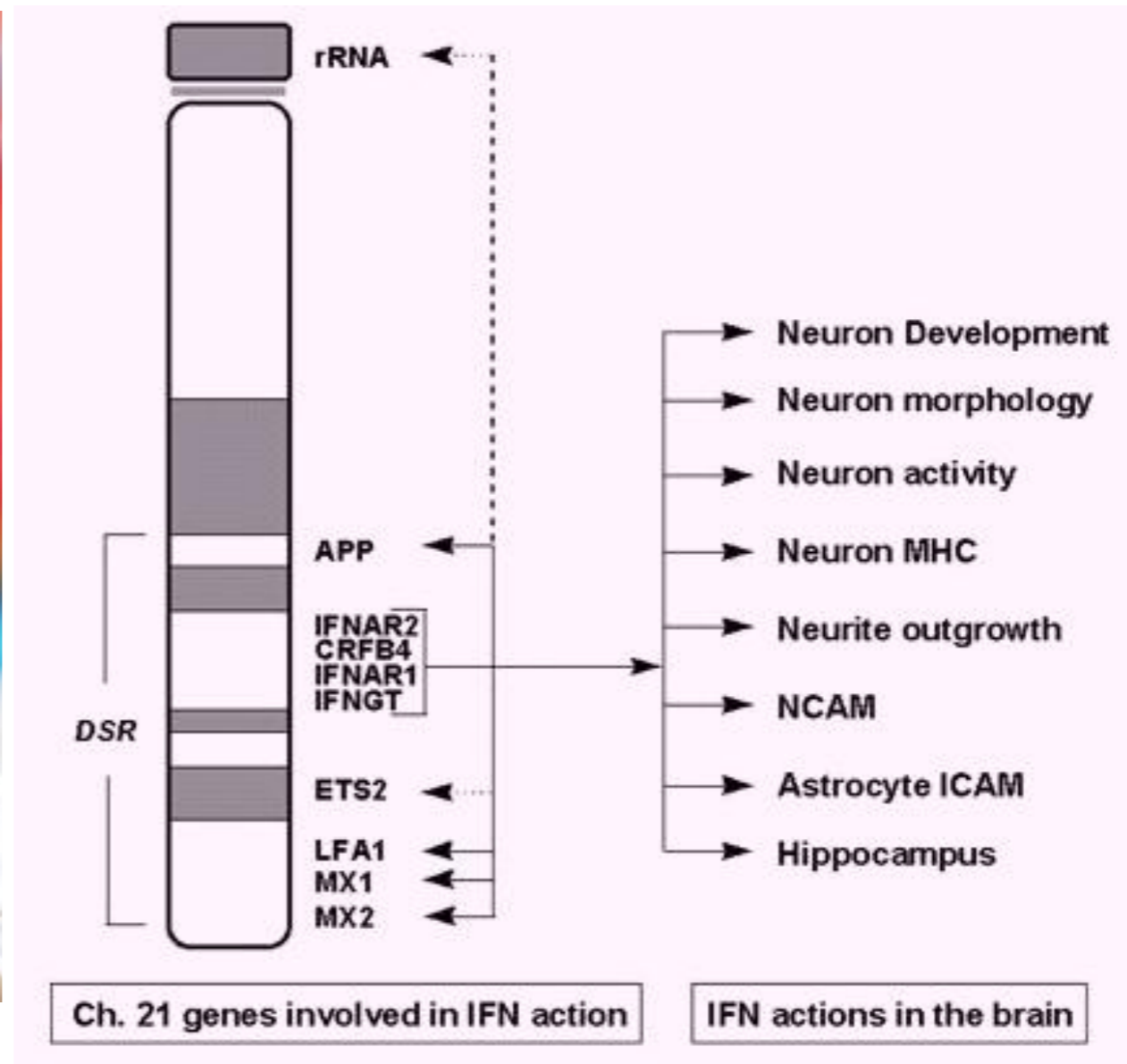


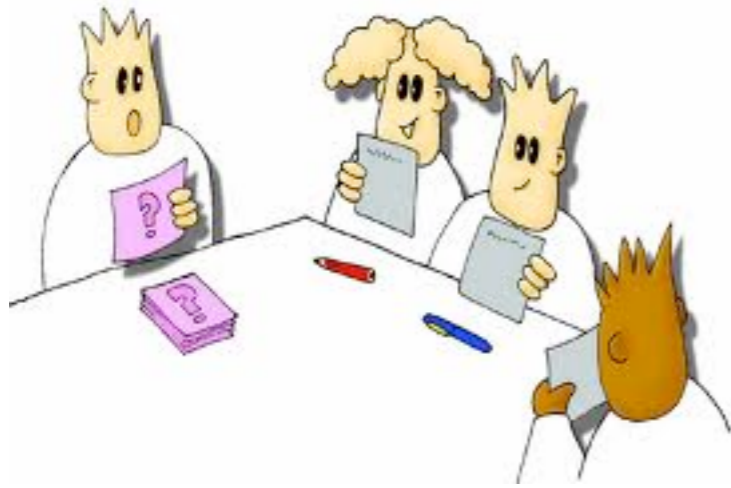


Population Genetics

Topic 1

Genes (3.1)



