

# **Exchange Among Sex Chromosomes and Autosomes - Primates**

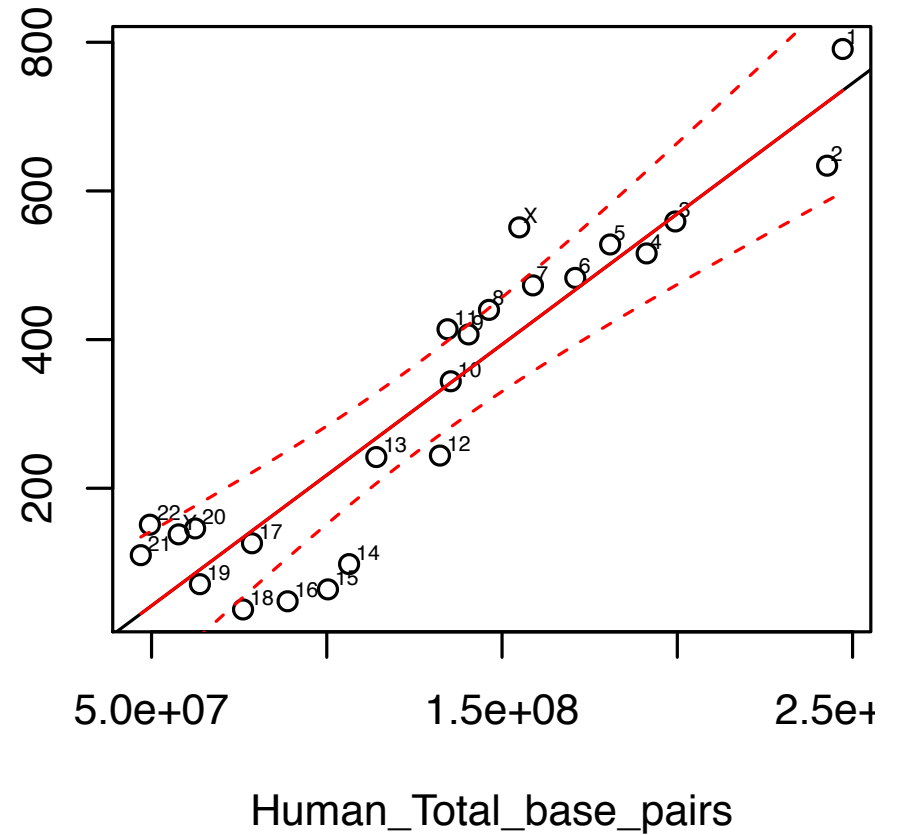
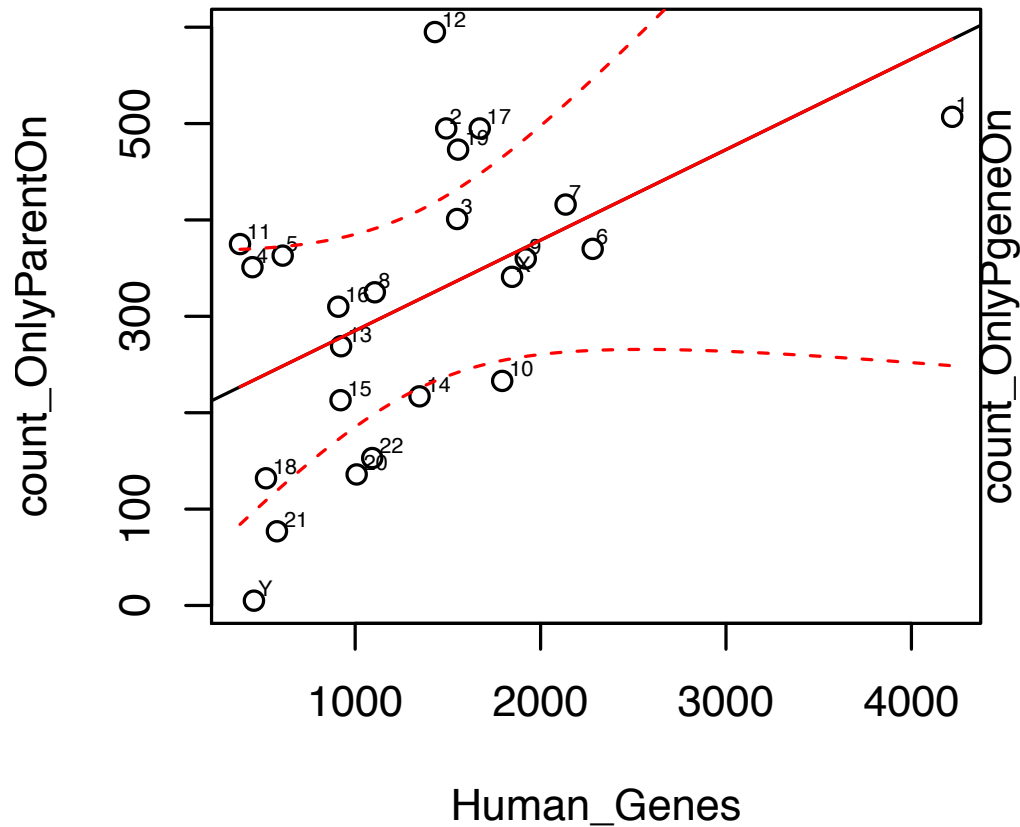
Yan Zhang

