In many fields today abbreviations and acronyms are common. They provide a useful tool for shortening long words or expression in order to save time and space. Some well-known general examples are DVD (digital versatile disc), UNICEF (United Nations International Children’s Emergency Fund), NASA (National Aeronautics and Space Administration), and UN (United Nations). Abbreviations are extensively used in the scientific and medical communities. It is common practice to use abbreviations for long names of many clinical diseases and procedures, and for scientific techniques that have to be repeated many times in medical or scientific papers, posters, and oral presentations. This can cause substantial communication difficulties for individuals who are not familiar with English abbreviations in their field. The example below is meaningless to individuals who are not familiar with the abbreviations used.

For example,

*IHC study of CNS tissue from MS subjects demonstrated loss of PLP-expressing OLs.*

Many individuals, including native English speakers, do not know the difference between an acronym and an abbreviation. Acronyms and abbreviations are formed by combining the first letter or letters of several words. All acronyms are abbreviations, but not all abbreviations are acronyms. An acronym is a special type of abbreviation that can be pronounced as a single word (it can be said), while all other abbreviations are pronounced letter by letter (you say each letter individually or spell it out).

For example,

*AIDS is an acronym for Acquired Immune Deficiency Syndrome because you say the abbreviation as a word (“aydz”); whereas HIV is an abbreviation for Human Immunodeficiency Virus (in this case you say each letter individually).*

It can be extremely frustrating and time-consuming trying to find out what certain commonly used acronyms and abbreviations mean. Abbreviations that some
consider universally known may be obscure to others. In addition, shortened forms used in one country may not be understood in another. In order to eliminate guesswork and prevent frustration, we have put together an alphabetized list of the most commonly used English acronyms and abbreviations in biomedical research. We feel that having a central reference list at your fingertips could be quite helpful for your scientific communications.

### Abbreviation Rules and Style Conventions in English

Apply the following guidelines when using abbreviations:

- On the first occurrence of an abbreviation, spell out the full term, with the abbreviation in brackets. Thereafter the abbreviated form may be used by itself.

  For example,

  Oligodendrocytes (OLs) are the cells responsible for producing a fatty protein called myelin. Each OL can supply myelin for several axons and each axon can be supplied by several OLs.

- Abbreviations may be pluralized by adding an *s* to the end. Plurals of capitalized abbreviations should have no apostrophe because the apostrophe indicates possession. However, plurals of lowercase abbreviations have an apostrophe.

  Examples:

  - PCRs (*not* PCR’s)
  - BACs (*not* BAC’s)
  - Drs. (*not* Dr’s)
  - rbc’s (*not* rbcs)

  **Exception 1:** Plurals of some abbreviations, particularly in references, are not formed by merely adding an *s*.

    Examples:

    - p for page and pp for pages (*not* ps or pgs)
    - l for line and ll for lines (*not* ls)
    - c for column and cc for columns (*not* cs)

  **Exception 2:** Singular and plural units of measure are abbreviated the same. An *s* is generally not added to the plurals.

    1 km and 5 km (*not* 5 kms)
Exception 3: If the abbreviation contains a period (full stop), form the plural with an apostrophe and an s (’s). This is probably because it looks more awkward without apostrophes:

For example,

Ph.D.’s
M.D.’s

Exception 4: Plurals of single-letter abbreviations are formed by adding ’s.

For example,

X’s

- Abbreviations may be made possessive by adding ’s for singular possessive, and s’ for plural possessive.

For example,

EMBO’s homepage

- Articles are usually omitted when acronyms are used, being included only when terms or names are written out in full.

Example:

The United Nations International Children’s Emergency Fund is a voluntarily funded agency.

UNICEF was created on December 11, 1946.

- The choice of an indefinite article (a or an) before letter-by-letter abbreviations depends on the pronunciation of the first letter of the abbreviation, not on the written representation of the first letter. If the abbreviation begins with a consonant sound, use a. If it begins with a vowel sound, use an.

Examples:

an mRNA molecule - although “m” is a consonant, we use the an article because the first sound we make is an “em” sound.

an X-ray - this abbreviation begins with a consonant letter, but sounds like it starts with a vowel. The first sound we make is an “eks” sound.

