PGRNseq Sample and Phenotype Processing

Format the phenotype data for downstream processing.

```
pheno.df <- data.frame(id=nomiss.pheno$SM_ID,
                       sex=as.factor(nomiss.pheno$Sex),
                       ANC=as.numeric(nomiss.pheno$ANC_nadir_1000cells.per.mcL),
                       site=as.factor(nomiss.pheno$Study.site),
                       race=as.factor(nomiss.pheno$Race),
                       dose=as.factor(nomiss.pheno$Dose..mg.))
```

Expirical Distributions of Phenotypes

```
anc.plt <- ggplot(pheno.df, aes(x=ANC)) + geom_histogram()
print(anc.plt + ggtitle('ANC'))
```

```
## stat_bin: binwidth defaulted to range/30. Use 'binwidth = x' to adjust this.
```

```
loganc.plt <- ggplot(pheno.df, aes(x=log10(ANC))) + geom_histogram()
print(loganc.plt + ggtitle('log10(ANC)'))
```

```
## stat_bin: binwidth defaulted to range/30. Use 'binwidth = x' to adjust this.
```

PCA

Prune SNP set for LD, filter on MAF, and run PCA.

```
ld.snpset <- snpgdsLDpruning(exome.geno)
```

```
## SNP pruning based on LD:
##  Sliding window: 500000 basepairs, Inf SNPs
##  |LD| threshold: 0.2
## Removing 5465 non-autosomal SNPs
## Removing 154888 SNPs (monomorphic, < MAF, or > missing rate)
## Working space: 253 samples, 82543 SNPs
## Chromosome 1: 18.87%, 4656/24674
## Chromosome 2: 20.45%, 3516/17190
## Chromosome 3: 19.91%, 2892/14528
## Chromosome 4: 23.03%, 2349/10198
## Chromosome 5: 21.50%, 2432/11314
## Chromosome 6: 17.88%, 2712/15171
```

