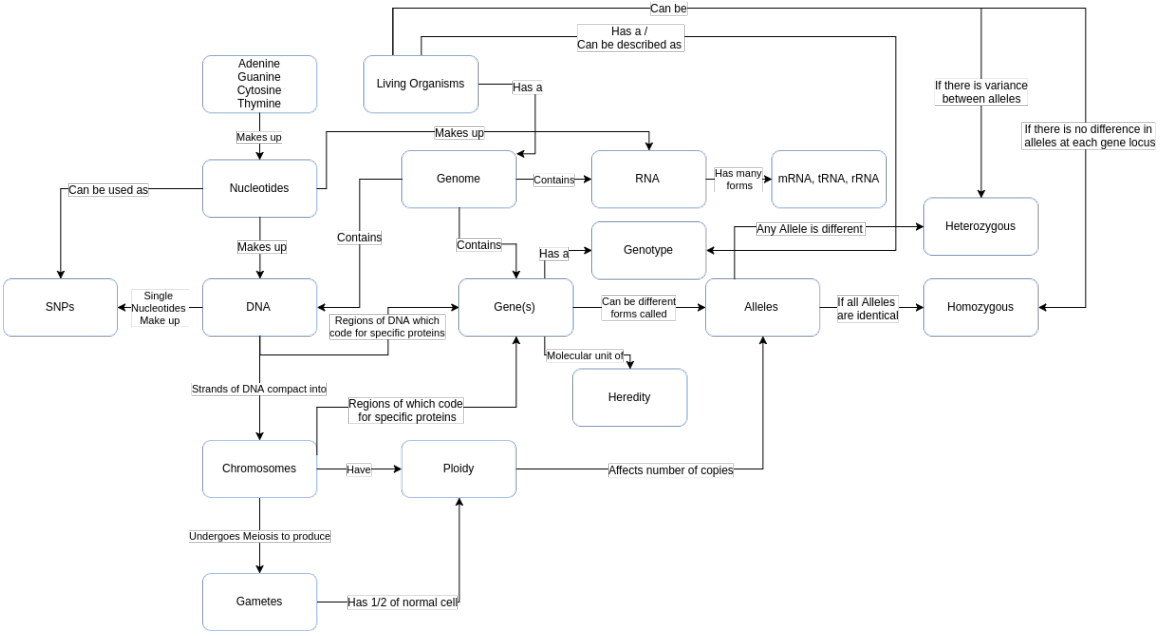
Genetics Dictonary

Nathan Hughes (nah31@aber.ac.uk)

August 17, 2017



Contents

1 QTL **3**

2 Phenotype **3**

3 Genotype **3**

4 Nucleotide **3**

5 SNPs **3**

6 DNA **3**

7 Chromosome **3**

8 Ploidy **3**

9 Gene **3**

10 Genome **4**

11 Homozygous **4**

12 Heterozygous **4**

13 Homologous Chromosomes **4**

14 Recombinaton **4**

15 Meiosis **4**

16 Gametes **5**

17 Gametogenesis **5**

18 Backcross **5**

19 Gene Knockout **5**

20 Alleles **5**

21 Chromosomes **5**

22 Recombination **5**

23 Progeny **5**

24 Transcription **5**

25 Candidate gene **5**

26 Mendelian inheritance **5**

27 Heritability **5**

1 QTL

- Quantitative Trait Locus
- See QTL Notes

2 Phenotype

- The physical manifestation of a trait

3 Genotype

- The genetic makeup of an individual organism

4 Nucleotide

- Building blocks of nucleic acids
- Basis of constructing DNA

5 SNPs

- Single*nucleotide polymorphism
- Is a region of DNA which varies
- i.e. C*G changing to a T*A in one specific place
- Can be found through the PCR process (amongst others)

6 DNA

- Deoxyribonucleic acid
- Is a molecule that carries all genetic instructions of a living organism

7 Chromosome

- is a DNA molecule that has been packaged into thread-like structures
- Each chromosome is made up of DNA tightly coiled many times around proteins called histones
- Is visible under microscope when cells are dividing.
- Linear arrangements of condensed DNA

8 Ploidy

- The number of sets of chromosomes in a cells
- The possible number of alleles for autosomal and pseudoautosomal genes

9 Gene

- A region of DNA
- Made up of nucleotides
- Sometimes called locus of DNA
- Is the molecular unit of heredity

10 Genome

- Encompasses DNA, RNA and mitochrondria/chroloplasts of an organism.