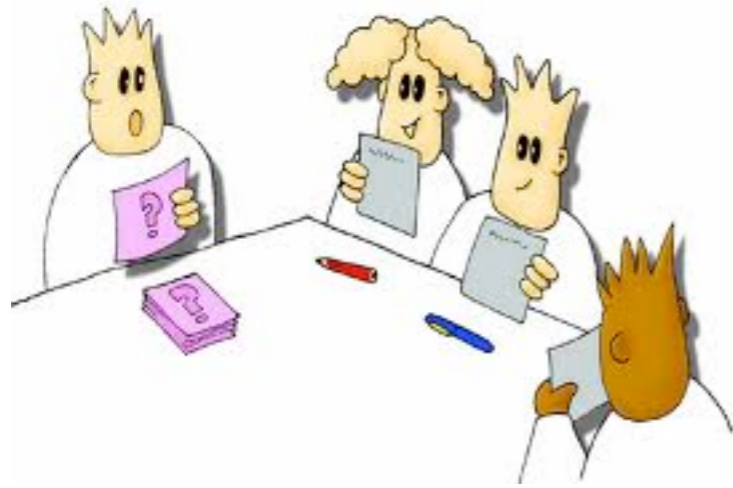


In a T-chart compare yourself to each of your parents in the personality and physical traits you have...

Trait	Parent you most likely resemble
sense of humour	father
foot shape	father
nose profile	mother
eye colour	mother
hair curl	neither
choice of movies	both
phobias	father
ear shape	mother
chin type	father
hair line pattern	father
laugh	mother
reading ability	father
mathematical skill	mother
thumbs/fingers	father
blood type	both

Mr Thibert —> 23 and Me



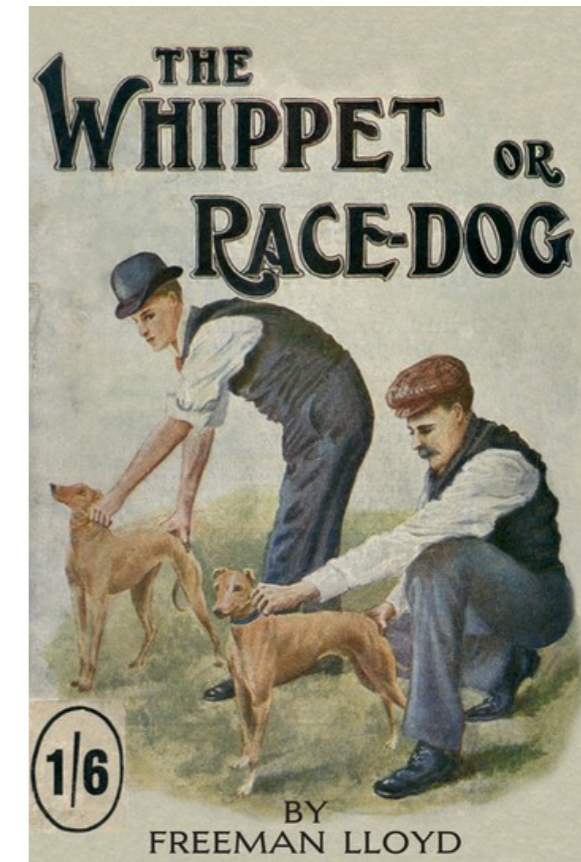


Which of the following would you consider as inheritable traits?

- Skin colour
- Freckles
- Number of fingers on each hand
- Blood type
- Colour blindness
- Sex (male/female)
- Ability to digest lactose
- Reflexes
- Type of ear wax (wet or dry)
- A scar from an accident
- Ability to speak
- Ability to speak Spanish
- Height
- Personality
- Intelligence

What is a gene?

- **An inheritable factor**
 - observed for generations in traditional plant and animal breeding



- **It is a length of DNA on a chromosome**
 - *the example shows the X chromosome with the location of genes causing disorders*
- **IT IS THE CODE OF THE INSTRUCTIONS OF A PROTEIN**

