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**APPENDIX TEN**

**Biochemical Glossary**

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**2-DE**: two-dimensional electrophoresis, technique to separate a mixture of proteins in a gel by electrophoresis, according to isoelectric point in one direction and size in another direction (see SDS-PAGE)

**3'-end**: (three prime) the terminal deoxyribose of a DNA strand or the terminal ribose of a RNA strand; replication and transcription of DNA is performed in the 3' to 5' direction, the translation of RNA in the 5' to 3' direction

**5'-end**: (five prime) the terminal -PO₄⁻⁻ on a DNA or RNA strand (see 3'-end)

**ω₁, ω₂, ω₃**: fatty acid with one or more -carbon, such as 9,12,15-octadecatrienoic acid (linolenate C18:3), which mammals have to obtain from their food

**ω-3 fatty acid**: fatty acid with three -carbon between the last double bond and the ω-carbon, such as 9,12,15-octadecatrienoic acid (linolenate C18:3), which mammals have to obtain from their food

**ω-6 fatty acid**: fatty acid with six -carbon between the last double bond and the ω-carbon, such as 9,12-octadecadienoic acid (linoleate C18:2), which mammals have to obtain from their food

**ω-carbon**: the C-atom to which the COOH-group of a fatty acid is attached, also referred to as number 2, the C-atom in the COOH-group being number 1

**A**: adenine, a base in DNA and RNA that pairs with thymine (T) in DNA and with uracil (U) in RNA

**ABC**: alternating current (see RF)

**acrylamide**: CH₂−CH−CO−NH₂, a toxic and carcinogenic substance that polymerizes into a gel used for Western blotting and SDS-PAGE

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**active hydrogen**: in lipids the replaceable hydrogen in the COOH-group (see derivatization)

**Ala**: alanine (A), a proteinogenic amino acid

**Amadori rearrangement**: the rearrangement of a peptide-sugar molecule into a ketosamine (see browning)

**antibody**: specialized protein, immunoglobulin, that binds to a foreign body as part of the immune system; they are produced in plasma cells that differentiate from B-cells (lymphocytes)

**antibody-antibody**: (secondary antibody) antibodies raised against the constant, non-antigen recognizing, part of antibodies; labeled antibody-antibodies are used to detect antigen-antibody complexes

**anticodon**: (nodoc) the codon (triplet) on tRNA that recognizes the correct place of incorporation of the attached amino acid into a growing polypeptide

**antigen**: any molecule that can activate the immune system into producing antibodies (see epitope)

**APCI**: atmospheric pressure chemical ionization

**Arg**: arginine (R), a proteinogenic amino acid

**array detector**: type of detector used in a mass spectrometer

**Asn**: asparagine (N), a proteinogenic amino acid

**Asp**: aspartate (D), a proteinogenic amino acid

**Aug**: base triplet coding for methionine and the start of the peptide chain (see UAA, UAG, UGA)

**average mass**: see mass

**base peak**: the tallest peak of a mass spectrum, assigned a relative intensity of 100%

**B-cell**: see antibody

**bioapatite**: the calcium phosphate matrix of bone

**biomarker**: a molecule more or less specific for a class of foodstuffs

**b-ion**: positively charged peptide fragment, resulting from collisionally induced dissociation of the OC-NH bond, containing the NH₂-group of the original peptide (see y-ion)

**branched fatty acid**: fatty acid with one or more CH₃-groups attached to the central chain, often synthesized by micro-organisms

**browning**: (Maillard reaction) the non-enzymatic binding of a peptide with a sugar molecule initially resulting in a ketosamine, after Amadori rearrangement, and often followed by fission, dehydration or polymerization (see melanoids)

**BSA**: bovine serum albumin

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**ammo acid**: an organic compound containing both a NH₂-group and a COOH-group, amino acids can connect through peptide bonds to form polypeptides and proteins

**amino acid epimerization**: see racemization

**ammonium hydroxide**: a solution of ammonia in water causing a small fraction of the water to be deprotonated: NH₃ + H₂O ↔ NH₄⁺ + OH⁻

