



Common Grammar Rules
for Scientific Writing

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Commas

Introductory Words, Clauses, and Phrases

Introductory words, clauses, and phrases introduce, link to a previous sentence, and provide background. Clauses are dependent; phrases are similar to clauses but not complete. They typically begin with adverbs (e.g., *after*, *although*, *as*, *because*, *before*, *if*, *since*, *though*, *until*, *when*).

Use a comma after an introductory word, clause, or phrase.

Independent Clauses

A group of words containing a subject and a verb that form a complete thought and can stand alone as a sentence is an independent clause. It is not preceded by a subordinating conjunction.

Independent clauses are connected by a coordinating conjunction preceded by a comma. Other connectors include *also*, *consequently*, *furthermore*, *however*, *moreover*, *nevertheless*, *therefore*. These connectors follow a semicolon and are followed by a comma.

Wrong: The phenotype appeared to be driven by this gene so we used a conditional knockout.
The phenotype appeared to be driven by the gene *in vitro*, however there was no change *in vivo*.

Right: The phenotype appeared to be driven by this gene, so we used a conditional knockout.
The phenotype appeared to be driven by the gene *in vitro*; however, there was no change *in vivo*.

Dependent Clauses

A group of words containing a subject and a verb without forming a complete thought (i.e., subordinate clauses). Usually indicated by signal words (e.g., *after*, *because*, *unless*, *whether*). Should not stand alone as a sentence.

If a dependent clause acts as a nonessential adjective, offset it with commas.

Wrong: This gene which is highly expressed in cardiomyocytes is upregulated.

Right: This gene, which is highly expressed in cardiomyocytes, is upregulated.

Use a comma if an adverbial, dependent clause is used at the beginning of a sentence but not if it's at the end.

Wrong: Aspirate the supernatant, when the centrifugation finishes.
When the centrifugation finishes aspirate the supernatant.

Right: Aspirate the supernatant when the centrifugation finishes.
When the centrifugation finishes, aspirate the supernatant.

Coordinating Conjunctions

Coordinating conjunctions are used to connect words, phrases, and clauses.

Examples: *for*, *and*, *nor*, *but*, *or*, *yet*, *so* (think FANBOYS)

Commas are used before coordinating conjunctions to separate independent clauses. The absence of a comma with a coordinating conjunction results in a run-on sentence. Use of a comma when there is not a coordinating conjunction can result in a comma splice.

Wrong (run-on): Human iPSCs can be differentiated into all cell types, and are used for genetic engineering.

Wrong (comma splice): Human iPSCs can be differentiated into all cell types, researchers use them for genetic engineering.

Right: Human iPSCs can be differentiated into all cell types, and researchers use them for genetic engineering.

Commas are used before coordinating conjunctions when using the Oxford comma in a list of three or more.

Wrong: Cells used for cartilage tissue engineering include primary chondrocytes, and stem cells.

Right: Cells used for cartilage tissue engineering include primary chondrocytes, adult stem cells, and pluripotent stem cells.

Subordinating Conjunctions

Subordinating conjunctions are commonly confused as subordinating conjunctions. These (usually) do not need a comma since they show a relationship between clauses.

Examples: *because, since, as long as, as, due to the fact that*

Coordinate Adjectives

Coordinate adjectives are a series of adjectives of equal value used to modify a noun. They should independently modify the noun; therefore, they could be reversed or combined with a noun.

Wrong: The **obese female** mice had severe heart disease.

Right: The **obese, female** mice had severe heart disease.
= The **female, obese** mice had severe heart disease.

Other Punctuation

Semicolons

Semicolons connect related independent clauses in cases of comma splices, connectors (e.g., *however, therefore*), and clauses containing commas. They cannot be used to connect dependent clauses.

Wrong: The cells died, the drug concentration was too high.
A dosage test was done, however, all the cells died.
The clinical trial was not performed in Athens, Greece, but it was successful in Athens, Georgia.

Right: The cells died; the drug concentration was too high.
A dosage test was done; however, all the cells died.
The clinical trial was not performed in Athens, Greece; but it was successful in Athens, Georgia.

Semicolons can also be used to help clarify lists that contain commas.

Wrong: This protocol was tested in labs in Paris, Texas, Athens, Georgia, and Rome, New York.

Right: This protocol was tested in labs in Paris, Texas; Athens, Georgia; and Rome, New York.

Colons

Colons can be used to introduce a list, separate independent clauses when the second explains the first, emphasize a word or phrase, or introduce a subtitle.

Colons must always follow a complete sentence (except if a subtitle). Typically use a lower case after a colon unless introducing a quote or series of related sentences.

Examples: This review will cover three topics: *in vitro models*, *in vivo models*, and clinical trials.

This experiment failed: we used an expired reagent.

After four weeks, I received the results of my experiment: success.

The KO mouse model: the next step

Apostrophes

For possessive, singular nouns, add 's.

A cell's nucleus

For possessive, singular nouns ending in s, add '.

The nucleus' chromatin

For plural nouns, add s.

All the cells

For possessive, plural nouns ending in s, add '.

All the cells' nuclei

For possessive, plural nouns not ending in s, add 's.

The nuclei's chromatin

Pronouns have special possessive forms, so do not add an ' or 's.