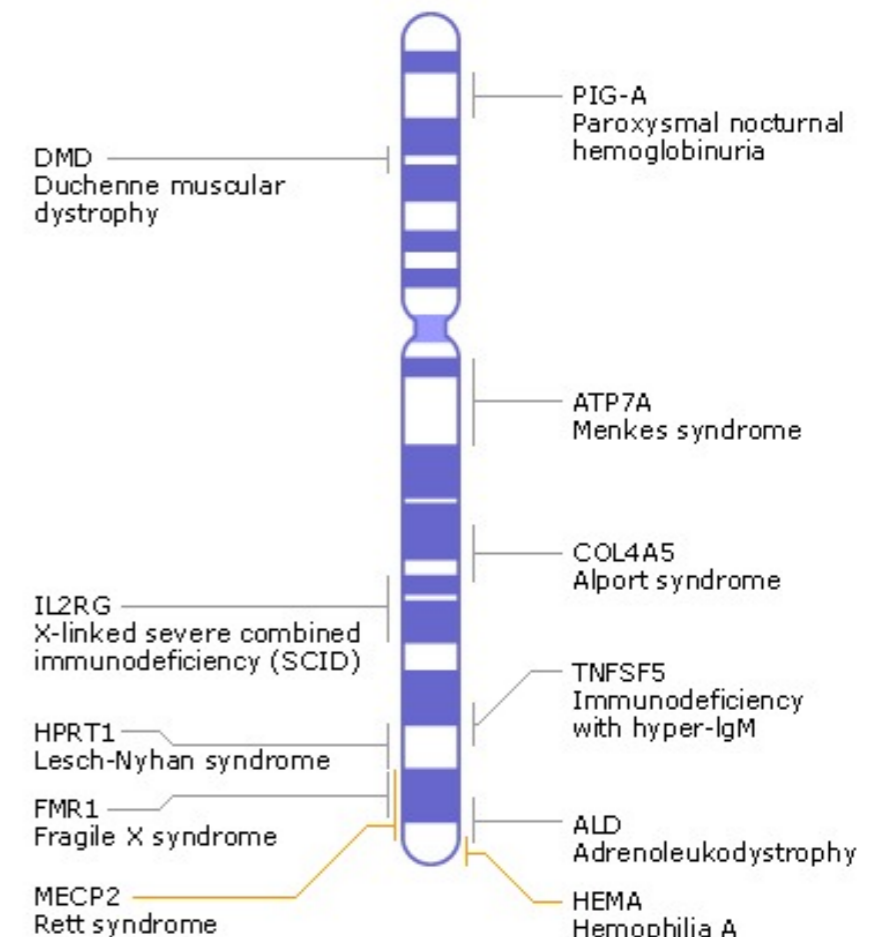


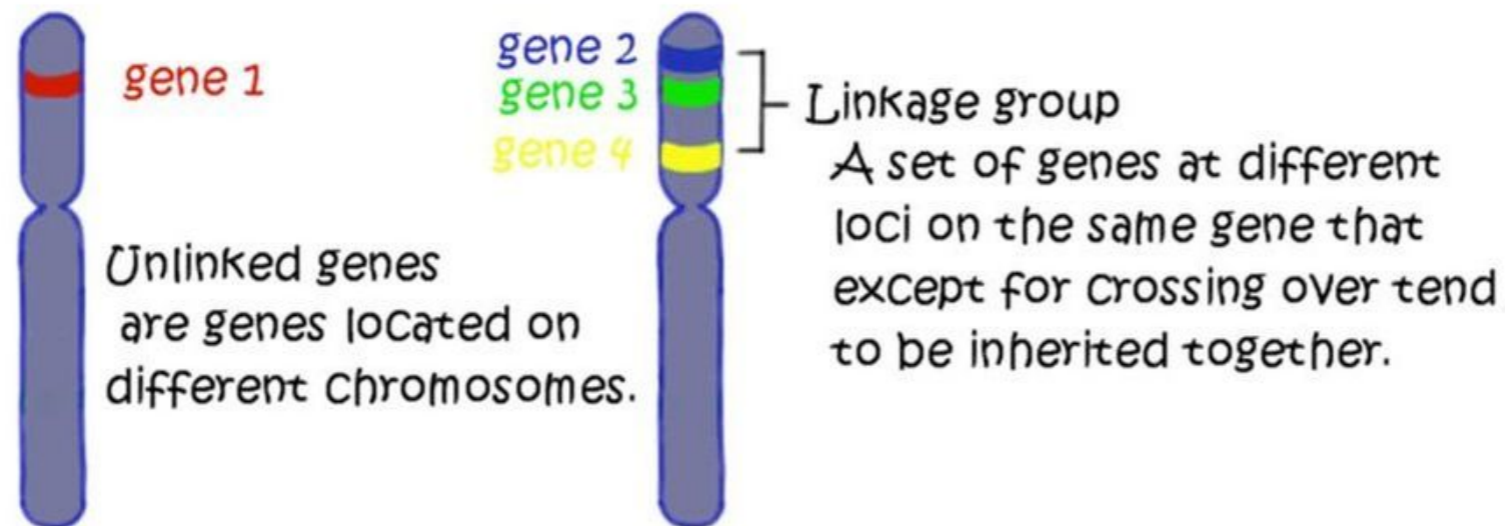
Table 3.1 Comparison of the number of genes in humans and other species

Organism	Scientific name	Number of bases	Number of genes
Virus (bacteriophage)	phiX174 *	5400	11
Bacterium	<i>Escherichia coli</i> (type K-12)	4 639 000	4377
Nematode (roundworm)	<i>Caenorhabditis elegans</i>	100 292 000	20 000
Human	<i>Homo sapiens</i>	3 000 000 000	21 000
Asian rice	<i>Oryza sativa</i>	430 000 000	up to 56 000
Baker's yeast	<i>Saccharomyces cerevisiae</i>	12 495 000	5770
Mouse-ear cress	<i>Arabidopsis thaliana</i>	135 000 000	25 000
Fruit fly	<i>Drosophila melanogaster</i>	122 654 000	27 407
Japanese canopy plant	<i>Paris japonica</i> **	150 000 000 000	Unknown