8/15/2013

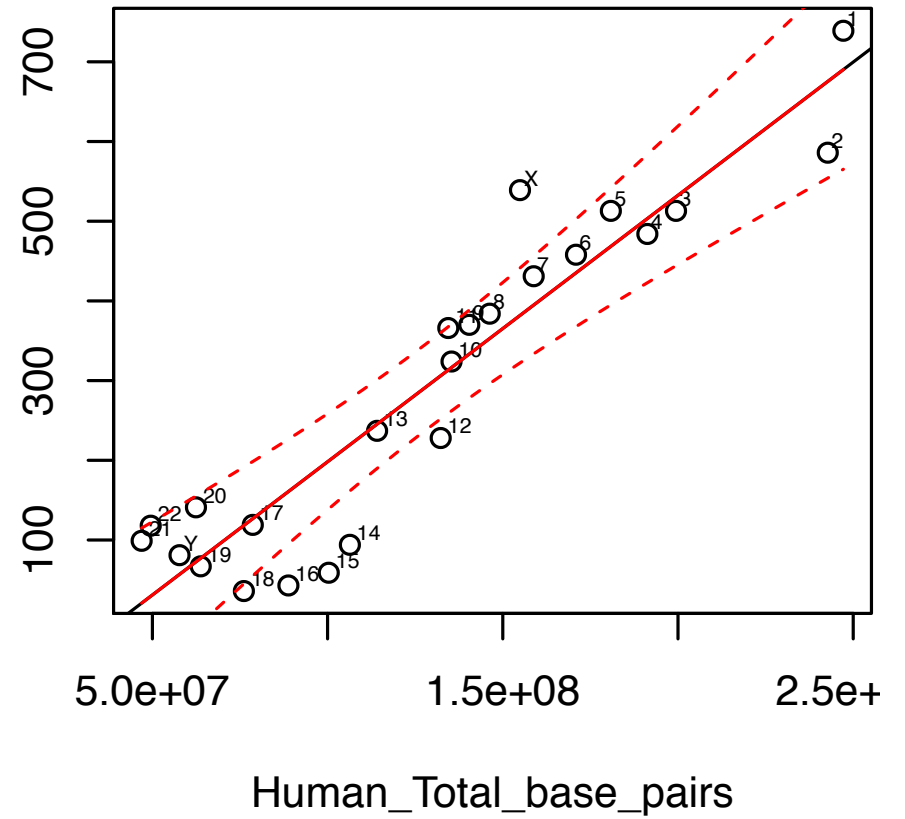
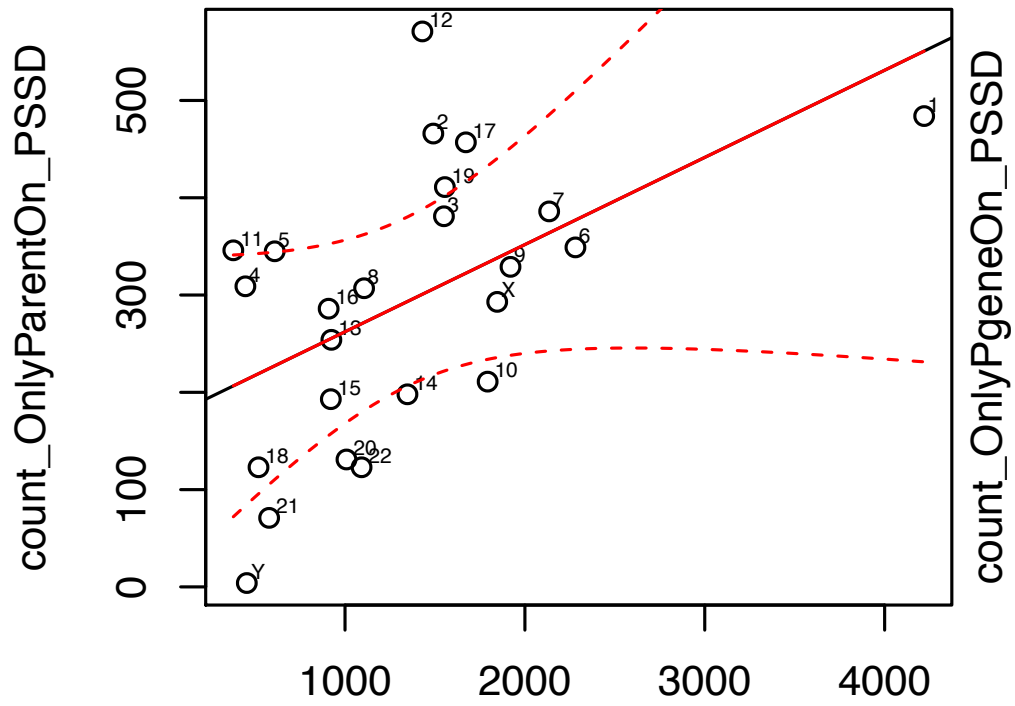
# Outline