There are several abbreviation styles used today. The only rule one should remember is to have a consistent style.

- Acronyms are generally presented in uppercase letters.

Examples:

AIDS, NATO, BBC, and SARS
However, some acronyms are no longer capitalized. Examples are laser, radar and sonar.

- A period is sometimes written after an abbreviated word (there is no strict rule). The general modern trend is to omit periods from abbreviations (to avoid an appearance of clutter).

Organizations, countries, and units of measure are not generally followed by periods.

Examples:
- EU (not E.U.)
- UN (not U.N.)
- IBM (not I.B.M.)
- 5 mg (not 5 mg.)

Periods are optional with degree titles (this is a matter of preference). However, in modern usage, periods are usually omitted.

Examples where both forms are acceptable:
- PhD or Ph.D.
- BSc or B.Sc.
- MD or M.D.

- If a sentence ends with an abbreviation that requires a period, do not add another period.

For example,
- The technician will be here at 4 p.m.
  not The technician will be here at 4 p.m.

- Abbreviations of chemicals from the periodic table always start with a capital letter; if there is a second letter, it is always lowercase.

For example,
- N Nitrogen
- O Oxygen
- Na Sodium
- Zn Zinc

- Do not divide abbreviations, or a numerical value followed by a unit of measure, between lines on a page.

.................AIDS .................10 mg
not.............AI not.............10
DS mg
### Table 1. List of abbreviations and Latin expressions used in scientific writing

| Abbreviation       | Expression  | Translation                                      |
|--------------------|-------------|--------------------------------------------------|
| c. or ca.          | Circa       | About (in reference to approximate date or time)  |
| c.f.               | Con fero    | Compare, consult                                 |
| –                  | Et          | And                                              |
| et al.             | Et alii     | And others (in reference to people)              |
| etc.               | Et cetera   | And so forth, and so on                          |
| et seq.            | Et sequentes| And the following                                |
| e.g.               | Exempli gratia | For example                                      |
| ibid.              | Ibidem      | The same place                                   |
| i.e.               | Id est      | That is                                          |
| l.c. or loc. cit.  | Loco citato | At the place already cited                       |
| N.B.               | Nota bene   | Note well (to draw attention to something)       |
| op. cit.           | Opere citato| In the work cited                                |
| P.S.               | Post scriptum| After writing (in reference to additions to a letter after the signature) |
| q.v.               | Quod vide   | Which see (in reference to a term/sentence to be looked up elsewhere) |
| sc.                | Scilicet    | Namely, to wit                                   |
| -                  | Sic         | As such, thus, so, just as that                  |
| vs.                | Versus      | Against                                          |
| Viz.               | Videlicet   | Namely, to wit                                   |

### General Abbreviations and Acronyms Used in Biomedical Research

| Abbreviation | Definition                      |
|--------------|--------------------------------|
| A            | Adenine or alanine              |
| aa           | Amino acid or aminoaeryl       |
| Ab           | Antibody                       |
| ABU          | L-a-Aminobutyric acid          |
| ABZ          | 2-Aminobenzoyl                 |
| AC           | Accession number               |
| ac           | Acetyl                         |
| Ac           | Actinium                       |
| Ac-CO A      | Acetyl-coenzyme A              |
| AChE         | Acetylcholinesterase           |
| Abbr | Description | Abbr | Description |
|------|-------------|------|-------------|
| Acm  | Acetamidomethyl | ADH  | Alcohol dehydrogenase |
| ADH  | Alcohol dehydrogenase | ADP  | Adenosine diphosphate |
| AFC  | 7-Amino-4-trifloromethyl-coumaride | Ag   | Antigen or silver |
| Aha  | 7-Aminoheptanoic acid | Al   | Aluminum |
| Ala  | Alanine | Am   | Americium |
| AMP  | Adenosine monophosphate | Amp  | Ampicillin |
| an   | Anisoyl | ANOVA| Analysis of variance |
| AP   | Anteroposterior or action potential or alkaline phosphatase | APC  | Antigen presenting cells |
| apoE | Apolipoprotein E | APP  | Amyloid Precursor Protein |
| APS  | Ammonium persulfate | Ar   | Argon |
| Arg  | Arginine | As   | Arsenic |
| ASA  | Acetyl salicylic acid | Asn  | Asparagine |
| Asp  | Aspartic acid | At   | Astatine |
| ATP  | Adenosine 5’- triphosphate | ATPase| Adenosine triphosphatase |
| Au   | gold | **B** |  |
| B    | Boron or bromouridine | Ba   | Barium |
| BAC  | Bacterial artificial chromosome | BAP  | Bacterial alkaline phosphatase |
| BCIP | 5-Bromo-4-chloro-3-indolyl phosphate | Be   | Beryllium |
| bh   | Benzhydryl | Bh   | Bohrium |
| Bi   | Bismuth | Bio-dNTP | Biotin-deoxynucleoside triphosphate |
| Bk   | Berkelium | BLAST | Basic Local Alignment Search Tool |
| BME  | Beta-mercaptoethanol | BMT  | Bone marrow (or blood and marrow) transplant |
| Bp   | Base pair |
Br Bromine
BrUrd Bromouridine
BSA Bovine serum albumin
bz Benzoyl
bzy Benzyl

