

SUPPLEMENTARY MATERIAL. R code for permutations test.

```
#Permutations test by Chris Shelley (2016).
#Both data sets should have the same number of data points.

control.data <- c(1,2,3,4,5) #Enter control data here
test.data <- c(6,7,8,9,10) #Enter test data here
N2 <- length(control.data)
all.data <- c(control.data, test.data)

mean.control.data <-c(mean(control.data))
mean.test.data <-c(mean(test.data))
true.mean.diff <- mean.control.data - mean.test.data
sd.control.data <-c(sd(control.data))
sd.test.data <-c(sd(test.data))

N1 <- c(length(all.data)) #Total number of data points
N.comb <- choose(N1,N2) #Number of combinations of N2 samples from N1
permA <- combn(all.data,N2) #Matrix containing all combinations of N2 samples from all data.

mean.a <- colMeans(permA) #Means of samples a.
mean.b <- rev(mean.a) #Flip vector to get means of samples b.

diff.mean <- mean.a - mean.b
corr.diff.mean <- diff.mean + (diff.mean / 1E6) #corrected as default hist function puts x values that
match a bin boundary in the lower bin (creates asymmetric histograms when values span negative and
positive numbers)
CI.values <- quantile(diff.mean, probs = c(0.05,0.95))
hist (corr.diff.mean, xlab = "Difference in means", )
abline(v = true.mean.diff, col = "red", lwd = 3)

greater.than.true.diff <- which (abs(diff.mean) >= (true.mean.diff)) #Directly calculates p value.
p.value = length(greater.than.true.diff) / N.comb

#g = corr.diff.mean # Include this section to overlay normal curve and changes y axis from
frequency to density.
#m<-mean(g)
#std<-sqrt(var(g))
#hist(g, density=20, prob=TRUE, xlim = c(-100,100),
# xlab="Difference between means",
# main="normal curve over histogram")
#curve(dnorm(x, mean=m, sd=std),
# col="darkblue", lwd=2, add=TRUE, yaxt="n")
#abline(v = true.mean.diff, col = "red", lwd = 3)

cat("Control data mean ", mean.control.data, "\n");
cat("Control data sd ", sd.control.data, "\n");
cat("Test data mean ", mean.test.data, "\n");
cat("Test data sd ", sd.test.data, "\n");
cat("Difference between the control and test means", true.mean.diff, "\n");
cat("Experimental data p value", p.value, "\n");
cat("5% CI value", CI.values[1], "\n");
cat("95% CI value", CI.values[2], "\n");
```