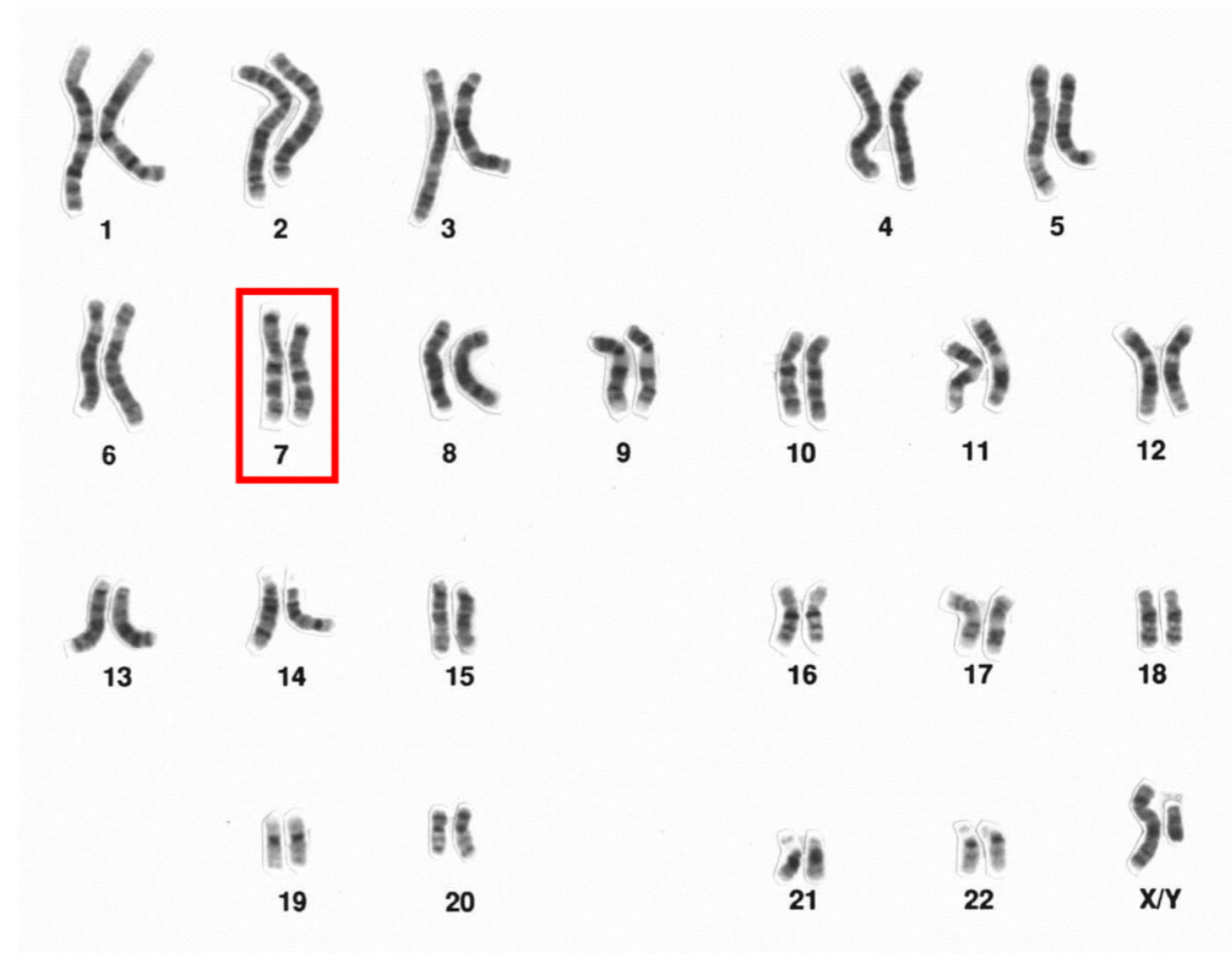
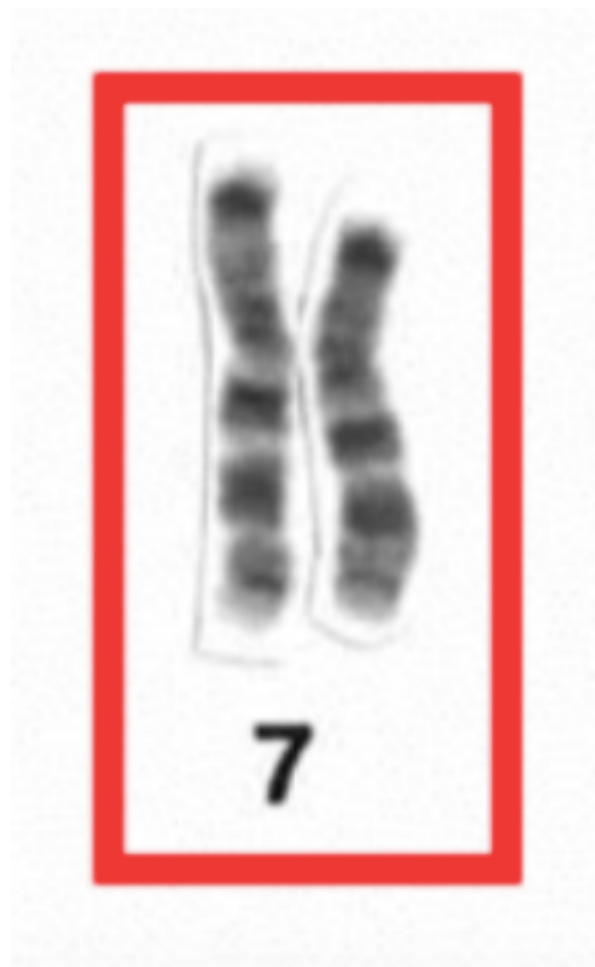
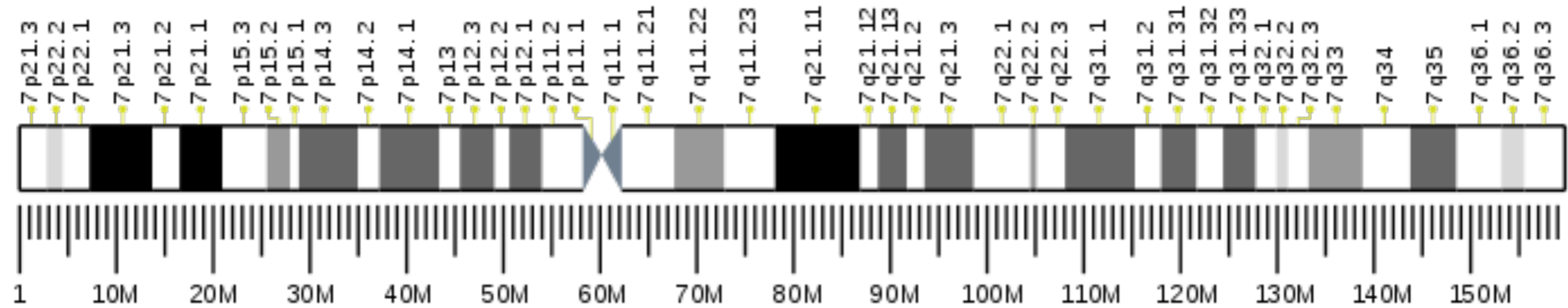
Genes and Chromosomes

