Chromosomal inheritance and gene location

Chromosomal theory of heredity

- 1865- Mendel's research was published. But no evidence
- 1900- recognition of mendel's research
- 1902- Sutton & Boveri – (Microscope, gene & chromosome)
- Hunt Morgan – eye gene - fruit fly

Mendel's theory	Sutton
Factors are in pairs (alleles)	Chromosomes have their genes Homologous pair
Factors separate at the time of gamete formation	Homologous pair are separate during gamete formation
Alleles on factors assort independently	Chromosome assort themselves indendently

Chromosomal Theory of Inheritance

- Chromosomes contain the units of heredity (genes)
- Pair chromosomes segregate during meiosis, each sex cell has half of the number of chromosomes found in a somatic cell. (Mendel's law of segregation)
- Chromosomes assort independently during meiosis (Mendel's law of independent assortment)
- Each chromosome contain many different genes

Modes of Inheritance

Autosomal recessive alleles [silent carriers] albinism, cystic fibrosis, certain types of hemophilia, Tay-Sachs disease, PKU, blue eyes.

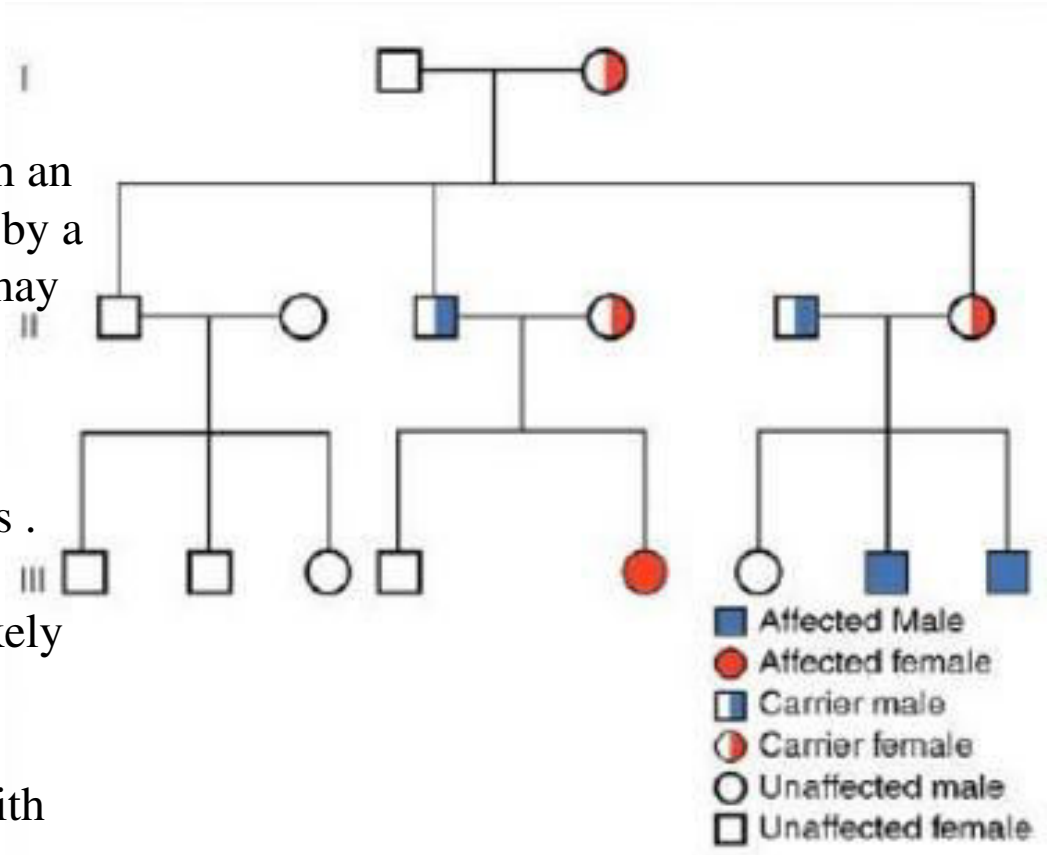
A pedigree following a trait associated with an autosomal recessive allele is often marked by a skipping of generations. That is, children may express a trait which their parents do not.

In such a situation, both parents are heterozygotes, also known as silent carriers .