**amphoter**: see iso-electric point

**anode**: the positive end of a direct current system (see cathode)

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**BSA**: bovine serum albumin
passing through its mid-width at half-height of the original (profile or continuum) spectrum and profile is replaced by a single line, with the same height derivatization agent (see silylation)

and evaporating the solvent slug then concentrating it by slowly raising the temperature GC-column by first condensing it in a solvent slug and

capillary electrophoresis: electrophoresis using a buffer solution in a capillary as the stationary phase
carboxyl: COOH-group
carrier gas: see mobile phase
cathode: the negative end of a direct current system (see anode)
centroid spectrum: mass spectrum in which the profile is replaced by a single line, with the same height of the original (profile or continuum) spectrum and passing through its mid-width at half-height
chaparone: protein that helps to fold another protein into an alternative form
charge detector: type of detector used in a mass spectrometer
chirality: property of a molecule of which two distinct three-dimensional configurations exist that each rotates the plane of polarized light in a different direction (see enantiomer)
chromatogram: plot of the relative abundance of the components in a sample against their retention time inside a chromatograph
chromatography: an analytical technique based on the differences in the speed of migration of the components of complex mixtures through a medium
CID: (CAD) collisionally induced dissociation of a peptide fragment into mostly b-ions and y-ions, allowing deduction of the original amino acid sequence after accurate mass measurement of both the parent molecule and the fragments
CIEP: counter immuno-electrophoresis, technique to immunologically detect selected target proteins after these have been separated by electrophoresis in a gel (see Western blot)
codon: (triplet) three consecutive bases (A, C, G, T or U) in DNA or RNA, each of the 64 possible codons codes for one of 20 amino acids (or for the end of the sequence)
cold-on-column injection: focusing a sample in a GC-column by first condensing it in a solvent slug and then concentrating it by slowly raising the temperature and evaporating the solvent slug
collagen: a structural water-insoluble protein, the most common protein in bone (see osteocalcin)
conservation: the phenomenon that proteins with a similar function are almost identical from generation to generation and from species to species (see myoglobin)
convergent evolution: the phenomenon that proteins that have evolved from different sources to perform comparable tasks often have a very similar composition and shape (see conservation)

Coomassie Brilliant Blue: a synthetic heterocyclic organic dye that binds nonspecifically to virtually all proteins; used in CIEP, Western blotting and 2-DE gels
cross-reactivity: due to the presence of the same epitopes on different antigens, polyclonal antibodies raised against one antigen will also partly bind to others; in the laboratory such will result in false positive identifications
C-terminus: the terminal COO−-group of a polypeptide chain (see N-terminus)
cyclic dipeptide: (diketopiperazine) two amino acids connected by two peptide bonds, the result of aminolysis at the N-terminal of a polypeptide chain
Cys: cysteine (C), a proteinogenic amino acid
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D: aspartate, a proteinogenic amino acid
Da: Dalton, the unit of atomic mass, 12C (19.9 x 10−27 kg) being 12.00 Da by definition
DACIA: digestion and capture immuno-assay, technique to immunologically detect selected target proteins after these have been released from a silicate-matrix by HF
DAG: diacylglycerol (see TAG)
D-amino acid: see L-amino acid
DC: direct current (see AC)
de novo sequencing: refers to the analysis of MS/MS data when no database reference for that protein is available (see peptide sequencing)
decarboxylation of an amino acid: loss of the COOH-group, resulting in an amine and carbon-dioxide (see decarboxylation)
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denaturation: permanent loss of the secondary and tertiary structure of a protein after a change in the temperature or the chemical environment dissolved the hydrogen bonds between different parts of the molecule
derivatization: replacing the active groups of a molecule with a non-polar group to reduce polarity and increase thermal stability, by esterification (methylization) or silylation
diagnosis of bone: all physical, chemical and biological changes of skeletal remains in an archaeological context; the ultimate outcome of the diagenetical processes is determined by the complex interactions between the buried materials and their environment
diazomethane: CH2N2, an explosive, toxic, carcinogenic, but efficient and easy to use derivatization agent (see methylization)
dicarboxylic fatty acid: fatty acid with COOH-groups on both ends, often the oxidation product of a mono-unsaturated fatty acid
diketopiperazine: see cyclic dipeptide
disulfide bond: (S-bridge) the covalent link between the sulfur atoms in two cysteine molecules; disulfide

