Familial Resemblance for Muscle Phenotypes in the *HERITAGE* Family Study

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ABSTRACT


Introduction/Purpose:

We hypothesized that skeletal muscle histological and biochemical phenotypes aggregate within families.

Methods:

Nineteen families (78 Caucasians) from the *HERITAGE* Family Study participated in the study. Proportions and areas of Type I, IIA, and IIX muscle fibers, capillary density, and maximal enzyme activities were determined in biopsy samples from the vastus lateralis obtained in the sedentary state and after a 20-wk endurance-training program.

Results:

In the sedentary state, there was evidence for familial resemblance for Type I fiber area ($P = 0.007$), number of capillaries around Type I and Type IIA fibers
(\(P = 0.04\)), and Type I and IIA fiber areas per capillary (\(P = 0.01\) and \(P = 0.04\), respectively). Significant familial aggregation (\(0.05 > P > 0.0001\)) was observed for maximal activities of enzymes of the energy production pathways. With regard to the training response, significant familial aggregation (\(0.05 > P < 0.0001\)) was observed for maximal activities of enzymes of the energy production pathways.

**Conclusion:**

These data provide evidence of familial aggregation for enzyme activities of the main energy metabolism pathways of the skeletal muscle in the sedentary state and in response to regular exercise.

**Key Words:** Enzyme; Capillary; Muscle Fiber; Sedentary; Training

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