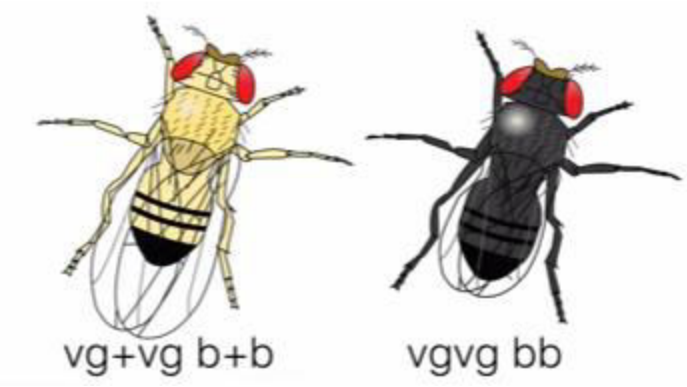
Close relatives who reproduce are more likely to have affected children.

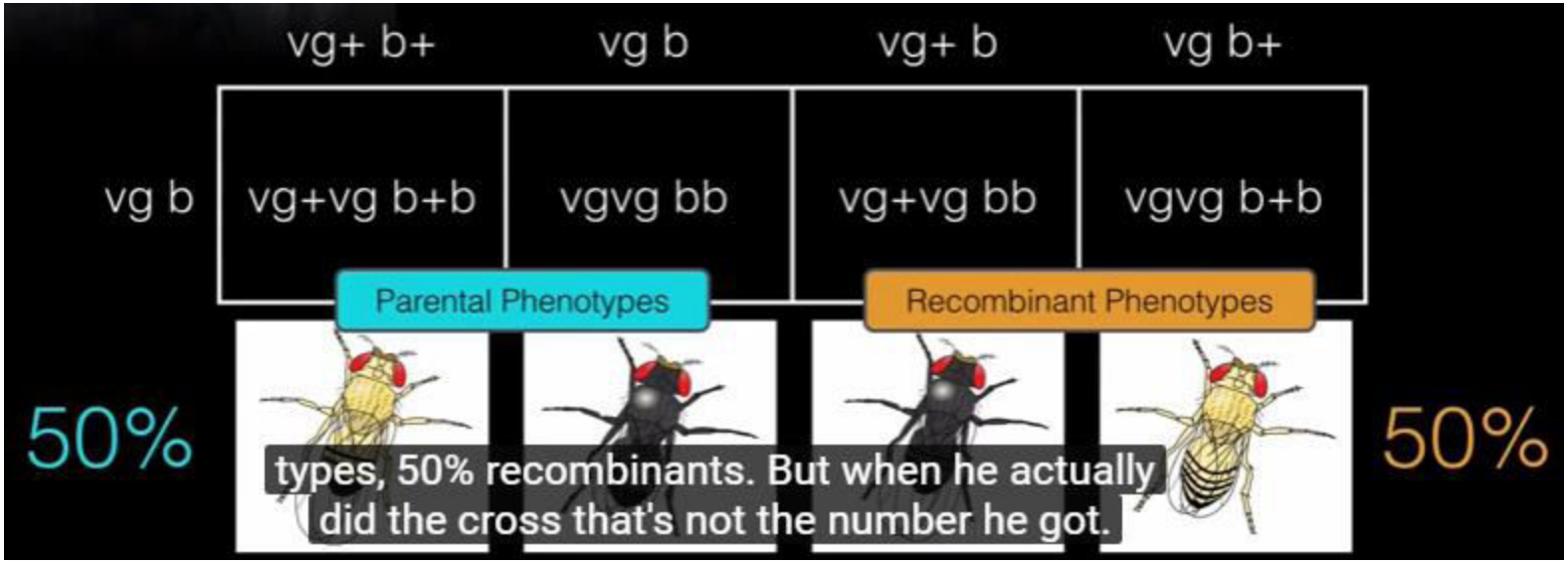
Both males and females will be affected with equal frequency