11 Homozygous

- An gene is said to be homozygous when identical alleles of the gene are present on all chromosomes
- Homozygous*dominant for a trait carries multiple copies for the dominant trait

12 Heterozygous

- A gene is said to be heterozygous when at a gene locus there is two different alleles (copies of the same gene)

13 Homologous Chromosomes

- Are the set made from both parents during meiosis
- Homologs have the same genes in the same loci where they provide points along each chromosome
- They enable a pair of chromosomes to align correctly before separating during meiosis
- Fig. 1 Illustrates this process

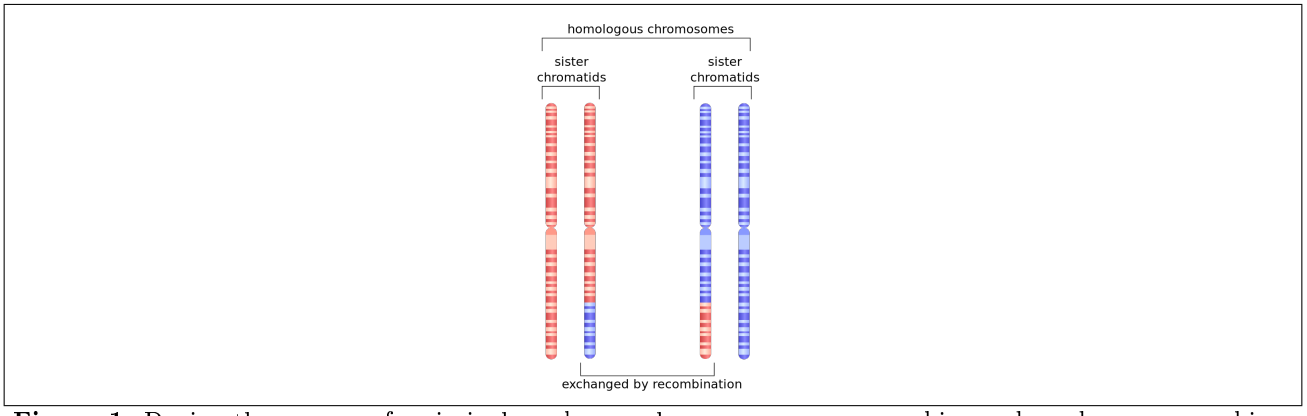


Figure 1: During the process of meiosis, homologous chromosomes can recombine and produce new combinations of genes in the daughter cells.

14 Recombinaton

- Is a process by which pieces of DNA are borken and recombined to produce new combinations of alleles
- In eukaryotic cells, this typically happens during meiosis
- Genes that are located further apart on the same chromosome have a greater chance of undergoing recombination

15 Meiosis

- Is a form of cell division that produces gametes
- During the first phase of meiosis, the homologous pairs of parental chromosomes can overlap and temporally fuse, causing a crossover

16 Gametes

- These are (generally(don't ask)) haploid cells
  - i.e. have one set of paternal chromosomes
- Used in sexual reproduction

17 Gametogenesis

- Is the biological process by which diploid or haploid cells undergo cell division
- Produces Gametes

18 Backcross

- Backcrossing is a crossing of a hybrid with one of its parents or an individual genetically similar to its parent
- In order to achieve offspring with a genetic identity which is closer to that of the parent

19 Gene Knockout

- A gene knockout is a genetic technique in which one of an organisms genes is made inoperative

20 Alleles

- Is a variant form of a given gene
- Sometimes, different alleles can result in a different observable phenotypic traits
- The word "allele" is short form of allelomorph
- ***Most*** multicellular organisms have two sets of chromosomes; that is, they are diploid

21 Chromosomes

22 Recombination

23 Progeny

24 Transcription

25 Candidate gene

26 Mendelian inheritance

- Is a type of inheritance that follows the laws of Gregor Mendel
- Fig. 2 Illustrates dominant and recessive phenotypes
- Fig. 3 Illustrates the law of independent assortment
- The Law of Dominance states that recessive alleles will always be masked by dominant alleles. Therefore, a cross between a homozygous dominant and a homozygous recessive will always express the dominant phenotype, while still having a heterozygous genotype.

