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DNA Glossary of Commonly Used Terms

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Allele: An alternative form of a gene.

Allele Frequency: The proportion of a particular allele among the chromosomes carried by individuals in a population.

Amino acid: Any of a class of 20 molecules that are combined to form proteins in living things. The sequence of amino acids in a protein and hence protein function are determined by the genetic code.

Amplification: An increase in the number of copies of a specific DNA fragment; can be in vivo or in vitro.

Basepair: Two complementary nucleotides joined by hydrogen bonds; basepairing occurs between A and T and between G and C.

- **Adenine**: A purine base; one of the four molecules containing nitrogen present in the nucleic acids DNA and RNA; designated by letter A.
- **Cytosine**: A pyrimidine base; one of the four molecules containing nitrogen present in the nucleic acids DNA and RNA; designated by letter C.
- **Guanine**: a purine base; one of the four molecules containing nitrogen present in the nucleic acids DNA and RNA; designated by letter G
- **Thymine**: a pyrimidine base; one of the four molecules containing nitrogen present in the nucleic acids DNA and RNA; designated by letter T

Base sequence: The order of nucleotide bases in a DNA molecule.

Base sequence analysis: A method, sometimes automated, for determining the base sequence.

Biotechnology: A set of biological techniques developed through basic research and now applied to research and product development.

Chromosome: The structure by which hereditary information is physically transmitted from one generation to the next.

Denaturation: the process of splitting the complementary double strands of DNA to form single strands.

Deoxyribonucleic acid (DNA): The genetic material of organisms, usually double-stranded; a class of nucleic acids identified by the presence of deoxyribose, a sugar, and the four nucleobases.

DNA sequence: The relative order of base pairs, whether in a fragment of DNA, a gene, a chromosome, or an entire genome.

Double Helix: The shape that two linear strands of DNA assume when bonded together.

Electrophoresis: a technique in which molecules are separated by their velocity and size in an electric field

Enzyme: A protein that can speed up a specific chemical reaction without being changed or consumed in the process.

Gel: semisolid matrix (usually agarose or acrylamide) used in electrophoresis to separate molecules

Gene: the basic unit of heredity; a sequence of DNA nucleotides on a chromosome

Gene frequency: the relative occurrence of a particular allele in a population

Genome: All the genetic material in the chromosomes of a particular organism; its size is generally given as the total number of base pairs.

Genome projects: Research and technology development efforts aimed at mapping and sequencing some or all of the genome of an organism.

Genotype: the genetic makeup of an organism, as characterized by its physical appearance or phenotype

Heredity: the transmission of characteristics from one generation to the next

Heterozygosity: The presence of different alleles at one or more loci on homologous chromosomes.

Homologies: Similarities in DNA or protein sequences between individuals of the same linear sequences, each derived from one parent.

Homologous chromosomes: A pair of chromosomes containing the same linear gene sequences, each derived from one parent.

Linkage: The proximity of two or more markers (genes, etc.) on a chromosome; the closer together the markers are, the lower the probability that they will be separated during DNA repair or replication process, and hence the greater the probability that they will be inherited together.

Locus (pl. loci): The specific physical location of a gene on a chromosome.

Mitosis: The process of nuclear division in cells that produces daughter cells that are genetically identical to each other and to the parent.

Mutation: Any inheritable change in DNA sequence.

Nucleic acid: A nucleotide polymer of which DNA and RNA are major types.

Nucleotide: A unit of nucleic acid composed of phosphate, ribose or deoxyribose, and a purine or pyrimidine base.

Nucleus: The cellular organelle in eukaryotes that contains the genetic material.

Oligonucleotide: long string of nucleotide bases, eg a primer

Polymerase chain reaction (PCR): An in vitro process that yields millions of copies of desired DNA through repeated cycling of a reaction involving the DNA polymerase enzyme.

Polymorphism: Difference in DNA sequence among individuals. Genetic variations occurring in more than 1% of a population would be considered useful polymorphisms for linkage analysis.

Population: A group of individuals residing in a given area at a given time.

Primer: Short preexisting polynucleotide chain to which new deoxyribonucleotides can be added by DNA polymerase.

Restriction enzyme: A protein that recognizes specific, short nucleotide sequences and cuts DNA at those sites. Bacteria contain over 400 such enzymes that recognize and cut over 100 DNA sequences.

Restriction fragment length polymorphism (RFLP): Variation between individuals in DNA fragment sizes cut by specific restriction enzymes; polymorphic sequences that result in RFLPs that are used as markers on both physical maps and genetic linkage maps. RFLPs are usually caused by mutation at a cutting site.

Sex chromosomes (x and y chromosomes): Chromosomes that are different in the two sexes and involved in sex determination.

Short tandem repeats (STR): Multiple copies of an identical DNA sequence arranged in direct succession in a particular region of a chromosome.

Tandem repeat sequences: Multiple copies of the same base sequence on a chromosome; used as a marker in physical mapping.

Variable number tandem repeats (VNTR): repeating units of a DNA sequence which number varies between individuals