- Human (confidence intervals,  $\alpha=0.05$ , Bonferroni)
- Other primates
  - Test co-residence randomness
  - Exchange between autosomes and sex chromosomes

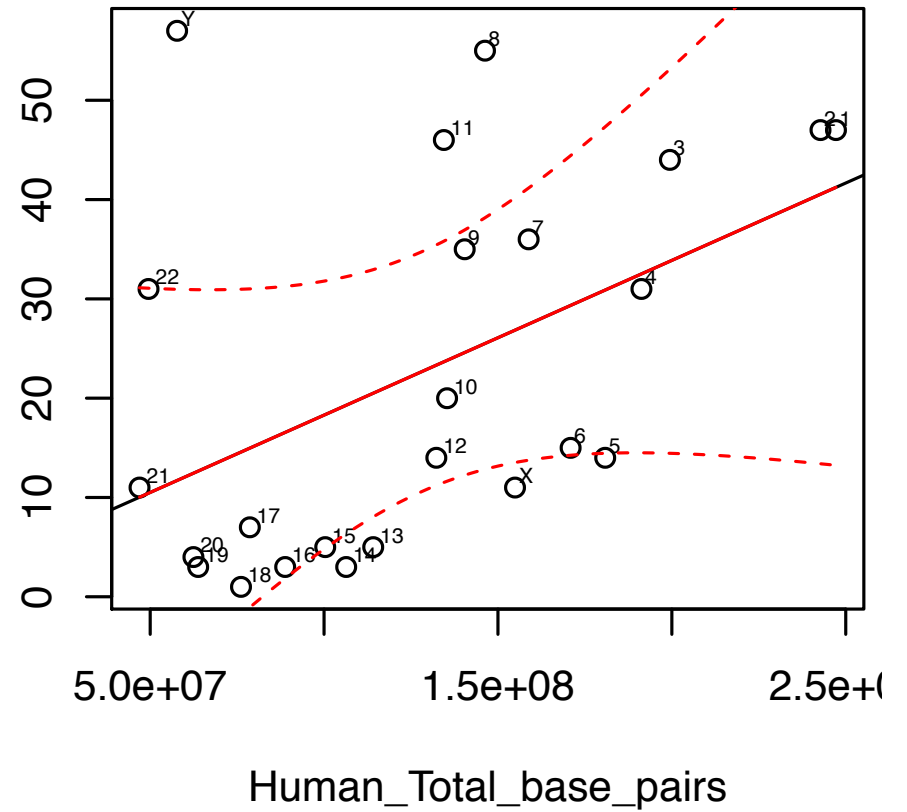
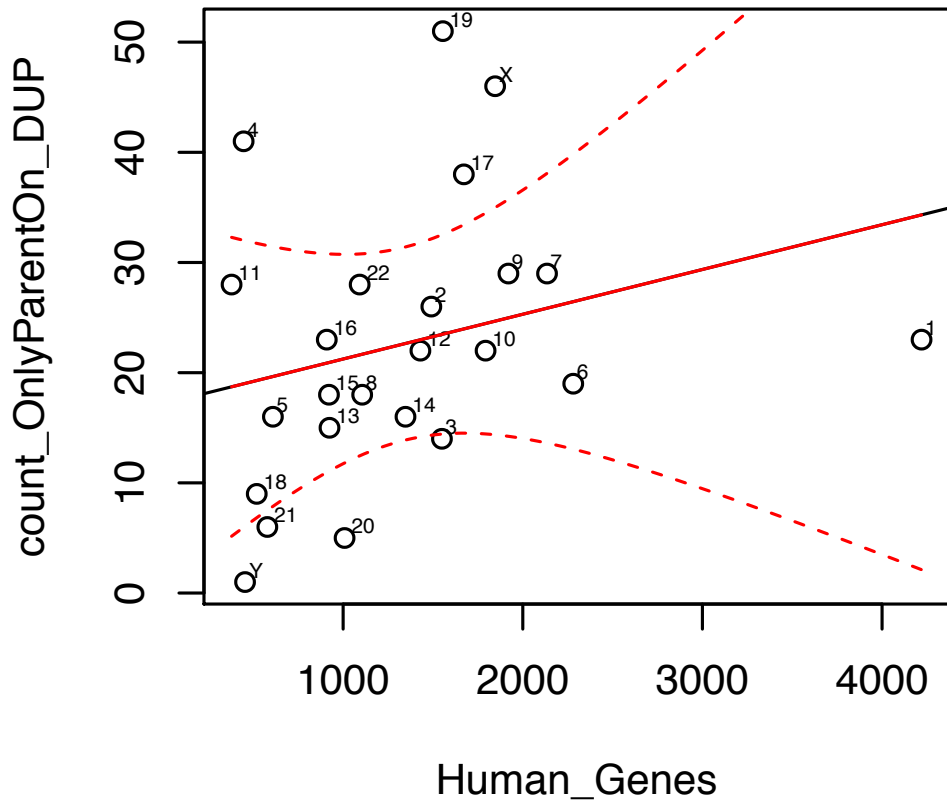
# Human (total pgenes)