C
c
\text{Carbon or cytosine or cysteine}
\text{Carbon}
Ca Calcium
CA Casamino acids
CAT Chloramphenicol acetyl
CD Central domain
Cd Cadmium
cDNA Complementary deoxyribonucleic acid
Ce Cerium
Cf Californium
CFU Colony-forming units
CIAP Calf intestinal alkaline phosphatase
cl Chloro
Cl Chlorine
Cm Curium
Co Cobalt
Cr Chromium
Cs Cesium
CSF Cerebrospinal fluid
CTP Cytidine 5'-triphosphate
Cu Copper
Cyd Cytidine
Cys Cysteine

D
d Aspartic acid
dAMP Deoxyadenosine monophosphate
dATP Deoxyadenosine triphosphate
DAG Diacylglycerol
Db Dubnium
dCCTP Deoxycytidine triphosphate
ddATP Dideoxycytidine triphosphate
ddCTP Dideoxyadenosine triphosphate
ddGTP Dideoxyguanosine triphosphate
ddNTP Dideoxynucleoside triphosphate
DEAE Deethylaminoethyl
DEPC Diethyl Pyrocarbonate
dGTP Deoxyguanosine triphosphate
DIDS 4,4'-di-isothiocyanato-2,2'-disulfostilbene
| Acronym | Abbreviation |
|---------|--------------|
| DIG     | Digoxigenin  |
| DIV     | Days In Vitro|
| DMF     | N,N-Dimethylformamide |
| DMS     | Dimethylsulfide |
| DMSO    | Dimethyl sulfoxide |
| DMT     | Dimethyltryptamine |
| DNA     | Deoxyribonucleic acid |
| DNase   | Deoxyribonuclease |
| dns     | Dansyl |
| Dnp     | 2,4-Dinitrophenyl |
| dNTP    | Deoxyribonucleotide triphosphate |
| DPI     | Diphenylene iodonium |
| Dpr     | 2,3-Diaminopropionic acid |
| Ds      | Darmstadtium |
| ds      | Double stranded |
| DT      | Diphtheria toxin |
| DTA     | Diphtheria toxin A chain |
| DTE     | Dithienylethene |
| DTT     | Dithiothreitol |
| dTTP    | Deoxythymidine triphosphate |
| dUTP    | Deoxyuridine triphosphate |
| DV      | Dorsoventral |
| Dy      | Dysprosium |

**E**

| Acronym | Abbreviation |
|---------|--------------|
| E       | Glutamic acid |
| EDT     | 1,2-Ethanedithiol |
| EDTA    | Ethylenediaminetetraacetic acid |
| EGTA    | Ethylene glycol tetraacetic acid |
| ER      | Endoplasmic reticulum |
| Er      | Erbium |
| Es      | Einsteinium |
| EtBr    | Ethidium Bromide |
| EtOH    | Ethanol |
| Eu      | Europium |
| exo     | Exonuclease |

