

GLOSSARY OF TECHNICAL TERMS

This glossary contains definitions of technical terms used in this document as they relate to us and as they are used in this document in connection with our business or us. Such terminology and meanings may not correspond to standard industry meanings or usages of these terms.

“acetonitrile”	the chemical compound with the formula CH_3CN
“adjuvant”	something (a drug or method) that enhances the effectiveness of medical treatment
“affinity”	an attractive force between substances or particles that causes them to enter into and remain in binding or association
“algorithm”	a set of steps that are followed in order to solve a mathematical problem or to complete a computer process
“amino acid”	organic molecule containing both an amino group and a carboxyl group, usually as the building blocks of proteins
“amplification”	a usually massive replication of genetic material and especially of a gene or DNA sequence (as in a polymerase chain reaction)
“antibody”	protein produced by B cells in response to a foreign molecule or invading microorganism. Also called immunoglobulin
“antibody engineering”	genetic engineering for the purpose of designing antibodies with increased antigen affinity and/or therapeutic efficiency
“antibody humanization”	the modification of the sequences of antibodies from non-human species to increase their similarity to antibody variants produced naturally in humans
“antigen”	molecule that is able to provoke an immune response
“assay”	examination and determination as to characteristics
“base”	the purines and pyrimidines in DNA and RNA
“bioinformatics analysis”	analysis of biochemical and biological information using computers especially as applied to molecular genetics and genomics
“biological pathway”	a series of actions among molecules in a cell that leads to a certain product or a change in a cell

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“biological assay”	determination of the relative strength of a substance (as a drug) by comparing its effect on a test organism with that of a standard preparation
“bp”	abbreviation for Base-Pair; two nucleotides in an RNA or DNA molecule that are naturally held together by hydrogen bonds — for example, G (guanine) pairs with C (cytosine) and A (adenine) with T (thymine) or U (uracil)
“buffer solution”	solution which can resist changes in pH when small quantities of acid or alkali are added
“cell biology”	the study of cell structure and function
“cell culturing” or “cell culture”	the process by which cells are grown under controlled conditions, generally outside of their natural environment
“cell line engineering”	modification or development of cell lines to produce designed functions
“chromatography”	a biochemical technique in which a mixture of substances is separated by charge, size or some other property by allowing it to partition between a moving phase and a stationary phase
“cloning vector”	a small piece of DNA, taken from a virus, a plasmid, or the cell of a higher organism, that can be stably maintained in an organism, and into which a foreign DNA fragment can be inserted for cloning purposes
“co-expression”	the simultaneous expression of two or more proteins transcribed from two or more genes
“codon optimization”	a technique to improve the protein expression in living organism by increasing the translational efficiency of gene of interest via substitution of codons without changing the encoded amino acids
“colitis”	inflammation of the colon, characterized by lower-bowel spasms and upper abdominal cramps
“combinatorial pathway assembly”	process of assembly of a combination of DNA constructs encoding re-engineered metabolic pathways
“CRISPR-Cas9”	a genome-editing technique that involves expressing the RNA-guided Cas9 endonuclease along with guide RNAs directing it to a particular sequence to be edited

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“culture media”	nutrients used for growing bacteria or other cells in a laboratory
“cytokine”	extracellular signal protein or peptide that acts as a local mediator in cell–cell communication
“ <i>de novo</i> ”	anew or from scratch
“Deoxynucleoside” or “Deoxyribonucleoside”	a nucleoside component of DNA containing 2-deoxy-d-ribose
“deoxy-ribonucleoside triphosphate”	a generic term referring to the four deoxyribonucleotides: dATP, dCTP, dGTP and dTTP
“DNA”	polynucleotide formed from covalently linked deoxyribonucleotide units. It serves as the store of hereditary information within a cell and the carrier of this information from generation to generation
“DNA amplification”	the amplification of a sequence of DNA; repeated copying of DNA
“DNA sequencing”	determination of the order of nucleotides in a DNA molecule
“DNA synthesizer”	a machine which can automatically synthesize a specific sequence of nucleotide bases with desired length.
“ <i>E. coli</i> ”	<i>Escherichia coli</i> , a kind of gram-negative bacterium that is widely used in genetic engineering research and application
“electrophoresis”	the movement of suspended particles through a fluid or gel under the action of an electromotive force
“electrophysiology”	the branch of medicine or biology dealing with the study of electrical activity in human or animal bodies
“endocrinology”	a branch of medicine concerned with the structure, function, and disorders of the endocrine glands
“endotoxin”	a toxic heat-stable lipopolysaccharide substance present in the outer membrane of gram-negative bacteria that is released from the cell upon lysis