- In all cases, a gene is located on the same spot on the same chromosome in every one.
- This spot is called its **locus**.
- If two different genes are on the same chromosome... They are **Linked**.
 - * they are inherited together *in most cases*
- If they travel on different chromosomes, then they are inherited independently of one another.

Linked vs. Unlinked Genes



Human Chromosome 7



HEREDITY



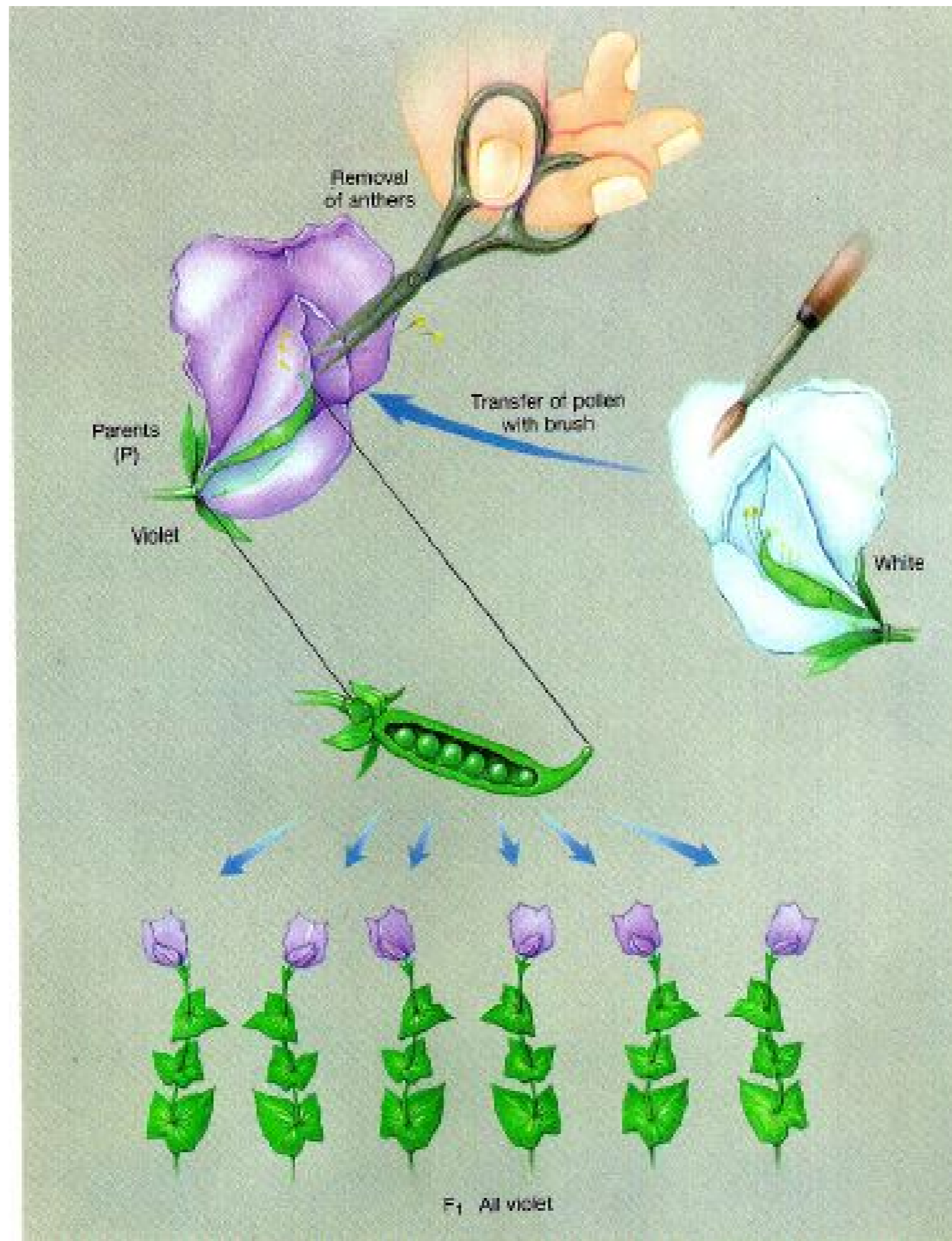
Gregor Mendel

What made Mendel suited for studying genetics?