BSTFA: N,O-bis(trimethylsilyl)trifluoroacetamide, a derivatization agent (see silylation)
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C: cysteine, a proteinogenic amino acid
C: cytosine, a base in DNA and RNA that pairs with guanine (G)
CAD: collisionally activated dissociation, see CID
calcium gluconate: see HF
capillary electrophoresis: electrophoresis using a buffer solution in a capillary as the stationary phase
carboxyl: COOH-group
carrier gas: see mobile phase
cathode: the negative end of a direct current system (see anode)
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Appendix X: Biochemical Glossary

bonds play an important role in maintaining the three dimensional structure of many proteins (see DTT)

DNA: deoxyribonucleic acid, a long polymer of nucleotides (a heterocyclic base bound to a sugar and one or more phosphate groups) containing the permanent genetic information necessary for protein synthesis; the sequence of the bases adenine (A), cytosine (C), guanine (G) and thymine (T) codes for the sequence of amino acids in proteins (see codon)

D-sugar: sugar with the same three-dimensional configuration as D-glyceraldehyde; most natural sugars are D-sugars (see chirality)

DTT: dithiothreitol, HS-CH₂-CH₂-OH, a reagent that reduces disulfide bonds in proteins

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E: glutamate, a proteinogenic amino acid

ECD: electron capture detector, used in a gas chromatograph

EI⁺: electron impact positive ionization, which triggers reproducible fragmentation
electron multiplier: type of detector often used in a mass spectrometer
electrophoresis: separation technique based on the differences in migration speed of molecules in the presence of an electric field (the mobile phase), the stationary phase can be a gel (gel electrophoresis) or a buffer solution in a capillary (capillary electrophoresis)

ELISA: enzyme-linked immuno-sorbent assay, technique to immunologically detect selected target proteins by chemically labeled antibodies (see RIA)
enantiomer: (optical isomer) molecule of which two distinct three-dimensional configurations exist that each rotates the plane of polarized light in a different direction (see chirality)

enterokinase: see trypsin
enzyme: biocatalyst, a protein that specifically accelerates a chemical reaction, in a biological system, without being used up

EPA: Environmental Protection Agency (USA)

epimerization: see racemization

epitope: the part of a macromolecule that is recognized by the immune system (see antigen)

ESI: electrospray ionisation

esterification: see methylation

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F: phenylalanine, a proteinogenic amino acid

FAB: fast atom bombardment ionization

FAMES: fatty acid methyl esters, fatty acids derivatized by esterification (methylization)

Faraday cup: type of detector used in a mass spectrometer

FID: flame ionization detector, used in a gas chromatograph

five prime: see 5'-end

fossilization: see mineralization

FT-ICR: see FTMS

FTMS: Fourier transform mass spectrometry, or Fourier transform ion cyclotron resonance (FT-IRC) mass spectrometry

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G: glycine, a proteinogenic amino acid

G: guanine, a base in DNA and RNA that pairs with cytosine (C)

GC/MS: gas chromatography combined with mass spectrometry

GC-column: glass tube inside the oven of a GC/MS, coated with a polar layer (stationary phase) and filled with a steady flow of carrier gas (mobile phase)
gene electrophoresis: electrophoresis using an agarose or acrylamide gel as the stationary phase
genetic code: the information necessary to synthesize proteins, as contained in the triplet sequence of DNA or mRNA molecules

Gln: glutamine (Q), a proteinogenic amino acid

Glu: glutamate (E), a proteinogenic amino acid

Gly: glycine (G), a proteinogenic amino acid
glyceraldehyde: optical active molecule of which the D- and L-enantiomers are used as reference for other molecules (see chirality)

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H: histidine, a proteinogenic amino acid

HCG: human chorionic gonadotropin, a hormone produced by the human placenta

HF: see hydrofluoric acid

His: histidine (H), a proteinogenic amino acid

hormone: a circulating messenger molecule that binds to a specific receptor, triggering a particular response