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“envelope proteins”	some complex proteins from viral envelopes, which are typically derived from portions of the host cell membranes (phospholipids and proteins)
“enzymatic reaction”	a chemical reaction catalyzed at the reactive sites by enzyme
“enzyme”	a biological macromolecule that acts as a catalyst. Most enzymes are proteins, but certain RNAs, called ribozymes, also have catalytic activity
“expression vector”	a small piece of DNA taken from a virus, a plasmid, or the cell of a higher organism, which is used as a vector to produce large amount of a heterologous protein; the protein produced may be used for purification or research on mutation-function relationship
“fibrosis”	a condition marked by increase of interstitial fibrous tissue
“flow cytometry”	a technology that simultaneously measures and analyzes multiple physical characteristics of single particles, usually cells, as they flow in a fluid stream through a beam of light
“fluorescence-based DNA sequencing”	DNA sequencing using fluorescently-labeled terminators
“fluorescence-labeled deoxynucleoside”	deoxynucleoside carrying fluorescence-tag that can be identified by a fluorescence detection system specifically matched to the emission characteristics of this fluorescent set
“full-length gene assembly”	the assembly of full-length gene by bonding multiple shorter DNA sequences together
“fusion protein”	a hybrid protein made up of different proteins
“GC-rich sequence”	a DNA sequence with higher-than-average percentage of GC base pairs
“gene”	a molecular unit of heredity of a living organism; region of DNA that controls a hereditary characteristic, usually corresponding to a single protein or RNA. This definition includes the entire functional unit, encompassing coding DNA sequences, non-coding regulatory DNA sequences and introns

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“gene fragment synthesis”	assembly of double-stranded synthetic DNA as larger fragments from oligonucleotides as starting materials
“gene synthesis”	assembly of synthetic genes from gene fragments, similar but not identical to gene cloning
“genome”	the totality of genetic information belonging to a cell or an organism
“glucoamylase”	a hydrolase that catalyzes the hydrolysis of terminal residues from non-reducing ends of polysaccharide chains with the release of glucose
“growth factor”	extracellular protein signal molecule that can stimulate a cell to grow or proliferate
“hematology”	a medical science that studies blood and blood tissues
“heterologous protein expression”	the expression of a heterologous gene or gene fragment in a host organism, which does not naturally have this gene or gene fragment
“homologous sequence-mediated cloning”	DNA cloning by homologous recombination
“human cDNA clone”	a cloned human cDNA sequence
“immunoassay”	technique used to detect the presence or quantity of a substance (such as a protein) based on its capacity to act as an antigen
“immunogenicity”	the capability of being immunogenic
“immunology”	a branch of science that studies the immune system and the cell-mediated or humoral immune responses
“inflammatory diseases”	disease accompanied by or tending to cause inflammation
“ <i>in vitro</i> ”	(Latin for “in glass”) in an artificial environment rather than inside a living organism
“ <i>in vivo</i> ”	(Latin for “in life”) in an intact cell or organism

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“kb”	a unit of measure of the length of a nucleic-acid chain that equals one thousand base pairs
“knock-in”	a process by which a heterologous gene is inserted into a specific locus in the target genome via homologous recombination
“knock-out”	a genetic technique in which one of a target organism’s genes are made deficient or inoperative
“library”	a collection of cloned DNA fragments that are maintained in a suitable cellular environment and that represent the genetic material of a particular organism or tissue
“microbiology”	a science that studies extremely small living things (such as bacteria and viruses)
“microorganism”	extremely small living thing that can only be seen with a microscope
“model animal”	an animal sufficiently like humans in its anatomy, physiology, or response to a pathogen to be used in medical research in order to obtain results that can be extrapolated to human medicine, such animal having a pathological or physiological condition that is similar to one occurring in humans
“molecular biology”	the branch of biology that studies the molecular basis of biological processes
“molecular cloning”	experimental methods in molecular biology that are used to assemble and replicate recombinant DNA molecules in host organisms
“monoclonal antibody”	an antibody produced by a single clone of immune cells or cell line and consisting of identical antibody molecules
“myeloma cells”, or “multiple myeloma cells”	cells of multiple myeloma, which is a cancer that forms in a type of white blood cell called a plasma cell
“nanobiotechnological”	of or relating to nanobiotechnology, which is an application of nanotechnology. For example, DNA nanotechnology or cellular engineering would be classified as bionanotechnology because they involve working with biomolecules on the nanoscale

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“next-generation sequencing”	non-Sanger-based high-throughput DNA sequencing technologies. Millions or billions of DNAs can be sequenced in parallel, yielding substantially more throughput for genome sequencing
“non-pathogenic”	not capable of inducing disease
“nuclear hormone receptors”	a class of ligand activated intercellular proteins that, when bound to specific sequences of DNA, serve as on-off switches for transcription within the cell nucleus
“nucleic acid”	a polymer of nucleotides linked by phosphodiester bonds. DNA and RNA are the primary nucleic acids in cells
“nucleoside”	a compound consisting of a purine or pyrimidine base linked to a sugar, especially ribose or deoxyribose
“nucleotide”	nucleoside with one or more phosphate groups joined in ester linkages to the sugar moiety. DNA and RNA are polymers of nucleotides
“nucleotides”, or “nucleotide monomers”	organic molecules that serve as monomers, or subunits, of nucleic acids like DNA and RNA, composed of a nitrogenous base, a five-carbon sugar (ribose or deoxyribose), and at least one phosphate group.
“oligonucleotide” or “oligodeoxynucleotide synthesis”	chemical oligodeoxynucleotide synthesis; a cyclical process that elongates a chain of nucleotides from the 3’-end to the 5’-end
“oncology”	the study and treatment of cancer and tumors
“PAGE”	polyacrylamide gel electrophoresis
“PCR”	polymerase chain reaction; technique for amplifying specific regions of DNA by the use of sequence-specific primers and multiple cycles of DNA synthesis, each cycle being followed by a brief heat treatment to separate complementary strands
“pathogenic sequence”	a (genetic) sequence causing or capable of causing disease
“peptide”	linear polymer of amino acids connected by peptide bonds
“peptide synthesis”	chemical synthesis of peptides involving the stepwise addition of protected amino acids to a growing peptide chain

