The contribution of non-coding mutations to human phenotypes and disease is unknown
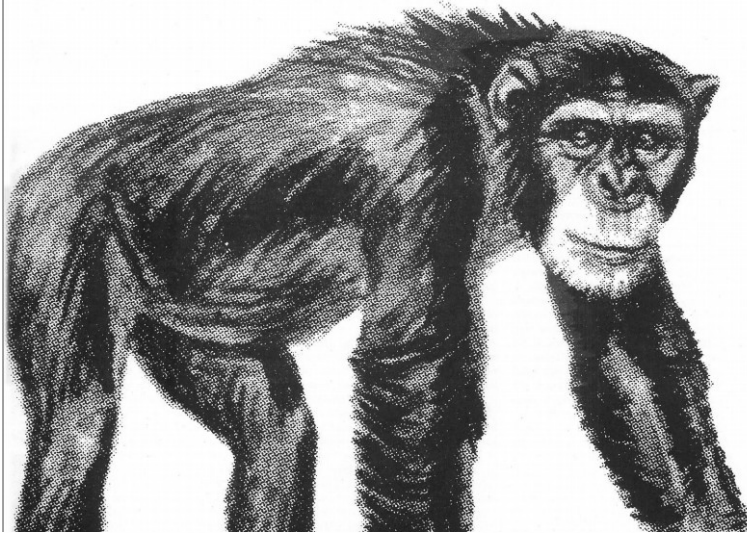

Reprinted from
11 April 1975, Volume 188, pp. 107-116

SCIENCE
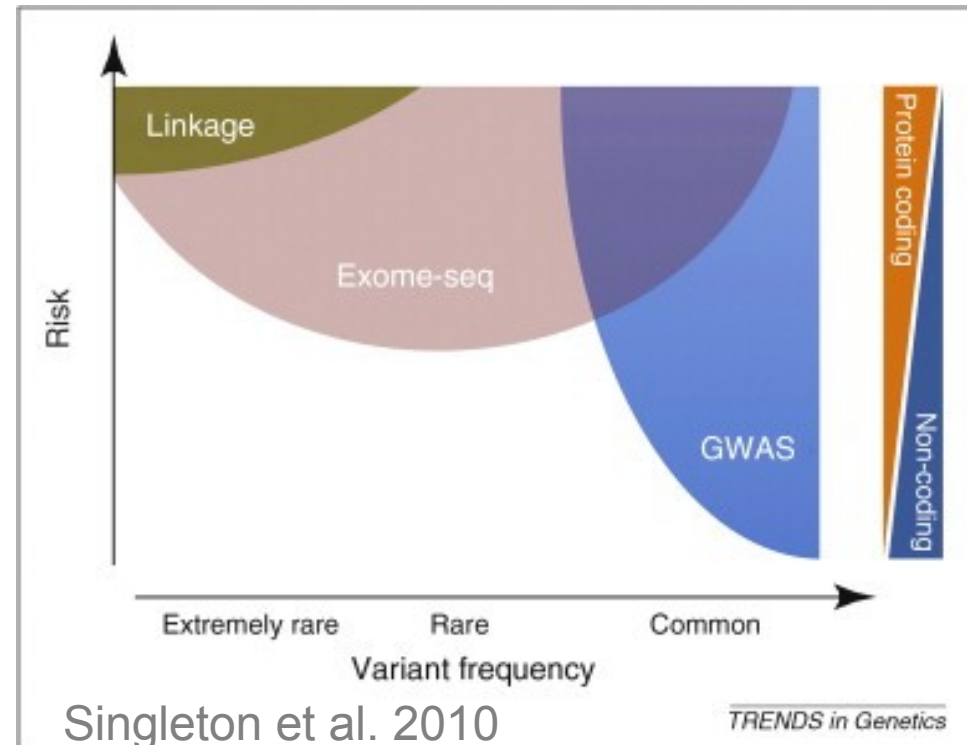
Evolution at Two Levels in
Humans and Chimpanzees

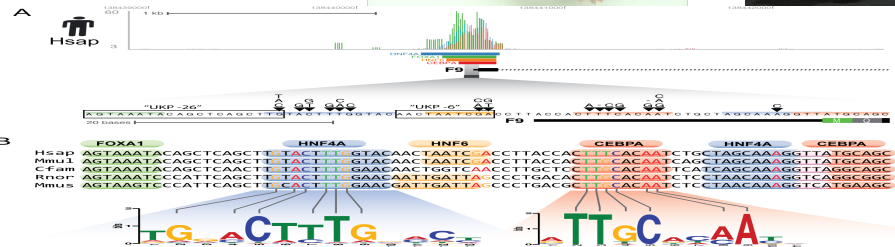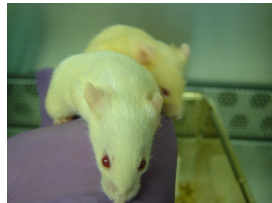Mary-Claire King and A. C. Wilson

Evolution at Two Levels in
Humans and Chimpanzees

Their macromolecules are so alike that regulatory
mutations may account for their biological differences.

Mary-Claire King and A. C. Wilson

Singleton et al. 2010

TRENDS in Genetics

Wilson Lab – Understanding human gene regulation and disease with comparative genomics

1) Generating/analyzing "big" datasets to assign function to the non-coding genome
- Hemostasis (F. Gagnon, S. Mital, and C. Hayward labs)
- Puberty (M. Palmert and A. Goldenberg labs)
- Early zebrafish heart development (I. Scott lab)
- Genome biology of topoisomerases

2) Testing regulatory DNA function in human cells and model organisms

Wilson Lab – Understanding human gene regulation and disease with comparative genomics

1) Generate "big" datasets to assign function to the non-coding genome
- Protein-DNA and epigenomic assays
    -ChIP-seq, ChIP-exo …
- Gene expression
    -RNA-seq
    -high-throughput qPCR (Fluidigm BioMark with Rossant lab),
    -Single cell mRNA sequencing (Fluidigm C1 system)

2) Analyze "big" datasets to assign function to the non-coding genome
- detect differential DNA occupancy, gene expression
- Compare NGS results between species
- Integrative analyses to assign function to the non-coding genome

3) Test regulatory DNA function in human cells and model organisms
- Targeted sequencing/cloning/reporter assays of non-coding DNA
    -Fluidigm Access Array microfluidic PCR
- CRISPR/Cas9 genome editing to delete/modify non-coding DNA
- Gene reporter assays in zebrafish (with Ian Scott's Lab)