

GENETIC BASIS OF INDIVIDUAL DIFFERENCES IN TISSUE COMPOSITION

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A total of 19 pairs of twin adolescent boys, 14 MZ and 5 DZ, were used to determine the relative contribution of the genotype to the individual differences observed in surface density of muscle, subcutaneous fat, and bone. The cross-sectional areas of these tissue components were calculated from photographs of the upper arm, taken by means of an ultrasonic apparatus. Results are given in the table below, showing the mean percentage intrapair differences and the F-ratio of (a) the cross-sectional area of the three tissue components (upper part), and

	Total	Muscle	Fat	Bone
MZ	6.93	6.55	13.90	6.70
DZ	9.83	7.82	31.95	31.25
F	0.632	0.231	4.796	10.834
MZ		2.58	14.04	9.25
DZ		5.69	19.35	24.07
F		7.783	2.072	3.267

(b) the relative contribution of the different tissues to the total area (lower part). Interindividual variations in bone only could be ascribed to genetic differences.

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ULTRASTRUCTURAL AND ENZYMATIC DIFFERENCES IN SKELETAL MUSCLE OF TWINS

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Biopsies were taken from the vastus lateralis muscle of 16 twin pairs, 10 MZ and 6 DZ, and were analyzed by electron microscopy, stereological and enzymatic methods for

(a) the morphometric parameters: volume density of myofibrils, volume density of mitochondria, volume density of cytoplasm, surface density of inner and outer mitochondrial membranes, and mitochondrial volume to myofibril volume ratio;

(b) the activities of mitochondrial enzymes: Succinate Dehydrogenase, Malate Dehydrogenase, and Hydroxyacyl-CoA-Dehydrogenase;

(c) the activities of extramitochondrial enzymes: Hexokinase and Glyceraldehyde-3 P-Dehydrogenase.

A comparison of the intrapair differences between MZ and DZ twins showed no significant differences for all the above mentioned variables, but the activity of the Hydroxyacyl-CoA-Dehydrogenase. On the basis of this evidence it was concluded that interindividual variability observed in the cellular metabolic equipment is conditioned primarily by extragenetic influences. Moreover, it was noted that cellular intrapair differences could not explain intrapair differences measured in Vo_2 max.

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DISTRIBUTION OF BLOOD GROUPS, SALIVARY BLOOD-GROUP SUBSTANCES AND NATURAL ANTIBODIES, IN A SAMPLE OF MZ TWINS

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The distribution of A_1A_2BO , MN, and Rh-Hr blood groups, of salivary ABH substances, and of natural antibodies, was assessed in a sample of 60 MZ twin pairs. Titrations were made for ABH substances and for antibodies. The resulting distribution provides indications as to the level of genetic control over the quantitative expression of these traits.

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