HPLC: high pressure (performance) liquid chromatography, separation of a complex mixture by passing the sample through a non-polar column in a polar solvent; competition between the stationary and the mobile phase separates the molecules in time (see RP-HPLC)

humic acid: see humus

humus: soil organic matter, supramolecular compound in the soil, characterized by long-chain alkanes, melanoidins and acidic components, formed out of the complex mixture of decaying organic molecules from dead cells

hydrofluoric acid: HF, a synthetic weak acid with highly corrosive properties; it will dissolve almost all inorganic metal and semi-metal oxides, including silicate compounds like glass and ceramics. HF can pass the skin and harm internal tissues, especially in organs depending on calcium and magnesium such as the heart and the nerves. Exposure to small quantities of HF can be fatal, even with appropriate medical care (calcium gluconate is used as antidote)

hydrogen bond: the weak attractive force between a hydrogen atom in a molecule and atoms such as O or N in the same or another molecule; hydrogen bonds play an important role in maintaining the three dimensional structure of DNA and proteins (see denaturation)
**hydrolysis of a polypeptide**: the breaking, by addition of a water molecule, of the peptide bonds that bind the amino acids together

**hydrophilic**: ‘water-loving’, eager to dissolve in water

**hydrophobic**: ‘water-hating’, reluctant to dissolve in water

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**I**: isoleucine, a proteinogenic amino acid

**Ile**: isoleucine (I), a proteinogenic amino acid

**immunoglobulin**: see antibody

**in vitro**: ‘in glass’, taking place in laboratory conditions (see in vivo)

**in vivo**: ‘in life’, taking place in a biological system (see in vitro)

**inborn errors of metabolism**: a large group of disorders each caused by a change in the DNA coding for an enzyme; symptoms are due to the toxic accumulation of substances or to the lack of essential compounds

**insulin**: protein hormone consisting of two polypeptide chains connected by disulfide bonds; after initial synthesis, the disulfide bonds are made and the peptide chain is cut twice after which the central part of the chain is removed leaving the functional protein (proteolytic cleavage)

**integer mass**: mass without decimals (see mass)

**ion repeller**: charged plate in an ion source that pushes oppositely charged ions into the mass analyzer of a mass spectrometer

**ion source**: part of a mass spectrometer where the molecules in the sample are converted to gas phase ions

**ion**: charged molecule, an extra electron or a missing proton (H⁺) will result in a negative ion (M⁻ or [M-H]⁻ respectively), while a missing electron or an extra proton will result in a positive ion (M⁺ or MH⁺ respectively)

**IS**: internal standard, a known amount of a known compound added to a mix of unknown compounds with the purpose of approximating the concentration of these compounds once they are analyzed

**iso-electric point**: (pI), the pH at which amphoteric molecules, which have both acidic and basic functional groups (such as amino acids), carry no net charge (see 2-DE)

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**K**: lysine, a proteinogenic amino acid

**keratin**: protein in human skin and hair (and dust), frequent contaminant in protein identification analyses by mass spectrometry

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**L**: leucine, a proteinogenic amino acid

**ladder**: see peptide ladder

**Laemmli**: several details of the methods for Western blot and SDS-PAGE are named after U.K. Laemmli, who developed much of the protocol

**L-amino acid**: amino acid with the same three-dimensional configuration as L-glyceraldehyde; most natural amino acids are L-amino acids (see chirality)

**lauryl sulfate**: see SDS

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**LC-MS/MS**: liquid chromatography tandem mass spectrometry, see HPLC and MS/MS

**Leu**: leucine (L), a proteinogenic amino acid

**linoleate**: 9,12-octadecadienoic acid (C18:2), an essential fatty acid (see ω-6 fatty acid)

**linolenate**: 9,12,15-octadecatrienoic acid (C18:3), an essential fatty acid (see ω-3 fatty acid)

**lipase**: enzyme that performs saponification (in biological systems)

**lipoic acid**: a diverse group of organic molecules including fatty acids, fats, waxes, steroids and terpenoids

**long-chain fatty acids**: fatty acids with more than ten C-atoms

**L-sugar**: see D-sugar

**Lys**: lysine (K), a proteinogenic amino acid

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**M**: methionine, a proteinogenic amino acid

**M’**: positively charged molecule because of an extra electron (see ion)

**M⁺**: positively charged molecule because of a missing electron (see ion)

**[M-H]⁻**: negatively charged molecule because of a missing proton (see ion)

**MAG**: monoacylglycerol (see TAG)

**magnetic sector**: a type of mass analyzer

**Maillard reaction**: see browning

**MALDI-TOF**: matrix assisted laser desorption and ionization time-of-flight mass spectrometer, an instrument characterized by ability to measure high molecular masses, in which the the target proteins are ionized by a laser while trapped in a solid matrix

