We began this series in 2000 with the aim of making available in an easily accessible format all the advances on the genetic basis of a large family of exercise-related traits. The current review presents the 2004 update of the human gene map for physical performance and health-related fitness phenotypes. It is based on peer-reviewed papers published by the end of 2004. The genes and markers with evidence of association or linkage with a performance or fitness phenotype in sedentary or active people, in adaptation to acute exercise, or for training-induced changes are positioned on the genetic map of all autosomes and the X chromosome. Negative studies are reviewed but a gene or locus must be supported by at least one positive study before being inserted on the map. One new feature is that we have incorporated the genes whose sequence variants have been associated with either the level of physical activity or indicators of sedentarism. By the end of 2000, in the early version of the gene map, 29 loci were depicted. In contrast, the 2004 human gene map for physical performance and health-related phenotypes includes 140 autosomal gene entries and quantitative trait loci, plus four on the X chromosome. Moreover, there are 16 mitochondrial genes in which sequence variants have been shown to influence relevant fitness and performance phenotypes. Thus, the map is growing in
complexity and progress is being made. The number of laboratories and scientists concerned by the role of genes and sequence variations in exercise-related traits is rising. But exercise science and sports medicine is generally lagging behind in terms of utilizing the advances in genetic and genomic technologies.