A low number of individuals normal affected

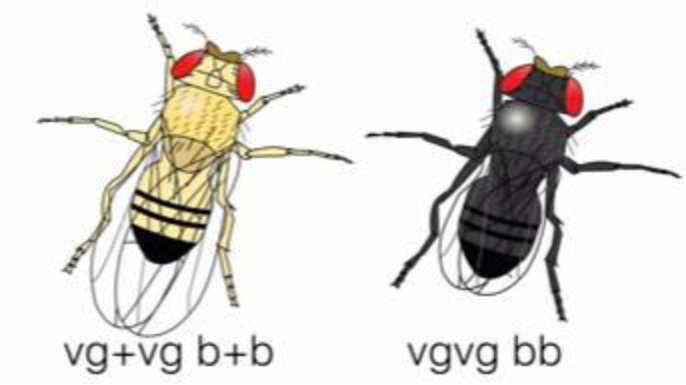


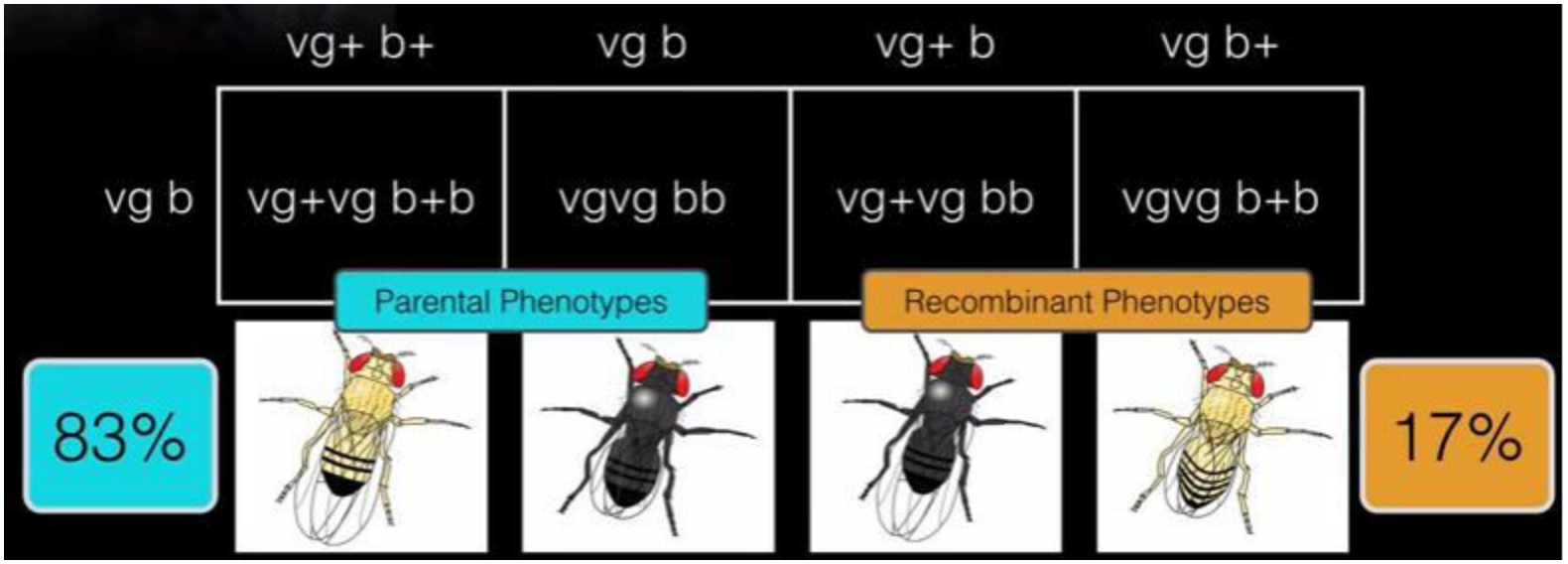
Thomas Hunt Morgan genetic law



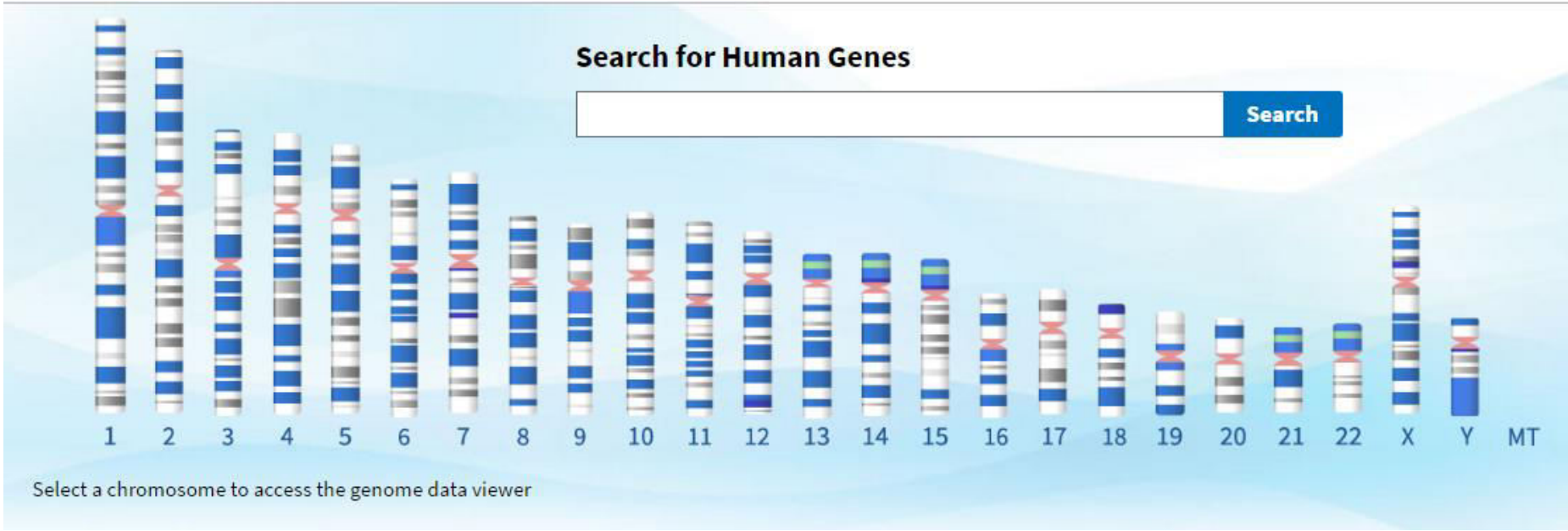


Thomas Hunt Morgan - recombination genetic law

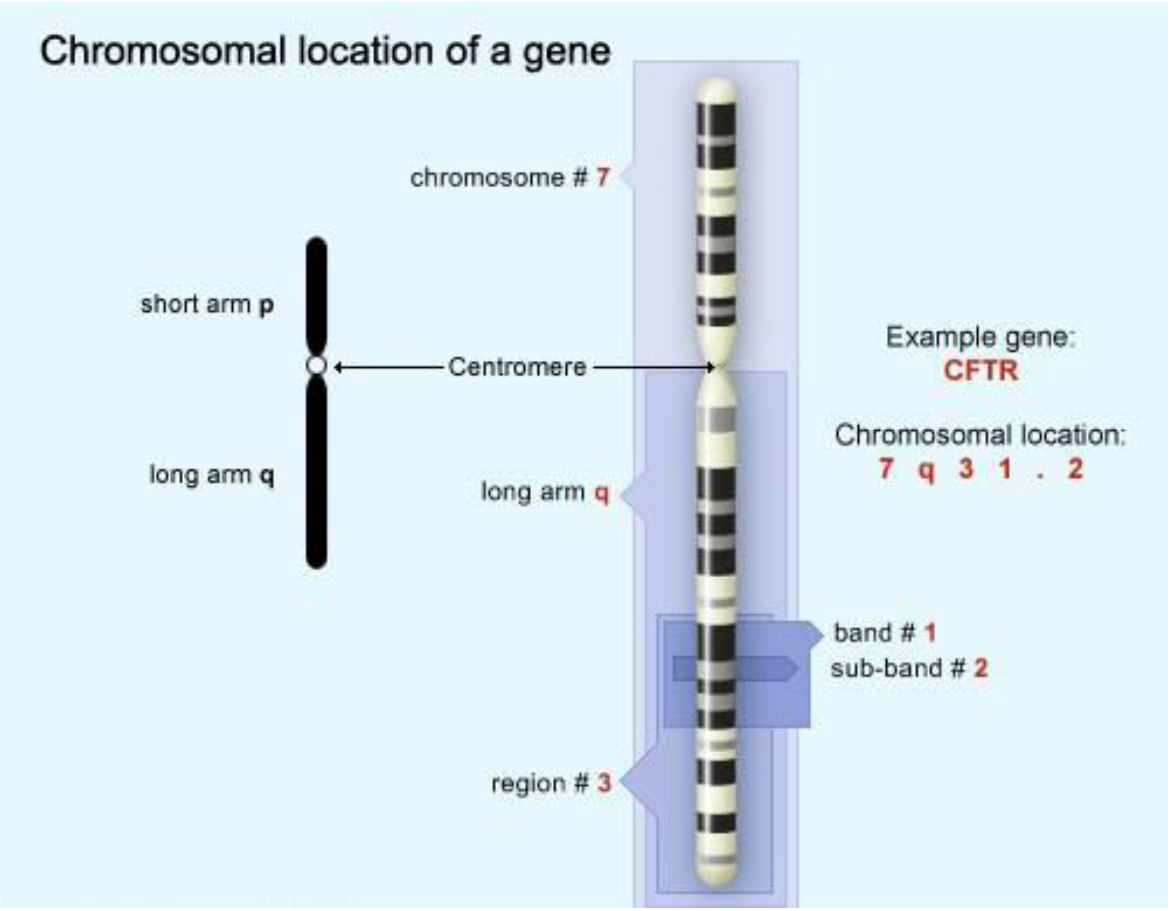


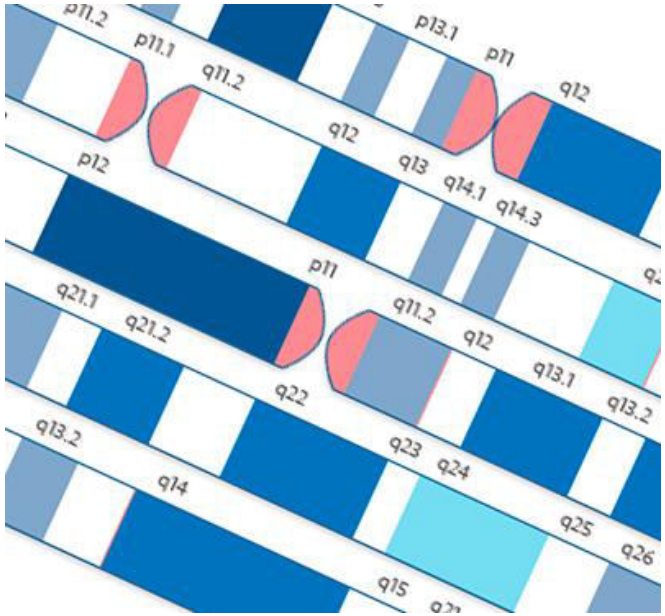


Genome data viewer



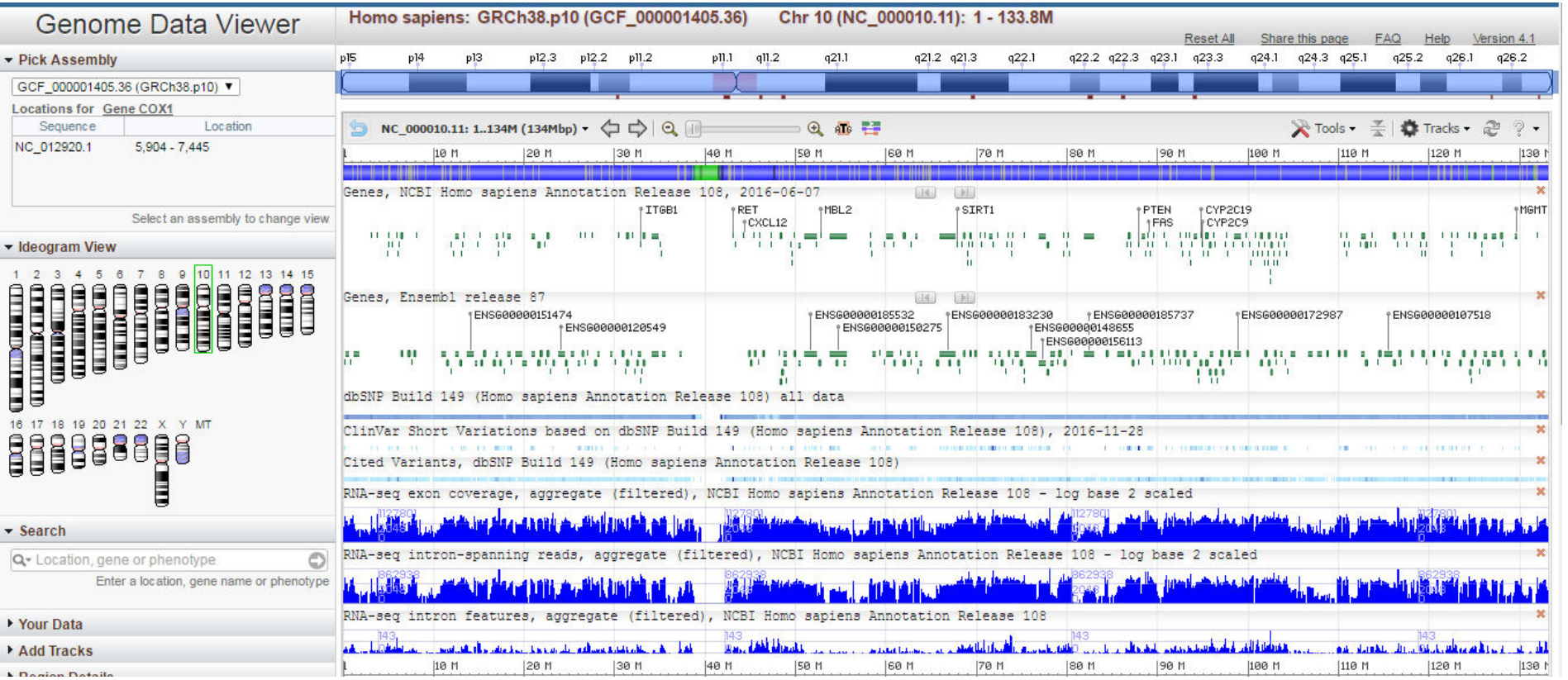
Cytogenetic location



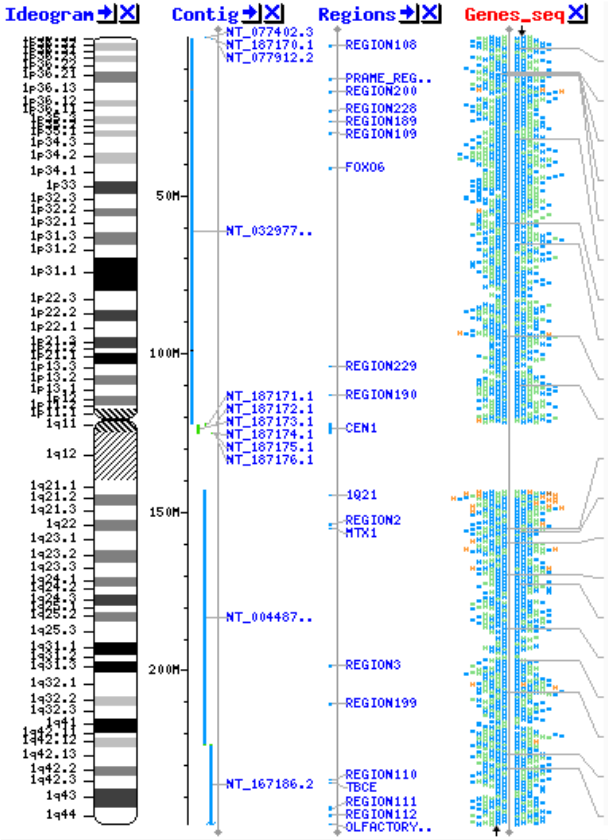


Ref: U.S. National Library of Medicine

GENOME data viewer



Gene location



Homo sapiens (human) **Annotation Release 108 (Current)** — **BLAST human sequences**