**mass analyzer**: part of a mass spectrometer where ions are separated according to their m/z

**mass spectrometry**: an analytical technique based on the accurate measurement of the m/z of ions using differences in their behavior in an electro-magnetic field

**mass spectrum**: plot of the relative intensity (frequency) of ions with different m/z, as measured by a mass spectrometer (see centroid spectrum)

**mass**: the mass of an element can be the mass of its lightest isotope, the mono-isotopic mass, or the weighted average mass of all its isotopes, the average mass (see Da)

**MCP**: microchannel plate detector, used in a TOF mass spectrometer

**Me**: methyl (-CH₃)

**medium-chain fatty acids**: fatty acids with six to ten C-atoms

**melanoids**: constituents of humus (SOM) resulting from the browning and polymerization of proteins

**MeOH**: methanol (CH₃OH)

**Met**: methionine (M), a proteinogenic amino acid

**methylization**: replacing active groups of a molecule with a methyl-group (CH₃) in order to reduce polarity and increase thermal stability (see diazomethane)

**MH⁺**: positively charged molecule because of an extra proton (see ion)
micelle: a sphere of lipids with the hydrophilic parts on the outside and the hydrophobic tails towards the center

mineralization: (fossilization) replacement of the collagen in bone by minerals (see diagenesis)

mobile phase: in gas chromatography, the flow of gas inside the GC-column carrying the molecules evaporating from the stationary phase

monoclonal antibodies: antibodies produced by a single cloned line of B-cells that will only bind to a single epitope (see polyclonal antibodies)

mono-isotopic mass: see mass

mono-unsaturated fatty acid: fatty acid with one double bond, more common in food of vegetable origin, which can be oxidized into dicarboxylic fatty acids

mRNA: messenger RNA that transfers the genetic code from DNA (in the nucleus) to the ribosomes (in the cytoplasm) where protein synthesis takes place

MS/MS: tandem mass spectrometry, an approach that allows precursor molecules to be mass measured, fragmented by collisions with gas molecules, and the resulting products to be mass measured

mutation: any change in the base sequence of the functional part of DNA, and thus in the associated mRNA and proteins

MW: molecular weight

myoglobin: the most important protein transporting oxygen in muscles; myoglobin has evolved several hundred million years ago and parts of the amino acid sequence and three-dimensional structure are the same in all species (see conservation)

m/z: mass to charge ratio, pronounced 'm over z' (see mass spectrum)

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N: asparagine, a proteinogenic amino acid

NIH: National Institutes of Health (USA)

NIST: National Institute of Standards and Technology (USA)

nodox: see anticodon

NP-HPLC: normal phase HPLC, with a polar stationary phase and non-polar mobile phase, this is the traditional but now less frequently used set-up (see RP-HPLC)

N-terminus: the terminal NH$_2$-group of a polypeptide (see C-terminus)

nucleotide: a heterocyclic base bound to a sugar and one or more phosphate groups (see DNA)

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oleic acid: cis-9-octadecenoic acid (C18:1 cis-Δ5)

oligosaccharide: a polymer of 3-10 sugars (see polysaccharide)

optical isomer: see enantiomer

osteocalcin: (bone Gla protein) second most abundant protein in bone (see collagen)

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P/S ratio: the ratio of the abundance of palmitic acid (C16:0) versus stearic acid (C18:0)

P: proline, a proteinogenic amino acid

palmatic acid: hexadecanoic acid (C16:0)

palmitoleic acid: cis-9-hexadecenoic acid (C16:1 cis-Δ5)

parent molecule: the original molecule in a sample before it is fractured inside a mass spectrometer (by ionization or otherwise)

peptide bond: the connection between two amino acids with the general formula R$_1$-C-CO-NH-C$_2$

peptide ladder: a reference mix of known proteins that produce reference bands on a gel

peptide mapping: peptide-mass fingerprinting, the identification of peptides by comparing their measured mass with the mass of known peptides in database (see peptide sequencing)

peptide sequencing: the identification of proteins by determining part of their amino acid sequence by tandem MS/MS and comparing this with the sequence of known proteins in a database (see peptide mapping)

peptide: see polypeptide

peptide-mass fingerprinting: see peptide mapping

Phe: phenylalanine (F), a proteinogenic amino acid

phosphorylation: a common PTM that affects the activity of a protein

photomultiplier: type of detector used in a mass spectrometer

phthalates: a large group of man-made molecules, commonly added to plastics

phytanic acid: 3,7,11,15-tetramethyl-hexadecanoic acid which is present in the meat and milk of ruminant animals and the fat of fish