# Human (PSSD)



# Human (DUP)

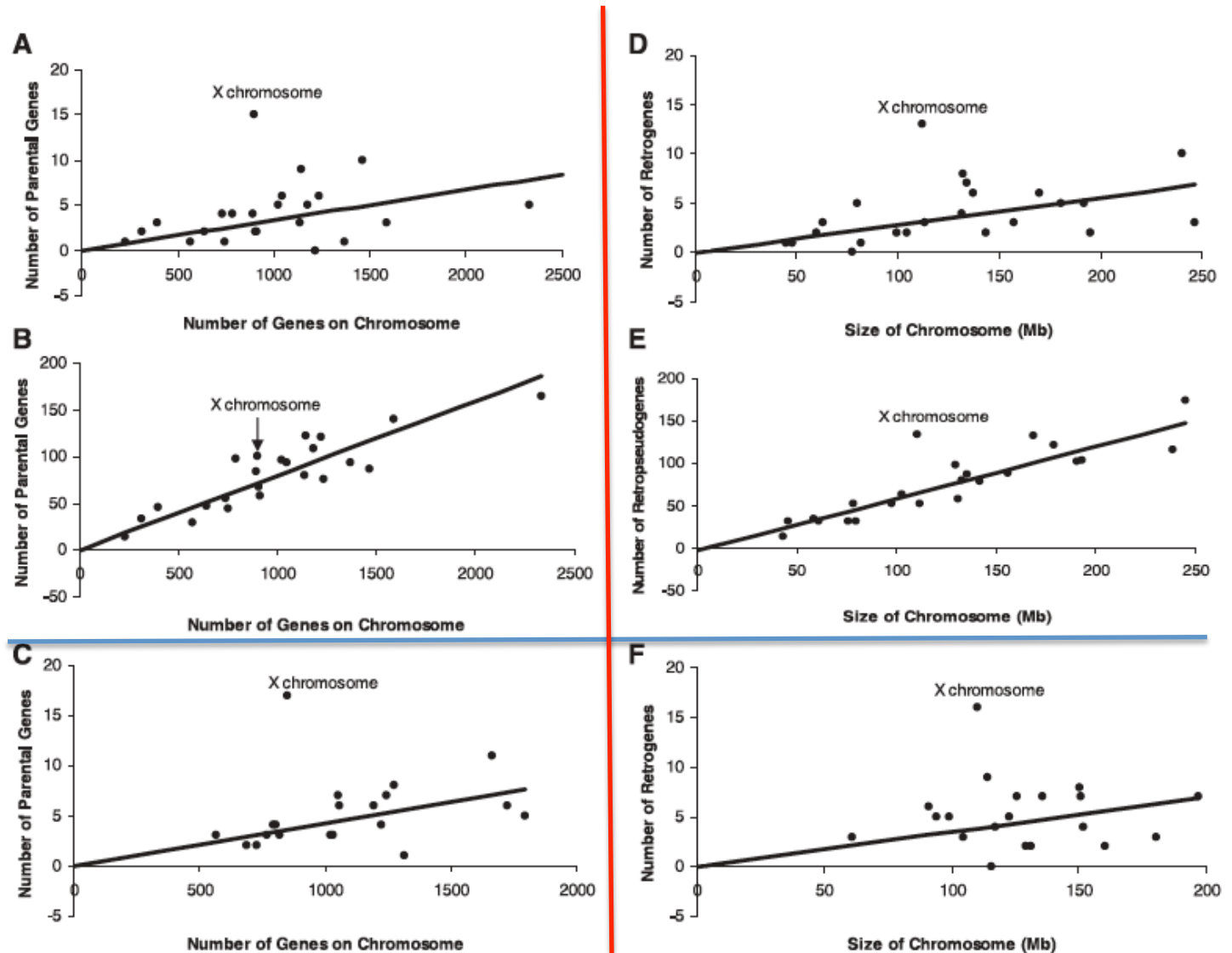


# Reference:

## Rough summary from their work (ctd)