**F**

| Acronym | Abbreviation |
|---------|--------------|
| F       | Fluorine or phenylalanine |
| fa      | Formylaminoacyl |
| FBS     | Fetal bovine serum |
| FCS     | Fetal calf serum |
| Fe      | Iron |
| FITC    | Fluorescein isothiocyanate |
| Abbreviation | Definition                     |
|-------------|--------------------------------|
| Fm          | Fermium                        |
| FOA         | 5-Fluoroacetic acid            |
| Fr          | Francium                       |
| FSH         | Follicle-stimulating hormone   |
| G           | Gram                           |
| g           | Gravitational force            |
| G           | Glycine                        |
| Ga          | Gallium                        |
| Gd          | Gadolinium                     |
| Ge          | Germanium                      |
| GFP         | Green Fluorescent Protein      |
| Gln         | Glutamine                      |
| Glu         | Glutamic acid                  |
| Gly         | Glycine                        |
| GM          | Genetically Modified           |
| GMO         | Genetically Modified Organisms |
| GUS         | Beta-D-glucuronidase           |
| H           | Hydrogen or histidine          |
| Hb          | Hemoglobin                     |
| HBSS        | Hank’s Buffered Salt Solution  |
| HCl         | Hydrochloric acid              |
| H&E         | Hematoxylin and Eosin          |
| He          | Helium                         |
| HEPES       | 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid |
| Hf          | Hafnium                        |
| Hg          | Mercury                        |
| His         | Histidine                      |
| HLA         | Histocompatibility Leukocyte Antigen |
| hm          | Hydroxymethyl                  |
| Ho          | Holmium                        |
| HPRT        | Hypoxanthine phosphoribosyltransferase |
| HRP         | Horseradish peroxidase         |
| Hs          | Hassium                        |
| Hsp         | Heat Shock Protein             |
| HT          | High temperature              |
| hU          | Dihydouridine                  |
| humi.       | Humidity                       |
| Hyl         | Hydroxyllysine                 |
| Hyp         | Hypoxanthine                   |
| Acronym  | Description                                      |
|----------|--------------------------------------------------|
| I        | Iodine or isoleucine                             |
| Ig       | Immunoglobulin                                   |
| IgA      | Immunoglobulin A (gamma A immunoglobulin)        |
| IgD      | Immunoglobulin D (gamma D immunoglobulin)        |
| IgE      | Immunoglobulin E (gamma E immunoglobulin)        |
| IgG      | Immunoglobulin G (gamma G immunoglobulin)        |
| IgM      | Immunoglobulin M (gamma M immunoglobulin)        |
| IIe      | Isoleucine                                       |
| In       | Indium                                           |
| Ino      | Inosine                                          |
| IPP      | Isopentenyl diphosphate                          |
| IPTG     | Isopropyl-beta-D-thiogalactopyranoside           |
| IR       | Infrared                                         |
| Ir       | Iridium                                          |
| K        | Potassium or lysine                              |
| Kr       | Krypton                                           |
| L        | Leucine                                          |
| La       | Lanthanum                                        |
| LB       | Luria-Bertani medium or Luria broth              |
| Leu      | Leucine                                          |
| Li       | Lithium                                          |
| Lr       | Lawrencium                                       |
| LTA      | Lipoteichoic Acid                                |
| Lu       | Lutetium                                         |
| Lys      | Lysine                                           |
| M        | Methionine                                       |
| mAb      | Monoclonal antibodies                            |
| MCS      | Multiple cloning site                            |
| Md       | Mendelevium                                      |
| MeOH     | Methanol                                         |
| Met      | Methionine                                       |
| Mg       | Magnesium                                        |
| MgCl     | Magnesium chloride                               |
| MMLV     | Moloney murine leukemia virus                    |
| mmt      | Monomethoxytrityl                                |
| Abbreviation | Acronym | Description |
|--------------|---------|-------------|
| Mn           | Manganese |
| Mo           | Molybdenum |
| MOPS         | 4-Morpholinepropanesulfonic acid |
| mRNA         | Messenger Ribonucleic Acid |
| Mt           | Meitnerium |
| MTS          | $3-(4,5\text{dimethylthiazol-2-yl})-5-(3\text{carboxymethoxyphenyl-2-})$-$(4\text{sulfophenyl})-2H\text{tetrazolium}$ |
| mtDNA        | Mitochondrial DNA |