What plant did Mendel choose to study & why was it an ideal plant?







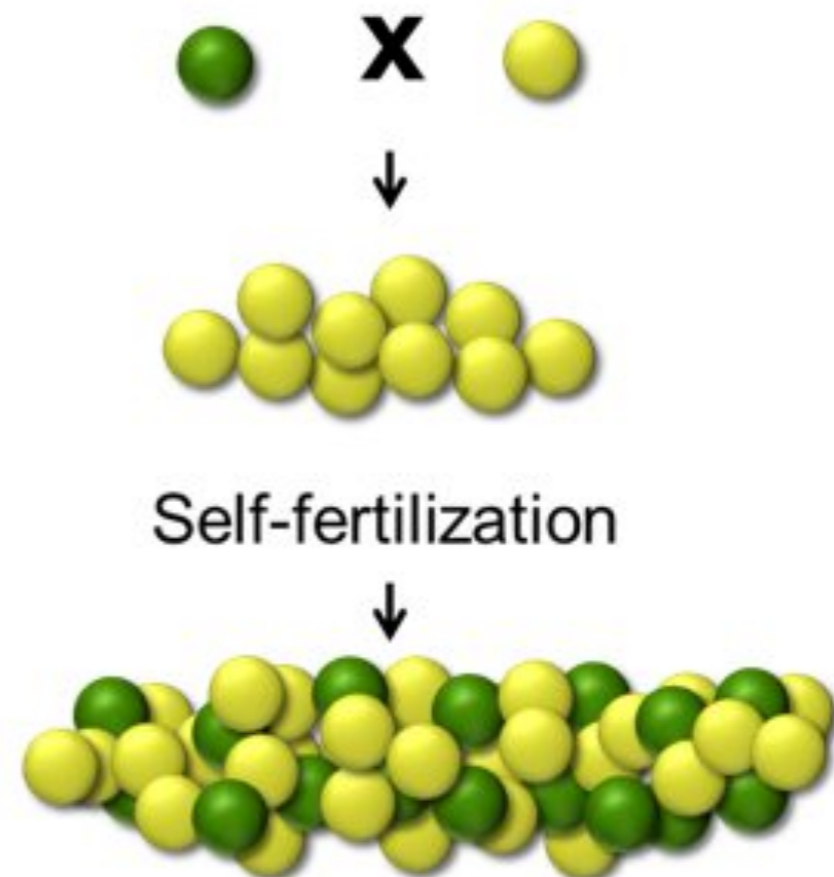
Allele

(Different expressions of a gene)

- Seed colours in Pea plants may be expressed differently. eg yellow or green
 - Both are pea colours occupy the same locus and so are







Gregor mendel



Allele

(Different expressions of a gene)

- Blood types are a human example of alleles—> gene expressions on the same locus

<u>Red blood cell appearance</u>	<u>(blood group)</u>
	A
	B
	AB
	O

Allele

(Different expressions of a gene)

