

**SNP:** Sites in genome where two individuals (of the same species!) differ by a single base. The different values this position can take is referred to as 'Allele'. The set of alleles a person has defines its genotype :

TAGC

TTGC

Alleles: A,T Genotypes: AT,TT,AA

The reason for the 2 bases appearing in genotype is that each person has duplicate chromosomes except the sex chromosome. So one chromosome with A allele and the duplicate one with T makes it AT. Genotype thus refers to the particular set of SNP an individual has at a particular site. About 10 million SNPs exist in human population the rarest of them being at 1% frequency. Alleles of SNPs that are close together will also have a higher chance of being inherited together [The explanation revolves around how chromosome division during cell reproduction takes place, think about it.] The set of associated SNP alleles in a region of chromosome is called the haplotype .

Person's genotype may not define its haplotype . Consider this case a diploid individual with SNPs at two loci on the same chromosome. The first one can be A/T and the second one G/C. Thus the genotypes are:

AA,AT,TT ;; GG,GC,CC

Now there are 9 possible configurations possible:

	AA	AT	TT
GG	AG AG	AG TG	TG TG
GC	AG AC	AG TC or AC TG	TG TC
CC	AC AC	AC TC	TC TC

**Genotype Frequency:** Ratio of number of individuals of a given phenotype to the total population.

There is inherent difference between allele frequency and genotype frequency:

Let allele frequency =  $f$

Let Genotype frequency be represented by  $G$

Consider diploid species (some pink flower) with alleles ' $Rw$ '

30 flowers with RR

20 flowers with Rw

50 flowers with ww

$$f(w) = \frac{Rw + 2*(ww)}{2*RR + 2*ww + 2*Rw} \left[ \frac{\text{Number of alleles}}{\text{Total alleles}} \right]$$

On the other hand, the genotype frequency is :

$$g(Rw) = \frac{Rw}{Rw + RR + ww} \left[ \frac{\text{Genotype}}{\text{Total population}} \right] \quad (1)$$

Thus genotypic frequency is an indicative of richness of population in terms of a particular genotype. In our case the  $g(Rw)$  is  $\frac{30}{100}$