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Abstract:
This update of the human gene map for physical performance and health-related fitness phenotypes covers the research advances reported in 2006 and 2007. The genes and markers with evidence of association or linkage with a performance or a fitness phenotype in sedentary or active people, in responses to acute exercise, or for training-induced adaptations are positioned on the map of all autosomes and sex chromosomes. Negative studies are reviewed, but a gene or a locus must be supported by at least one positive study before being inserted on the map. A brief discussion on the nature of the evidence and on what to look for in assessing human genetic studies of relevance to fitness and performance is offered in the introduction, followed by a review of all studies published in 2006 and 2007. The findings from these new studies are added to the appropriate tables that are designed to serve as the cumulative summary of all publications with positive genetic associations available to date for a given phenotype and study design. The fitness and performance map now includes 214 autosomal gene entries and quantitative trait loci plus seven others on the X chromosome. Moreover, there are 18 mitochondrial genes that have been shown to influence fitness and performance phenotypes. Thus, the map is growing in complexity. Although the map is exhaustive for currently published
accounts of genes and exercise associations and linkages, there are undoubtedly many more
gene-exercise interaction effects that have not even been considered thus far. Finally, it should be
appreciated that most studies reported to date are based on small sample sizes and cannot therefore
provide definitive evidence that DNA sequence variants in a given gene are reliably associated with
human variation in fitness and performance traits.