**N**

| Abbreviation | Acronym | Description |
|--------------|---------|-------------|
| N            | asparagine or nitrogen |
| Na           | Sodium |
| NaF          | Sodium fluoride |
| NAD          | Nicotinamide adenine dinucleotide |
| NADH         | Nicotinamide adenine dinucleotide (reduced form) |
| NADP         | Nicotinamide adenine dinucleotide phosphate |
| NADPH        | Nicotinamide adenine dinucleotide phosphate (reduced form) |
| Nb           | Niobium |
| NBT          | Nitroblue tetrazolium |
| Nd           | Neodymium |
| Ne           | Neon |
| Ni           | Nickel |
| NMDA         | N-methyl-D-aspartic acid |
| No           | Nobelium |
| Np           | Neptunium |
| nRNA         | Nuclear RNA |
| NT           | Nucleotides or nuclear transfer or null type |
| NTP          | Nucleoside triphosphate |
| NZCYM        | Casein hydrolysate casamino acids yeast extract magnesium medium |

**O**

| Abbreviation | Acronym | Description |
|--------------|---------|-------------|
| O            | Oxygen or orotidine |
| OD           | Optical Density |
| Oilgo(dT)    | Oligodeoxythymidylic acid |
| OMP          | Orotidine monophosphate |
| o/n          | Over night |
| Ord          | Orotidine |
| ORF          | Open reading frame |
| Oro          | Orotate |
| Os           | Osmium |
### P

| Abbreviation | Description |
|--------------|-------------|
| P            | Phosphorus or praline |
| Pa           | Protactinium |
| PAC          | P1 artificial chromosome |
| Pb           | Lead |
| PBMC         | Peripheral blood mononuclear cells |
| PBS          | Phosphate Buffer Saline |
| Pd           | Palladium |
| PEI          | Polyethylenimine |
| PEG          | Polyethylene glycol |
| PFU          | Plaque-forming units |
| Phe          | Phenylalanine |
| PK           | Protein kinase |
| PIPES        | Piperazine-N,N’-bis(2-ethanesulfonic acid) |
| Pm           | Promethium |
| PMSF         | Phenylmethylsulfonyl fluoride |
| PNK          | Polynucleotide kinase |
| Po           | Polonium |
| Poly(A)      | Polyadenylic acid |
| Poly(A)+     | Polyadenylated messenger Ribonucleic Acid |
| Poly(U)      | Polyuridylic acid |
| Pr           | Praseodymium |
| Pro          | Proline |
| Pt           | Platinum |
| PTX          | Pertussis toxin |
| Pu           | Plutonium |
| Puo          | Purine nucleoside |
| Pur          | Purine |
| PVC          | Polyvinyl chloride |
| Pyd          | Pyrimidine nucleoside |
| Pyr          | Pyrimidine |

### Q

| Abbreviation | Description |
|--------------|-------------|
| Q            | Glutamine or ubiquinone (coenzyme Q) |

### R

| Abbreviation | Description |
|--------------|-------------|
| R            | Arginine |
| Ra           | Radium |
| Rb           | Rubidium |
| Re           | Rhenium |
| Rf           | Rutherfordium |
| Rg           | Roentgenium |
| Rh           | Rhodium |
| Abbreviation | Full Form |
|--------------|-----------|
| Rn           | Radon     |
| RNA          | Ribonucleic acid |
| RNase        | Ribonuclease |
| RNP          | Ribonucleoprotein |
| RRM          | RNA recognition motif |
| rRNA         | Ribosomal ribonucleic acid |
| RT           | Room temperature or reverse transcriptase |
| Ru           | Ruthenium |
| Rxn          | Reaction |

**S**

| Abbreviation | Full Form |
|--------------|-----------|
| S            | Sulphur or serine |
| Sb           | Antimony |
| Sc           | Scandium |
| SDS          | Sodium Dodecyl Sulfate |
| Se           | Selenium |
| Ser          | Serine |
| Sg           | Seaborgium |
| Si           | Silicon |
| Sm           | Samarium |
| Sn           | Tin |
| SR           | Sarcoplasmic reticulum |
| Sr           | Strontium |
| ss           | Single stranded |
| SSC          | Sodium citrate buffer |
| STR          | Short tandem repeats |