pI: see iso-electric point

PID: photo-ionization detector, used in a gas chromatograph

plasma cell: cell of the immune system that produces antibodies

polyclonal antibodies: a mixture of antibodies against the different epitopes on one specific antigen (see monoclonal antibodies)

polypeptide: a non-functional protein fragment, or a protein shorter than 50 amino acids

polysaccharide: a polymer of many monosaccharides (sugars) joined by glycosidic links, such as cellulose, chitin glyocogen and starch; polysaccharides are usually water-insoluble and have no sweet taste

poly-unsaturated fatty acid: fatty acid with two or more double bonds, more common in food of vegetable origin

primary structure: the amino acid sequence of a protein

Pro: proline (P), a proteinogenic amino acid

protein: a long chain of amino acids connected by peptide bonds and folded into a specific three-dimensional shape that defines its function; proteins are the main molecular actors in nature

proteolytic cleavage: the enzymatic cutting of a protein at a peptide bond

proteomics: an umbrella term to describe the study of proteins
PTM: post-translational modification, any change in a protein after synthesis (see insulin)

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Q: glutamine, a proteinogenic amino acid

QQQ: triple quadrupole mass spectrometer (see MS/MS)

quadrupole: a type of mass analyzer

quaternary structure: the interactions between several protein molecules that function more or less closely together (for example dimerization)

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R: arginine, a proteinogenic amino acid

racemic mixture: equal mix of the two different enantiomers of the same molecule (see chirality)

racemization: (epimerization) process during which single enantiomers of optically active molecules, such as L-amino acids, transform into an equal mix of L- and D-amino acids (see chirality)

RAM: relative atomic mass or average mass (see mass)

ramp: gradually increase of the temperature inside the GC-column to make different components in the sample move from the stationary into the mobile phase

rcf: relative centrifugal force, the force experienced by particles in a centrifuge expressed in units of gravity: rcf = RPM² x diameter (in cm) x (1.118 x 10^-3)

receptor: a protein in the lipid cell membrane that initiates a specific reaction within the cell when it comes into contact with a specific compound outside the cell (see hormone)

reflectron: electrostatic mirror in an TOF mass analyzer that increases the flight path of the ions and improves their separation

relative abundance: the abundance of a component in a mixture relative to the most abundant component (see chromatogram)

relative intensity: the abundance of a specific ion, with a certain m/z, relative to the most abundant ion in the mass spectrum (see base peak)

retention time: time between the introduction of a sample into a separation device (such as a GC-column) and the arrival of the component at the detector (see chromatogram)

RF: radio frequency, about 10⁶ Hz, the AC potential carried by two of the four rods of a quadrupole mass analyzer

RIA: radioimmunoassay, technique to immunologically detect selected target proteins by antibodies labeled with a radioactive compound (see ELISA)

ribosome: an organelle in the cytoplasm in which protein synthesis takes place according to the instructions on a strand of mRNA (see translation)

RNA: ribonucleic acid, a DNA-like polymer of nucleotides containing ribose instead of deoxyribose and uracil (U) instead of thymine (T); RNA functions as an intermediate in protein synthesis and contains parts of the genetic code (see DNA)

RNA-polymerase: large molecule in the nucleus that can make a complementary copy on RNA of part of a DNA molecule

RP-HPLC: reversed phase HPLC, with a non-polar stationary phase and a polar mobile phase, this is the most common set-up today (see NP-HPLC)

RPM: revolutions per minute, see rcf

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S: serine, a proteinogenic amino acid

sandwich ELISA: variant of the ELISA technique in which the antigens are immobilized by antibodies

saponification: the reaction between a metal hydroxide, like KOH or NaOH, with a fat resulting in glycerol and fatty acid salts (soaps)

saturated peak: truncated peak in a chromatogram caused by the saturation of the detector

S-bridge: serine, a proteinogenic amino acid

short-chain fatty acids: fatty acids with less than six C-atoms

silver nitrate: AgNO₃, used in CIEP, Western blotting and 2-DE gels to stain virtually all proteins

silylation: replacing the active groups of a molecule with a TMS-group in order to reduce polarity and increase thermal stability (see BSTFA)

sodium dodecyl sulfate: see SDS

solvent slug: solvents with sample condensed in a GC-column (see cold-on-column injection)