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“pH”	common measure of the acidity or alkalinity of a solution
“phage display”	a useful tool to use genetically modified bacteriophages to screen and express proteins and replicate selected proteins, enabling the engineering of antibodies and the development of new drugs
“pharmacological”	of the properties and reactions of drugs especially with relation to their therapeutic effect
“phosphoramidite method”	a method that couples an acid-activated deoxynucleotide phosphoramidite to a deoxynucleoside on a solid support for oligonucleotide chain synthesis
“plasmid miniprep”	method of preparing up to 20 µg molecular biology grade plasmid DNA
“polyclonal antibodies”	antibody mixture produced by or derived from two or more immune cells of different ancestry or genetic constitution
“precast gel”	a mass produced gel that is casted in its final shape
“precast protein separation gel”	a mass produced gel for protein separation that is casted in its final shape
“preclinical”	research concerning the stage before a pharmaceutical enters clinical trial
“protein”	the major macromolecular constituent of cells; a linear polymer of amino acids linked together by peptide bonds in a specific sequence
“protein complex”	an assembly of proteins, which form many interactions with each other and therefore are cohesive
“protein engineering”	the design and construction of proteins or enzymes with novel or desired functions, through the modification of amino acid sequences using recombinant DNA technology
“protein expression”	production of a protein
“protein-protein interaction”, or “protein interaction”	physical contacts with molecular docking between proteins that occur in a cell or in a living organism <i>in vivo</i>
“protein staining”	detecting or assaying of protein by Coomassie blue, silver, or fluorescent dye

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“protein transfer”	a process of electrophoretic transfer of proteins from polyacrylamide gels to nitrocellulose sheets
“proteomics”	the branch of genetics that studies the full set of proteins encoded by a genome
“qPCR”	quantitative PCR
“reagent”	simple chemical substance or mixture that is useful in chemical analysis or synthesis
“receptor binding”	binding of cell-surface receptor with its ligand
“recombinant antibody”	an antibody created by recombinant DNA technology using an antibody gene made in a laboratory or taken from human cells, eliminating hybridomas and animals immunization process
“recombinant protein”	a protein produced by a recombinant DNA
“restriction endonuclease”	an enzyme that cuts DNA at or near specific nucleotide sequences known as restriction sites
“restriction enzyme/endonuclease analysis”	analysis of characteristics of specific sequences that are recognized and cleaved by restriction enzyme
“ribonucleoside”	a nucleoside that contains ribose
“RNA”	polymer formed from covalently linked ribonucleotide monomers
“sdAb””, or “single-domain antibody”	an antibody composed only of a heavy chain and formed only by a single domain
“side-chain protecting groups”	protective groups added to the side chains of amino acids to prevent the polymerization of the amino acids via the side chains during solid-phase peptide synthesis, such as Fmoc (9-fluorenylmethyl carbamate) and t-Boc (Di-tert-butyl dicarbonate)
“signal peptide”	a short peptide present at the N-terminus of the majority of newly synthesized proteins to guide the protein towards the secretory pathway
“structural biology”	a branch of biology concerned with the molecular structure of biological macromolecules, especially proteins and nucleic acids

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“structural-function analysis”	study in which systematic variation in the structure of a compound, such as a protein, is correlated with its biological activity
“surface plasmon resonance”	a powerful method to monitor label-free biomolecular interactions in liquids
“surfactant”	a surface-active substance (as a detergent)
“synthetic biology”	the design and construction of novel biological parts, devices, and systems, and the re-design of existing, natural biological systems for purposes of improving usefulness
“target validation”	the process by which the interference with a predicted molecular target — for example protein or nucleic acid — of a drug candidate is verified
“therapeutic protein”	protein useful for the healing of disease
“thermo/acid-stable alpha-amylase”	a thermo- /acid-stable-amylase that hydrolyses alpha bonds of polysaccharides such as starch and glycogen, yielding glucose and maltose
“throughput”	the amount of material, data, etc., that enters and goes through a machine or system
“trans-membrane protein”	a protein that spans the plasma membrane of a cell
“truncation variant”	a frameshift variant that causes the translational reading frame to be shortened
“tumor”	a tissue that possesses no physiological function and arises from uncontrolled, rapid, proliferation
“ultrafiltration”	a filtration process that uses a porous membrane to isolate and remove unwanted small molecules or water
“yeast”	common term for several families of unicellular fungi, including species used for brewing beer and making bread, as well as certain pathogenic species