**T**

| Abbreviation | Full Form |
|--------------|-----------|
| T            | Threonine |
| Ta           | Tantalum |
| TAE          | Tris-acetate buffer |
| Taq          | Thermus aquatic DNA polymerase |
| Tb           | Terbium |
| TBE          | Tris/Borate/EDTA buffer |
| TBS          | Tris-Buffered Saline |
| TBST         | Tris-Buffered Saline Tween-20 |
| Tc           | Technetium |
| TCA          | Trichloroacetic acid |
| TdT          | Terminal deoxynucleotidyl transferase |
| Te           | Tellurium |
| TE           | Tris/EDTA buffer |
| TEA          | Triethanolamine |
| TEMED        | N,N,N’,N’-Tetramethylethylenediamine |
| Acronym | Description |
|---------|-------------|
| TES     | N-Tris(hydroxymethyl)methyl-2- minoethanesulfonic acid |
| Tg      | Transgenic |
| TGB     | Tris/Glycine buffer |
| Th      | Thorium |
| Thr     | Threonine |
| Ti      | Titanium |
| Tl      | Thallium |
| Tm      | Thulium |
| TP      | Thymidine phosphorylase |
| TRIS    | Tris-hydroxymethyl-aminomethanol |
| tRNA    | Transfer RNA |
| Trp     | Tryptophan |
| Tyr     | Tyrosine |
| U       | Uranium or uridine |
| UP      | Uridine phosphorylase |
| Ura     | Uracil |
| Urd     | Uridine |
| UTP     | Uridine triphosphate |
| UTR     | Untranslated region |
| Uub     | Ununbium |
| Uuh     | Ununhexium |
| Uun     | Ununnilium |
| Uuo     | Ununoctium |
| Uup     | Ununpentium |
| Uuq     | Ununquadium |
| Uus     | Ununseptium |
| Uut     | Ununtrium |
| Uuu     | Unununium |
| UV      | Ultraviolet |
| V       | Vanadium or valine |
| Val     | Valine |
| W       | Tungsten or tryptophan |
| WT      | Wild-type |
| X       | Xanthine |
| Xe      | Xenon |
| Abbreviation | Description                                                                 |
|--------------|-----------------------------------------------------------------------------|
| X-Gal        | 5-bromo-4-chloro-3-indolyl-beta-D-galactopyranoside                         |
| X-Gluc       | 5-bromo-4-chloro-3-indolyl-beta-D-glucuronic acid                           |
| Y            |                                                                |
| Y            | Yttrium or tyrosine                                                        |
| YAC          | Yeast Artificial Chromosome                                                 |
| Yb           | Ytterbium                                                                  |
| YMG          | Yeast and malt extract with glucose media                                  |
| YPD          | Yeast extract/peptone/dextrose bacterial media                             |
| YPG          | Yeast extract/peptone/galactose bacterial media                            |
| YT           | Yeast extract/tryptone bacterial media                                      |
| Z            |                                                                |
| Zn           | Zinc                                                                       |
| Zr           | Zirconium                                                                  |

Please note that amino acids are given three-letter and one-letter abbreviations (e.g., A or Ala for Alanine).