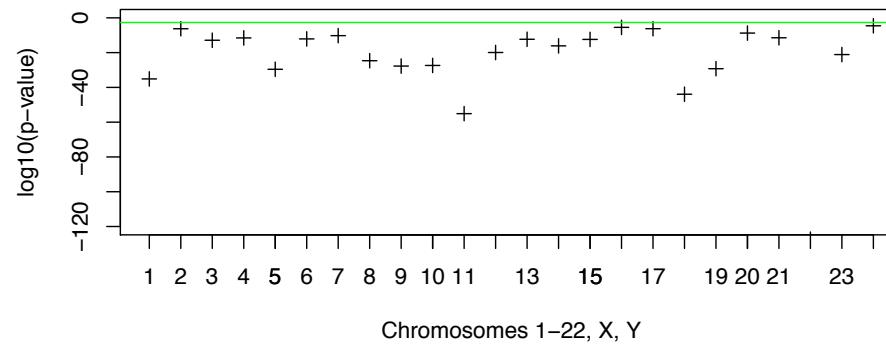
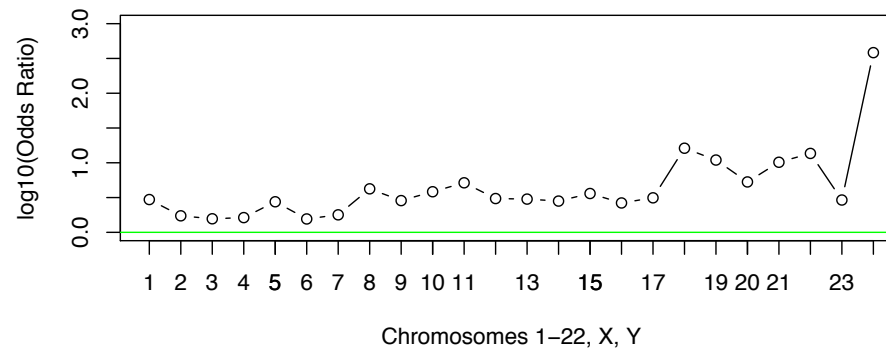
- Linear regression results (Y was not included):