SOM: soil organic matter, see humus

sonication: the application of ultrasound to stimulate residues into solution

source: see ion source

Southern blot: technique to immunologically detect selected target proteins after these have been separated by electrophoresis in a gel

split injection: feeding only part of a sample onto a GC-column, rich samples will be split into a part going into the column and a part exiting the instrument without being analyzed (see splitless injection)

splitless injection: feeding a complete sample into the GC-column (see split injection)

stationary phase: in gas chromatography, the active layer inside the GC-column that will slow down the molecules carried by the mobile phase (see retention time)

stearic acid: octadecanoic acid (C18:0)

Sypro Ruby: a fluorescent dye, containing ruthenium (Ru, atomic number 44), which interacts noncovalently
Appendix X: Biochemical Glossary

with most proteins; the stain is visualized with a UV or blue-light transilluminator, or a laser-based scanning instrument (Ru may be toxic)

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T: threonine, a proteinogenic amino acid
T: thymine, a base in DNA that pairs with adenine (A)
TAG: triacylglycerol, TAGs are also referred to as triglycerides or triacylglycerides

tandem mass spectrometry: see MS/MS
TCA: trichloro-acetic acid, used to precipitate proteins out of solution
TCD: conductivity detector, used in a gas chromatograph

terpenoids: also referred to as isoprenoids, a large group of mostly polycyclic compounds synthesized by plants for their defense, color or fragrance

tertiary structure: the overall shape of a protein usually stabilized by hydrophobic and hydrophilic forces, but also by hydrogen bonds, disulfide bonds or other PTMs

tetrahedron: a pyramid with a triangular base

thermal stability: the ability of a molecule to survive heating and evaporation without decomposition (see derivatization)

Thr: threonine (T), a proteinogenic amino acid
three prime: see 3'-end
TIC: total ion current
TMAH: tetramethyl-ammonium hydroxide, a reagent that can derivatize a compound in the sample inlet of a gas chromatograph (see TMTFTH)

TMCS: trimethylchlorosilane, added to BSTFA to aid the silylation of otherwise obstructed functional groups

TMS: trimethylsilyl, Si-(CH$_3$)$_3$, with an integer mass of 73 Da (see silylation)

TMTFTH: trimethyl-trifluorotolyl-ammonium hydroxide, a reagent that can saponify and derivatize a compound in the sample inlet of a gas chromatograph (see TMAH)

TOF: time-of-flight, a type of mass analyzer

transcription: process in the nucleus during which a copy of part of a DNA molecule is made on a mRNA molecule

translation: synthesis of protein strands by a ribosome in the cytoplasm according to the instructions on a strand of mRNA

trichloro-acetic acid: see TCA
triplet: see codon
tris-HCl: C$_3$H$_7$NO$_3$ • HCl, used in solution as a buffer in SDS-PAGE and 2-DE gels

tRNA: transport RNA that transports individual amino acids to a ribosome where they are incorporated into a protein according to the instructions on mRNA

Trp: tryptophan (W), a proteinogenic amino acid

trypsin: a digestive enzyme, produced in the pancreas as trypsinogen and activated by enterokinase; trypsin cleaves proteins at lysine (K) and arginine (R), except where either is followed by proline (P). Trypsin digestion results in predictable peptide fragments

Tyr: tyrosine (Y), a proteinogenic amino acid

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U: uracil, a base in RNA that pairs with adenine (A)
UAA, UAG, UGA: base triplets coding for the termination of the peptide chain (see AUG)

UHPLC: ultra high pressure liquid chromatography (see HPLC)

unsaturated fatty acid: fatty acid with one or more double bonds

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V: valine, a proteinogenic amino acid

Val: valine (V), a proteinogenic amino acid

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W: tryptophan, a proteinogenic amino acid

Western blot: a technique to separate proteins on a gel after which antibodies are applied to determine the presence of known proteins

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Y: tyrosine, a proteinogenic amino acid

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y-ion: positively charged peptide fragment, resulting from collisionally induced dissociation of the OC-NH bond, containing the COOH-group of the original peptide (see b-ion)

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z: charge state (see m/z)

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