. The cardiovascular system helps to maintain homeostasis with respect to body temperature. An increased heart rate increases the delivery of blood to your skin. Increased blood flow to your skin and sweating causes dissipation of heat, and body temperature remains within normal limits.

The Fitness Factor
Overall fitness determines heart rate during exercise. According to Trenton J. Niemi, MS, the range for a normal resting heart rate is 60 to 80 beats per minute. An athlete's resting heart rate can be as low as 28 to 40
beats per minute because his heart is more conditioned and pumps blood more efficiently. People who are sedentary can have a higher resting pulse of 100 beats per minute, because inadequate exercise causes the heart to work less efficiently.

**Personal Application**
The absence of adequate physical activity can lead to health problems that can cripple and kill. Proper diet and exercise planning with a trusted health care professional can preserve health. Do not initiate a dietary or exercise regimen without first consulting your health care provider.¹

**Article Summary:**
Summarize 3 main ideas from the article:

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Vocabulary: __________________________________________

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What connections can you make from this article to your heart rate lab design?

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