**Methods and Techniques Used in Biomedical Research**

| Abbreviation | Description                                                                 |
|--------------|-----------------------------------------------------------------------------|
| CHEF         | Contour-clamped homogeneous electric field gel electrophoresis             |
| CSGE         | Conformation-sensitive gel electrophoresis                                 |
| DFP          | DNA finger printing                                                         |
| DGGE         | Denaturing gradient gel electrophoresis                                     |
| ELISA        | Enzyme-linked immunosorbent assay                                           |
| EMSA         | Electrophoresis mobility shift assay                                        |
| ENDO         | Endodeoxyribonuclease assay                                                 |
| EXO          | 5’ and 3’ exodeoxyribonuclease assay                                        |
| FACS         | Fluorescence-activated cell sorting                                         |
| FIGE         | Field inversion gel electrophoresis                                         |
| FISH         | Fluorescent in situ hybridization                                           |
| GC           | Gas chromatography                                                          |
| HPLC         | High performance liquid chromatography                                      |
| HTRF         | Homogeneous time-resolved fluorescence assay                                |
| IEF          | Isoelectric focusing                                                        |
| IHC          | Immunohistochemistry                                                        |
| IP           | Immunoprecipitation                                                         |
| ISH          | In situ hybridization                                                       |
| LCR          | Ligase chain reaction                                                       |
| MNR          | Nuclear magnetic resonance                                                  |
| MS           | Mass Spec                                                                   |
| MZE          | Multiphasic zone electrophoresis                                            |
NAAT  Nucleic acid amplification technique
NB    Northern blot
PAGE  Polyacrylamide gel electrophoresis
PCR   Polymerase chain reaction
PFGE  Pulsed-field gel electrophoresis
PRINS Primed in situ labeling
qPCR  Quantitative PCR
RDA   Representational difference analysis
REMI  Restriction enzyme mediated integration
RFLP  Restriction fragment length polymorphism
RGE   Rotating gel electrophoresis
RPA   Ribonuclease protection assay
SB    Southern blot
SCGE  Single cell gel electrophoresis
SDA   Strand displacement amplification
TAFE  Transverse alternating-field electrophoresis
TAP   Tandem affinity purification
TGGE  Temperature gradient gel electrophoresis
TLC   Thin layer chromatography
WB    Western blot

**Radioactive Isotopes**

$^{14}$C  Carbon-14
$^{3}$H  Tritium-3
$^{131}$I Iodine-131
$^{32}$P  Phosphorus-32
$^{33}$P  Phosphorus-33
$^{35}$S  Sulfate-35

**Cell Lines**

3T3    Mouse embryo fibroblast cell line
9L     Rat glioma
A549   Human lung cancer cell line
B104   Rat neuroblastoma
BHK    Baby hamster kidney cells
B-LCL  B-lymphoblastoid cell line
C6     Rat glioma
CHO    Chinese hamster ovary
CLL    Carcinoma cell line
CMT    Canine mammary tumor
COS (monkey kidney)
CV-C African green monkey kidney cell line
EC Embryonal carcinoma (human)
EJ Human bladder cancer cell line
GH3 Rat pituitary tumor cell line
HaCaT Human keratinocyte cell line
HEK Human embryonic kidney
HeLa Henrietta Lacks (human cervical cell line)
HL-60 Human leukemia cell line
MCF-7 Human breast cancer cell line
MDCK Madin-Darby canine kidney
NS0 Mouse myeloma cell line
PC12 Chromaffin cell line (rat)
SCLC Small cell lung cancer cell line
SPEV Swine kidney cell line
SW480 Human colon cancer cell line
U87 Human glioblastoma-astrocytoma cell line
U343 Human astrocytoma cell line

Units of Measurement

Always abbreviate units when reporting numerical information. However, if you write the number out in full, you must spell out the unit of measurement. Always put a space between the number and the unit. When starting a sentence with a number and unit, both must be spelled out as words. Abbreviations for most units of measurement use small letters. The following abbreviations of units of measurement are frequently used in biomedical research.

A Ampere
a Area
A260 Absorbance measured at 260 nm
Bq Becquerel
C Coulomb
°C Degree Celsius
cal Calorie
Ci Curie
cm Centimeter
cpm Counts per minute
d Day
Da Dalton
DIV Days in vitro
dpm Disintegrations per minute
F Fahrenheit
g, gr Gram (g is commonly used)
h  Hour
Hz  Hertz
J   Joule
k   Kilo (10^3)
kb  Kilobases
kDa Kilodalton
L   Liter
lb  Pounds
M   Molar
m   Meter
mA  Milliamps
Mb  Megabase
mg  Milligram
min Minute
mL  Milliliter
mM  Millimolar
mmol Millimole
mo  Month
mol Mole
ms, msec Milliseconds (ms is generally used)
mV  Millivolt
MW  Molecular weight
N   Newton
n   Nano or sample size
ng  Nanogram
nm  Nanometer
OD  Optical density
oz  Ounces
pH  Power of hydrogen
r   Revolution
rpm Revolutions per minute
S   Svedberg units
s, sec Seconds (s is generally used)
T_m Melting temperature
U   Unit
µ   Micron
µM  Micromolar
µm  Micrometer
w, W Watt (W is commonly used)
wk  Week
wt  Weight
w/v Weight to volume
y   Year
V_max Maximum velocity
v/v Volume to volume