Genotype

C

C^{ch}

c^h

c

Phenotype

BLACK

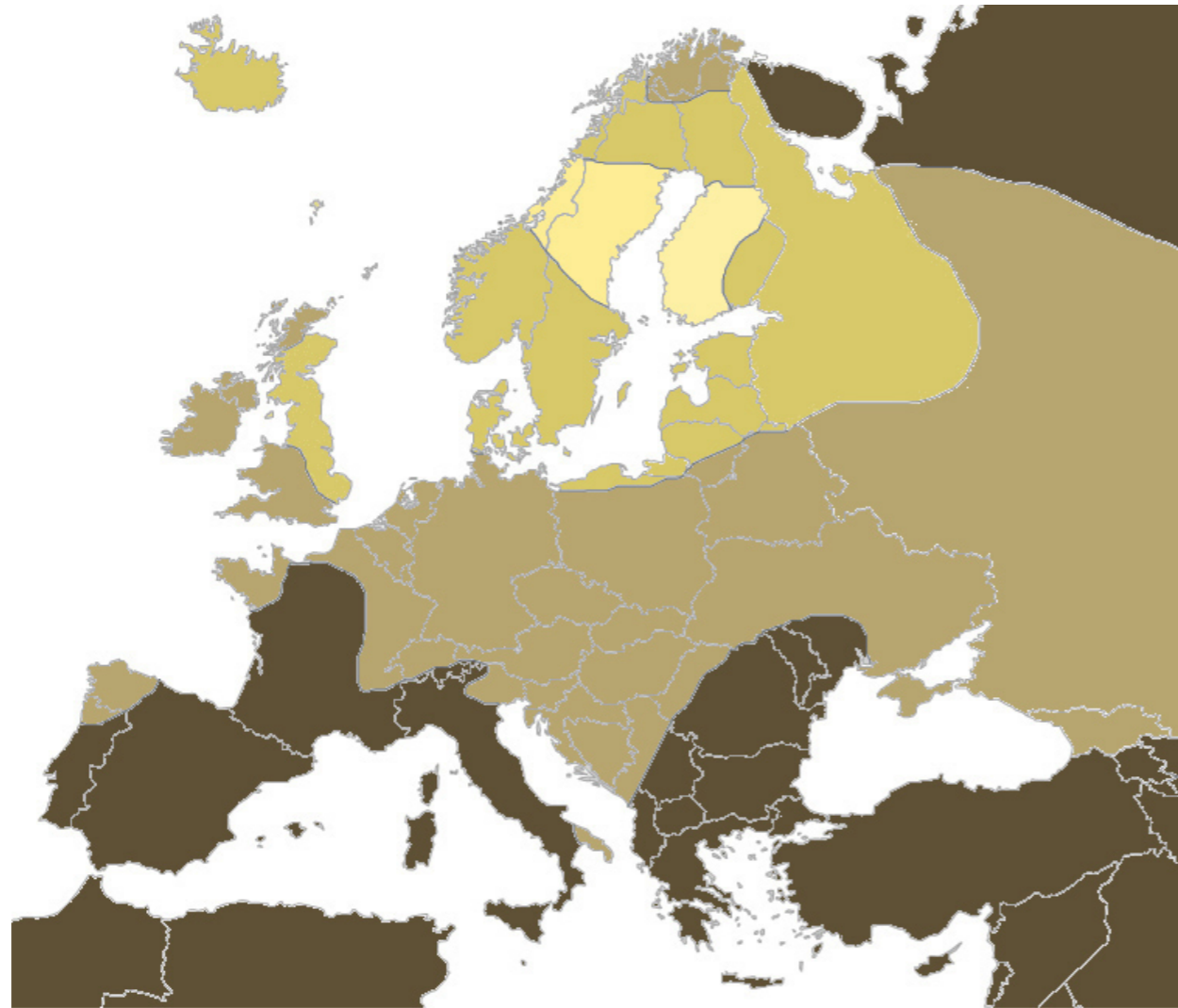
CHINCHILLA

HIMALAYAN

ALBINO



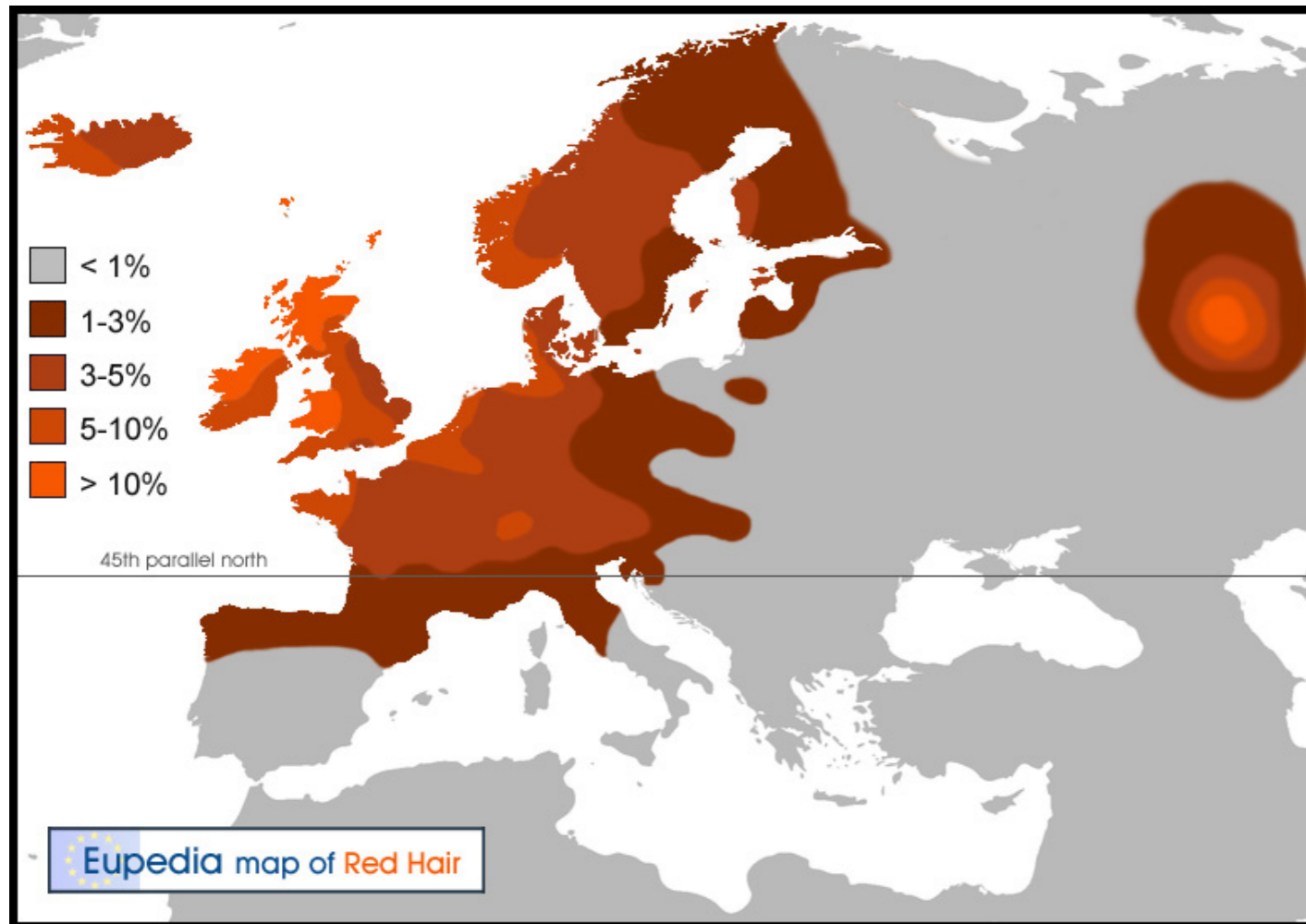
Blond-Alleles



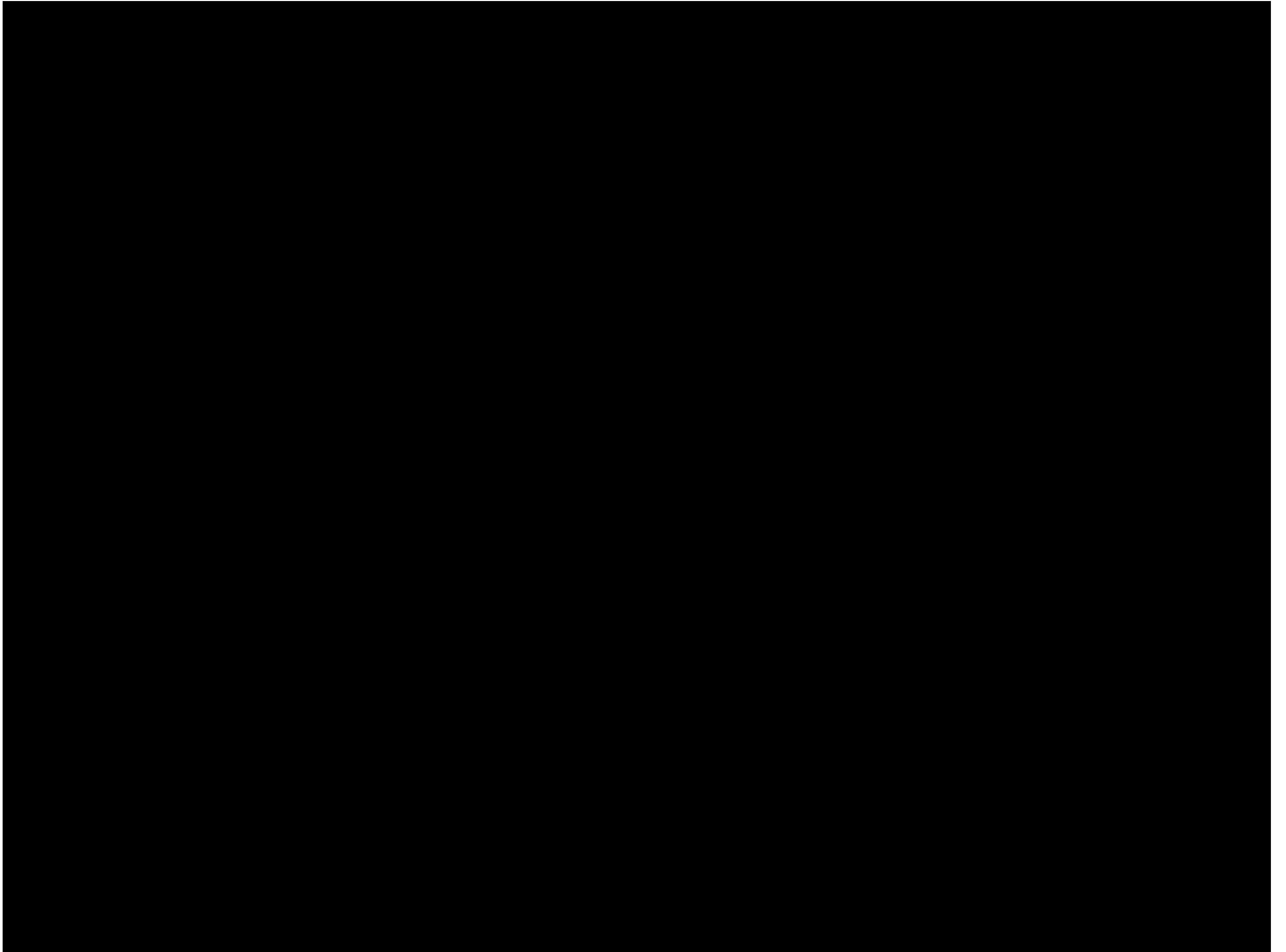
Percentage of light hair in Europe



Red-Alleles



[Asp294His](#)



Weekend assignment.

- **Comparing genes in different species**
- Go to **COMPARING GENES** on page 144
- Try the online data sites **(SEE DEMO)**
- Compare search the Gene HBB in Humans **Homo Sapiens, Macaca** monkeys, and Orangutang **Pongo**
- **Compare the first 120 bps -->** calculate the percent similarities between **human vs rhesus monkey** and **human vs orangutang**
- Look at DATA Base 2,3,4 on 145.