Fig. 1. Regressions for the parental genes of retrogenes in (A) human and (C) mouse and for the parental genes of retropseudogenes (B) in human. Regressions for the size of a chromosome in (D) human and (F) mouse and for the retropseudogenes (E) in human. In the plots, X is shown as 75% of its size as predicted by the model (15), although allowing X to assume 100% of its size does not change the results. Probabilities for the hypothesis that the chromosome with the highest observed/expected ratio [where the expected number is calculated as in (16)] is an outlier are calculated using Grubbs and Dixon outlier tests (16). For every distribution [except (B)], the X has the largest ratio and is an outlier with  $P < 0.005$  and  $P < 0.01$  for the Grubbs and Dixon tests, respectively; (B) shows no such outliers.



# Callithrix

Fisher's Exact Test: Co-residence is Random or Not for Each Chromosom



# Callithrix

```
|
      parent_auto    X    Y
pgene_auto      9300  447  3
X                482   66   0
Y                 11    1   0
```

Pearson's Chi-squared test

```
data: table_XYauto
X-squared = 61.3747, df = 4, p-value = 1.491e-12
```

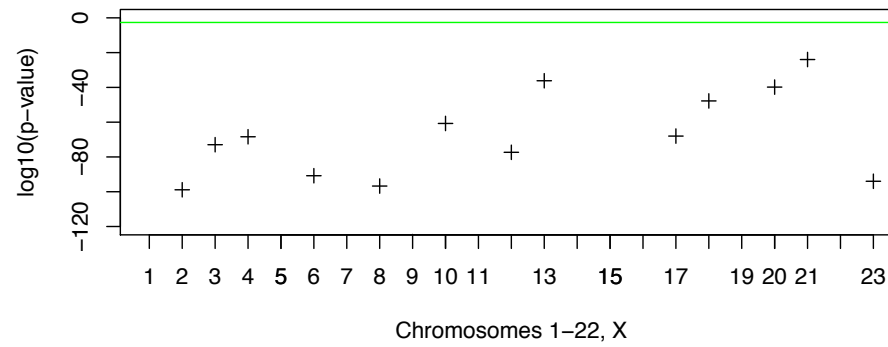
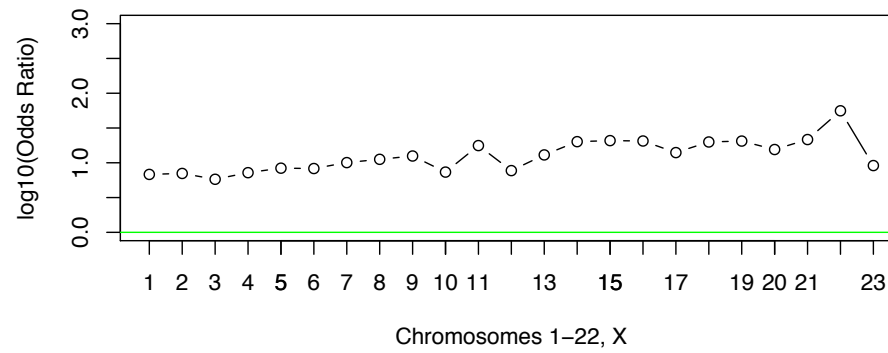
Fisher's Exact Test for Count Data

```
data: table_XYauto
p-value = 4.759e-10
alternative hypothesis: two.sided
```



