This review of the exercise genomics literature emphasizes the highest quality articles published in 2011. Given this emphasis on the best publications, only a small number of published articles are reviewed. One study found that physical activity levels were significantly lower in patients with mitochondrial DNA mutations compared with controls. A two-stage fine-mapping follow-up of a previous linkage peak found strong associations between sequence variation in the activin A receptor, type-1B (ACVRIB) gene and knee extensor strength, with rs2854464 emerging as the most promising candidate polymorphism. The association of higher muscular strength with the rs2854464 A allele was confirmed in two separate cohorts. A study using a combination of transcriptomic and genomic data identified a comprehensive map of the transcriptomic features important for aerobic exercise training-induced improvements in maximal oxygen consumption, but no genetic variants derived from candidate transcripts were associated with trainability. A large-scale de novo meta-analysis confirmed that the effect of sequence variation in the fat mass and obesity-associated (FTO) gene on the risk of obesity differs between sedentary and physically active adults. Evidence for gene-physical activity interactions on type 2 diabetes risk was found in two separate studies. A large study of women found that physical activity modified the effect of
polymorphisms in the lipoprotein lipase (LPL), hepatic lipase (LIPC), and cholesteryl ester transfer protein (CETP) genes, identified in previous genome-wide association study reports, on HDL cholesterol. We conclude that a strong exercise genomics corpus of evidence would not only translate into powerful genomic predictors but also have a major effect on exercise biology and exercise behavior research.