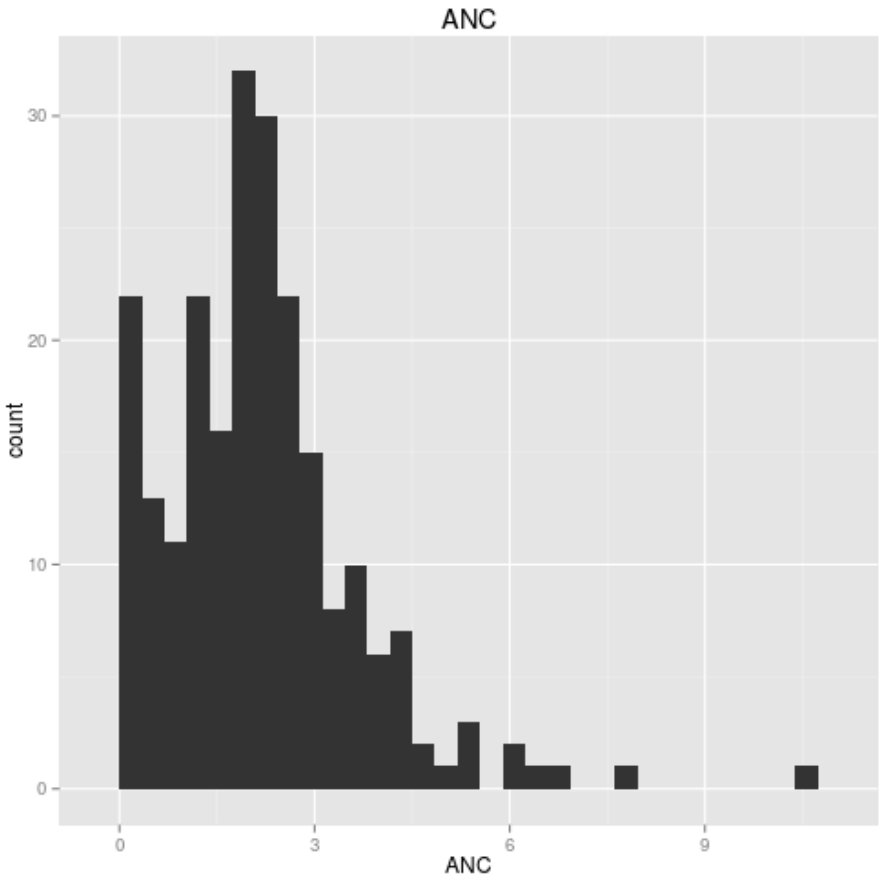


Figure 1: plot of chunk anc_plot

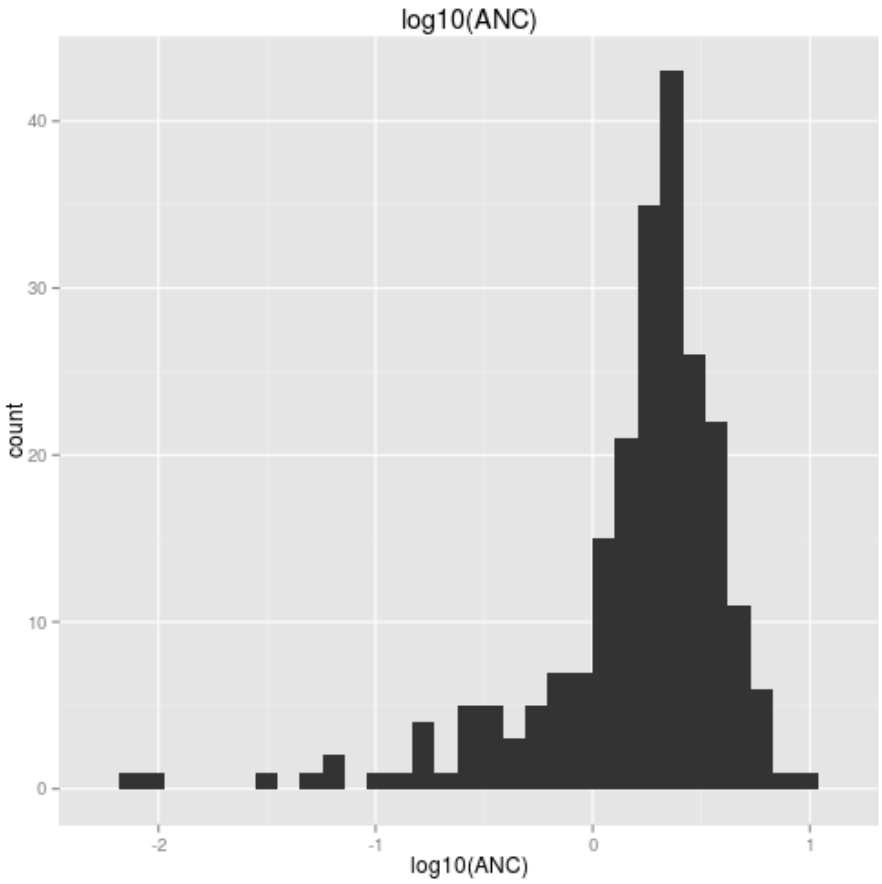


Figure 2: plot of chunk loganc_plt

```
## Chromosome 7: 21.38%, 2372/11092
## Chromosome 8: 21.66%, 1932/8921
## Chromosome 9: 20.28%, 2069/10201
## Chromosome 10: 21.81%, 2074/9511
## Chromosome 11: 18.56%, 2882/15528
## Chromosome 12: 19.83%, 2443/12318
## Chromosome 13: 24.93%, 1092/4380
## Chromosome 14: 20.15%, 1556/7721
## Chromosome 15: 19.78%, 1636/8273
## Chromosome 16: 17.84%, 1853/10384
## Chromosome 17: 16.85%, 2184/12963
## Chromosome 18: 24.19%, 907/3749
## Chromosome 19: 15.40%, 2303/14955
## Chromosome 20: 19.28%, 1239/6428
## Chromosome 21: 21.01%, 593/2823
## Chromosome 22: 18.48%, 944/5109
## 46636 SNPs are selected in total.
```

```
pca <- snpgdsPCA(exome.geno, snp.id = unlist(ld.snpset), maf = 0.05)
```

```
## Principal Component Analysis (PCA) on SNP genotypes:
## Removing 35291 SNPs (monomorphic, < MAF, or > missing rate)
## Working space: 253 samples, 11345 SNPs
##  Using 1 CPU core.
## PCA: the sum of all working genotypes (0, 1 and 2) = 1641285
## PCA: Fri Aug  8 15:45:09 2014    0%
## PCA: Fri Aug  8 15:45:09 2014    100%
## PCA: Fri Aug  8 15:45:09 2014    Begin (eigenvalues and eigenvectors)
## PCA: Fri Aug  8 15:45:09 2014    End (eigenvalues and eigenvectors)
```

```
pca.df <- data.frame(sample.id=pca$sample.id, eigenvect=pca$eigenvect)
```

Look at the first two PCs, and color the samples by self-reported ancestry.