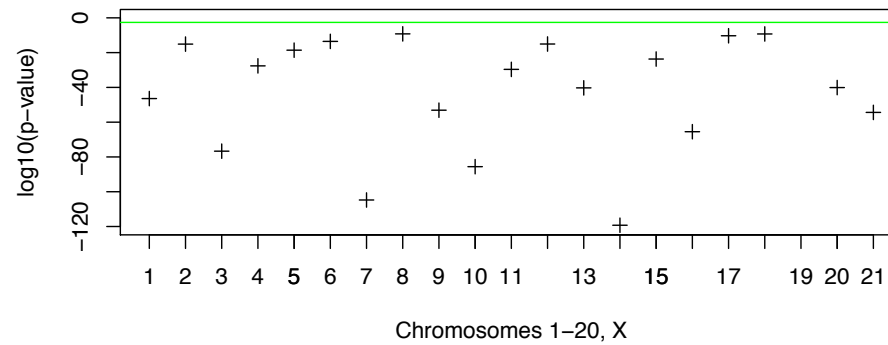
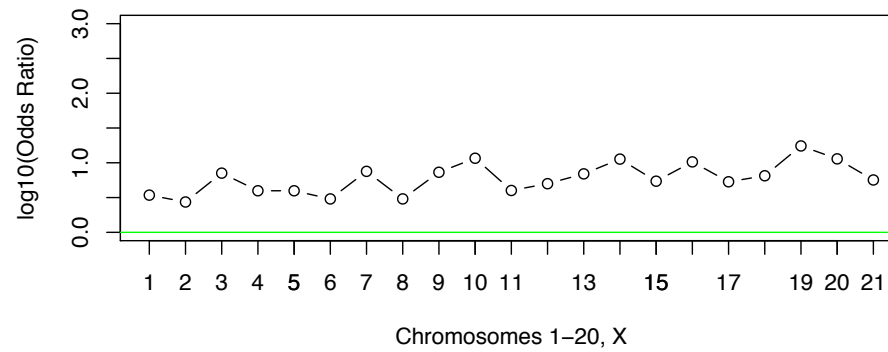
# Gorilla

Fisher's Exact Test: Co-residence is Random or Not for Each Chromosom



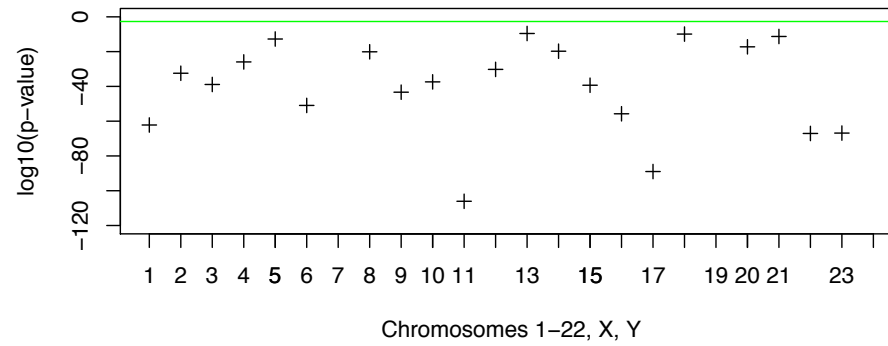
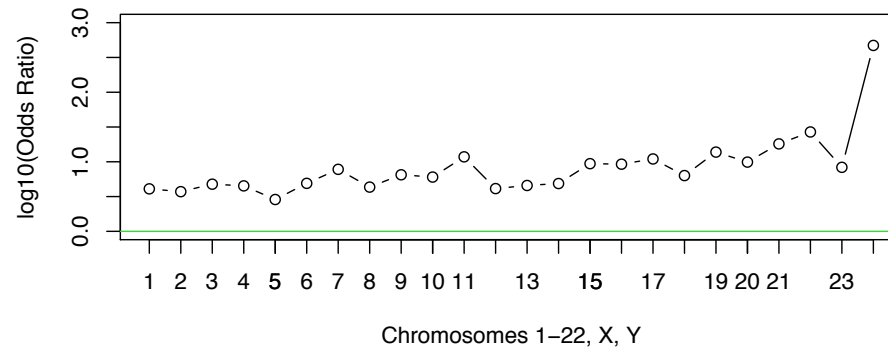
# Macaca

Fisher's Exact Test: Co-residence is Random or Not for Each Chromosom



# Pan

**Fisher's Exact Test: Co-residence is Random or Not for Each Chromosom**



# Pan

```
|
      parent_auto    X    Y
pgene_auto  7884  218   9
X           443   83   5
Y           123   19  159
```

Pearson's Chi-squared test

```
data: table_XYauto
X-squared = 4516.336, df = 4, p-value < 2.2e-16
```

Fisher's Exact Test for Count Data

```
data: table_XYauto
p-value < 2.2e-16
alternative hypothesis: two.sided
```

# Pongo

Fisher's Exact Test: Co-residence is Random or Not for Each Chromosom