Chromosome: [1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 X Y MT

Master Map: Genes On Sequence — Summary of Maps — Maps & Options

Region Displayed: **0-250M bp** — Download/View Sequence/Evidence

Symbol	O	Links	E	Cyto	Description
TP73	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p36.32	tumor protein p73
TARDBP	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p36.22	TAR DNA binding protein
MTOR	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p36.22	mechanistic target of rapamycin
MTHFR	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p36.22	OTTHUMP00000002368
NPPB	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p36.22	natriuretic peptide B
HDAC1	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p35.2-p35.1	histone deacetylase 1
JUN	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p32.1	Jun proto-oncogene, AP-1 transcription factor sub
LEPR	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p31.3	leptin receptor
F3	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p21.3	coagulation factor III, tissue factor
GSTM1	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1p13.3	glutathione S-transferase mu 1
MUC1	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q22	mucin 1, cell surface associated
LMNA	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q22	lamin A/C
CRP	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q23.2	C-reactive protein|OTTHUMP00000033307|pentr
F5	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q24.2	coagulation factor V
FASLG	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q24.3	Fas ligand
PTGS2	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q31.1	PGH synthase 2|PHS II|cyclooxygenase 2b|prosta
CFH	↓	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q31.3	complement factor H
IL10	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q32.1	interleukin 10
PARP1	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q42.12	poly(ADP-ribose) polymerase 1
AGT	↑	OMIM HGNC sv pr dl hm sts SNP	best RefSeq	1q42.2	OTTHUMP00000035878

Ref NCBI