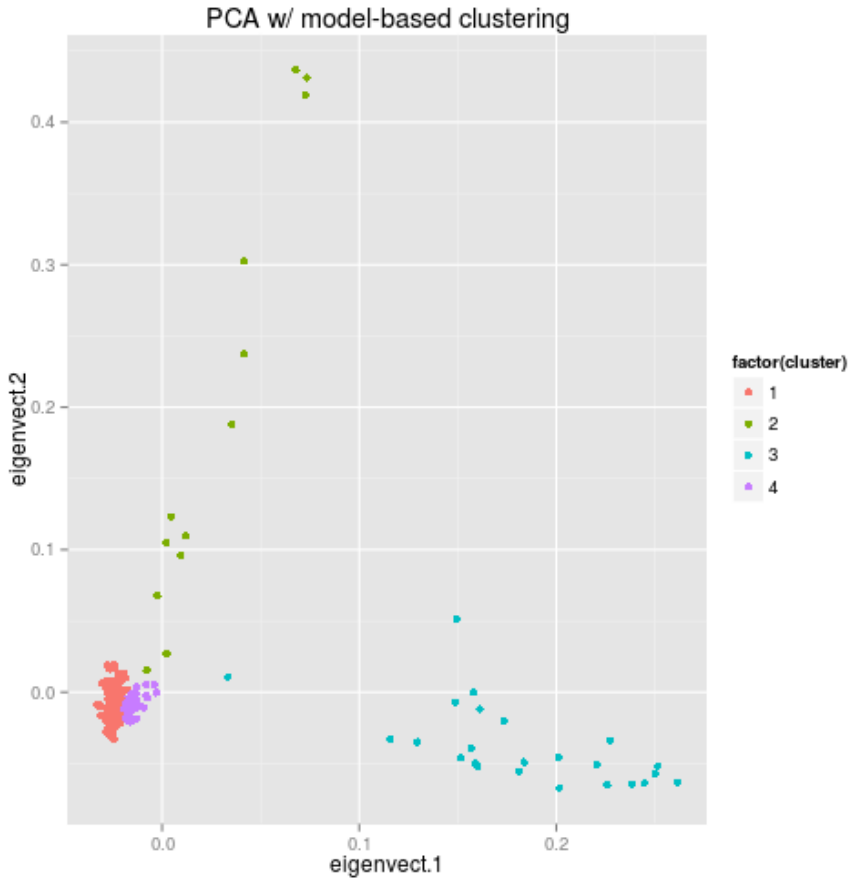
```
## Error: object 'eigenvect.1' not found
```

Model-based Clustering

Add principal components to the phenotype data frame, then cluster samples in the first two PCs.

```
pheno.df <- merge(pca.df, pheno.df, by.x = "sample.id", by.y = "id")
names(pheno.df)[which(names(pheno.df) == "sample.id")] <- "id"
cluster <- Mclust(pheno.df[,c("eigenvect.1", "eigenvect.2")])
pheno.df$cluster <- cluster$classification
```

Examine the results of our PCA and clustering the first two PCs.



Taking a closer look at the clustering of the Europeans. We may be able to explain some genetic variation just by site of ascertainment.

```
## Warning: Removed 35 rows containing missing values (geom_point).
```

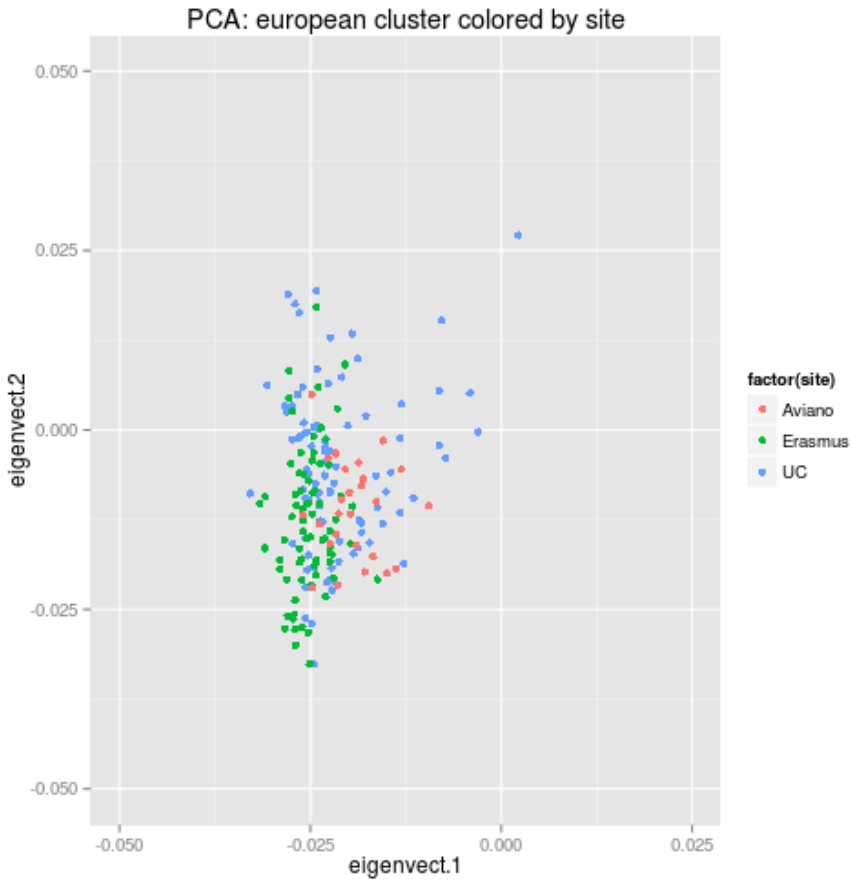


Figure 3: plot of chunk euro_zoom_plot