27 Heritability

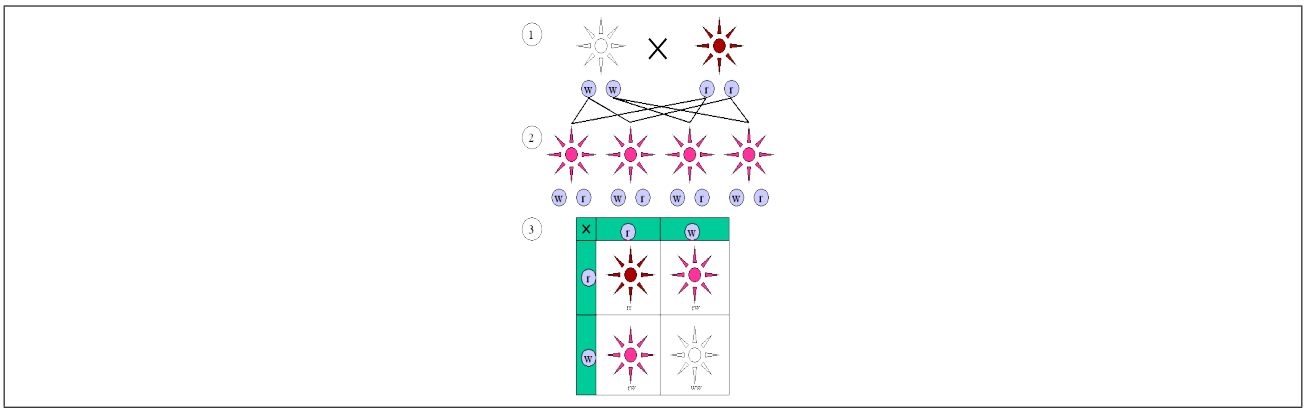


Figure 2: (1) Parental generation. (2) F1 generation. (3) F2 generation. Dominant (red) and recessive (white) phenotype look alike in the F1 (first) generation and show a 3:1 ratio in the F2 (second) generation.

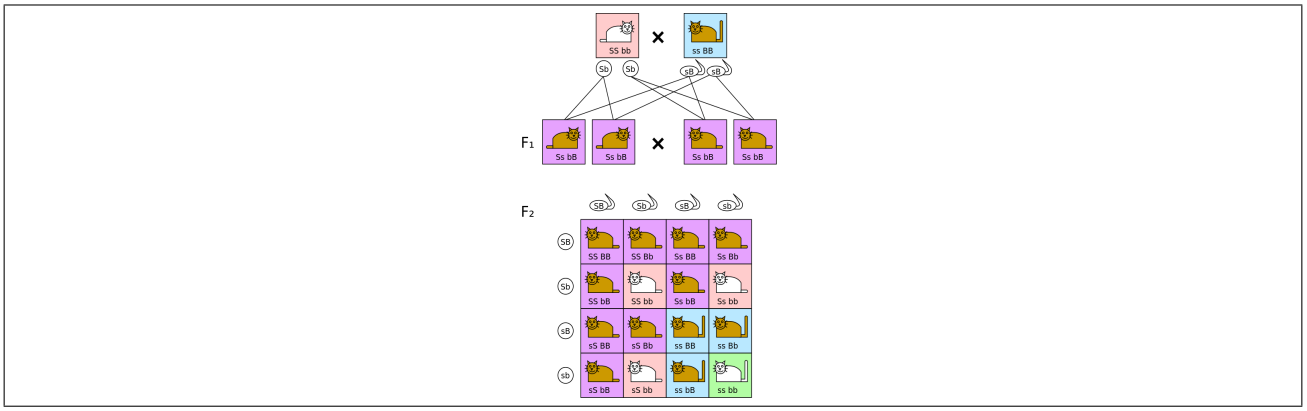


Figure 3: The phenotypes of two independent traits show a 9:3:3:1 ratio in the F2 generation. In this example, coat color is indicated by B (brown, dominant) or b (white), while tail length is indicated by S (short, dominant) or s (long). When parents are homozygous for each trait (SSbb and ssBB), their children in the F1 generation are heterozygous at both loci and only show the dominant phenotypes (SsbB). If the children mate with each other, in the F2 generation all combinations of coat color and tail length occur: 9 are brown/short (purple boxes), 3 are white/short (pink boxes), 3 are brown/long (blue boxes) and 1 is white/long (green box).