

## Homework 3: GWA analysis in practice

The homework uses data from the FAMuSS study (Functional SNPs Associated with Muscle Size and Strength). The data are available as tab-delimited text file. Background information can be found in Thompson et al. 2004.

Q1: Determine whether there is a deviation from HWE for the akt1\_t10726c\_t12868c SNP. Check whether stratifying by the variable Race alters your findings. Interpret the results.

Q2: Perform a data quality control check, i.e. do a genome-wide check for the validity of HWE, describe missing data patterns, and identify monomorphic SNPs. Describe and interpret your findings.

Q3: Determine whether any SNP in the akt2 gene is associated with NDRM.CH, uncorrected for multiple testing. Perform your analysis unadjusted and adjusting for Race, Gender and Age.

Q4: Test for an additive effect of the actn3\_r577x SNP on NRDM.CH. Repeat the test stratified by gender, and within gender strata.

Q5: Determine the OR of homozygous variant versus homozygous wildtype individuals at the resistin\_c180g SNP for having pre.BMI>25.

Q6: Perform a genome-wide scan for this dichotomized trait, using various genetic models. Summarize your findings.