



Allele: One of several alternative forms of a gene or DNA sequence at a specific chromosomal location (locus). At each autosomal locus, an individual possesses two alleles, one inherited from the father and one from the mother.

Expressed sequence tag (EST): A short DNA piece, usually about 200-500 nucleotides, copied from one end of an expressed gene, which is then used as a tag to fish a gene out of a portion of chromosomal DNA by matching the base pair sequence.

Gene expression: The result of the activity of a gene or genes that influences the biochemistry and physiology of an organism and may change its outward appearance.

Gene expression profiling: Determining specifically which genes are “switched on,” with precise definition of the phenotypic trait.

Gene mapping: Determining the relative physical locations of genes on a chromosome. Useful for plant and animal breeding.

Gene (DNA) sequencing: Determining the exact sequence of nucleotide bases in a strand of DNA to better understand the behavior of a gene.

Genome: All the genetic material in all the chromosomes of a particular organism.

Genomics: The mapping and sequencing of genetic material in the DNA of a particular organism and the use of that information to better understand what genes do, how they are controlled, how they work together, and what their physical locations are on the chromosome.

Genomic library: A collection of biomolecules made from DNA fragments of a genome that represent the genetic information of an organism that can be propagated and then systematically screened for particular properties. The DNA may be derived from the genomic DNA of an organism or from DNA copies made from messenger RNA molecules. A computer-based collection of genetic information from these biomolecules can be a virtual genomic library.

Genotype: The genetic identity of an individual. Genotype often is evident by outward characteristics, but may also be reflected in more subtle biochemical ways not visually evident.

Microarray: A piece of glass, plastic, or silicon onto which has been placed a large number of nucleic acids that are known to govern a variety of specific traits, which can then be used to test a biological sample for the presence of these genes.

Microsatellite markers: Repetitive stretches of short sequences of DNA used as genetic markers to track inheritance. At any one locus, several different alleles are found in a population, with each allele identifiable according to the number of repeat units. Microsatellites have been the standard DNA marker because they are easily detectable. Also called “simple sequence repeats” (SSR).

Phenomics: The study of the range of variation in measurable physical traits, or phenotypes, that are derived by the interaction of the genome with the environment.

Phenotype: The visible and/or measurable characteristics of an organism (how it appears outwardly).

Proteomics: The study of an organism’s proteins and their role in the organism’s structure, growth, health, disease resistance and other attributes.

Quantitative trait locus (QTL): A locus, or location, on a chromosome for genes that govern a measurable trait with continuous variation, such as height, weight, or color intensity. The presence of a QTL is inferred from genetic mapping, where the total variation is partitioned into components linked to a number of discrete chromosome regions.

Selectable marker: A gene, often encoding resistance to an antibiotic or a herbicide, introduced into a group of cells to distinguish those cells that contain the gene of interest from the cells that do not. Selectable markers are used in genetic engineering to help identify cells that have incorporated another desirable trait that is not easy to identify in individual cells.

Single nucleotide polymorphism (SNP): DNA sequence variations that occur when a single nucleotide (A, T, C, or G) in the genome sequence is altered. For a variation to be considered a SNP, it must occur in at least 1 percent of the population. Pronounced “snip.”

Vector: A type of DNA element—such as a plasmid, the genome of a bacteriophage, or a virus—that is self-replicating and can be used to transfer DNA segments into target cells.