My, his, its

For joint possession, add possessive form to last noun.

The mouse and rat's gene

When the plural form causes confusion, use 's.

Do's and don'ts

Hyphens

Hyphenate noun-verb and adverb-verb compound modifiers if preceding the noun it modifies, the adverb is not very, and the adverb does not end in -ly.

Wrong: drug induced effects
The effects were drug-induced
Newly-identified enzyme

Right: drug-induced effects
The effects were drug induced
Newly identified enzyme

When combining compound modifiers with the same first or last word, use a suspended hyphen.

Example: drug- and mutation-induced effects
Dose-dependent and -independent effects

Word Choice

Who vs. Whom

Who is used as the subject of the sentence
Whom is used as the object of the verb or preposition

Tip: Replace who/whom with he/she/they or him/her/them in the sentence: if he/she/they is correct, use *who*, if him/her/them is correct, use *whom*

That vs. Who

Who refers to people (preference but not wrong to use that)
That refers to objects

That vs. Which

That conveys essential information and is not preceded by a comma.
Which conveys additional information and is preceded by a comma.

Tip: Think “which” is disposable like a sand-“which” bag.

Wrong: The PCR experiment **which** I ran last week failed.
The experiment, **that** I ran last week, failed.

Right: The PCR experiment, **which** I ran last week, failed.
The experiment **that** I ran last week failed.

Accept vs. Except

Accept means consent to receive something offered or believe as valid/correct – an **Action**
The scientist **accepted** the results.

Except means other than
The scientist did all of the experiments **except** western blot.

Affect vs. Effect

Affect means to make a difference to or move emotionally – an **Action**
This pandemic has greatly **affected** our productivity.

Effect means a result or consequence of an action

Labs were shut down as an **effect** of the pandemic

Use vs. Utilize

Use means to engage with something in order to accomplish a task, achieve a goal, or take an advantage (or to exploit). Used if performing the **intended function**.

I **use** my pen for writing.

Utilize has the same definition but only when the item, process, or situation is employed in a way that goes beyond its intended use. Used if **innovative or novel** or if a nutrient is being taken up and used effectively.

I **utilize** my pen as a bookmark in my notebook.

Tip: Use can always substitute *utilize*, but the reverse is not true.

Compose vs. Comprise

Compose means to make up or to form the basis of

The parts **compose** the whole.

Comprise means to include, contain, or consist of

The whole **comprises** the parts.

Tip: Avoid **comprised of** (means included of); instead use **composed of**.

e.g. vs. i.e.

e.g. is short for *exempli gratia* which means “for example” (think: example given). Use this to list examples.

Pre-built ontologies were used to identify instances of head or brain injuries (**e.g.**, subdural hematoma, traumatic encephalopathy, depressed skull fracture).

i.e. is short for *id est* which means “that is” (think: in essence or in other words). Use to clarify a statement or in place of “aka.”

The Clinical Dementia Rating is used to quantify the severity of symptoms of dementia (**i.e.**, its stage).

Tip: Follow e.g. and i.e. with a comma

Clear and Concise

Starting a Sentence with *This*

Do not use a vague *this* to start a sentence. Instead, be sure the writer includes a noun or explicit statement to which the *this* refers.

Wrong: Alzheimer’s disease is the leading cause of dementia and is characterized by amyloid plaques and tau tangles withing the brain. **This** has prompted researchers to design and develop potential therapeutics.

Right: Alzheimer’s disease is the leading cause of dementia and is characterized by amyloid plaques and tau tangles withing the brain. **This devastating impact of the disease** has prompted researchers to design and develop potential therapeutics.

Empty Words and Phrases

Really, very, quite, extremely, severely, etc. do not intensify – use a thesaurus to find a better synonym

To avoid empty words and phrases, start with the subject of the sentence. (see appendix for sentence starters to avoid)

Wrong: There are more than five hundred people infected with the new Corona virus.

Right: Five hundred people are infected with the new Corona virus.

Redundancy

Avoid using more words than necessary. Check for referents (sneaky repetitions) and repetitions of a concept in an overly wordy sentence. Check for unnecessary doublings (e.g., *and*, *or*). See appendix for a full list of phrasal repetitions.

Wrong	Right
Yang and Yu argued that emotion is necessary and essential.	Yang and Yu argued that emotion is necessary.
Basic fundamentals	Fundamentals
True facts	Facts
Mix together	Mix
Small in size	Small

Clear Subject and Verb in Two-clause Sentences

Even if the grammar is correct, the message of a sentence may not be clear if a subject is missing or ambiguous.

Wrong: The children's parents completed questionnaires and were weighed weekly.

Right: The children's parents completed questionnaires, and the children were weighed weekly.

Nouns and Verbs

Verb Tense

Use present tense for general truths and atemporal facts.

Examples: Microbes in the human gut **have** a profound influence on...
This paper **presents** the results of...

Use past tense for work done, reported results, and observations.

Examples: We **collected** blood samples from...
Jankowsky et al. **reported** a similar decay rate...

Use future tense for perspectives.

Example: In a follow-up experiment, we **will study** the role of...

Count vs. Mass Nouns

Count nouns are discrete, individual entities that you can count and can be singular or plural.

Examples: *Nucleus* vs. *nuclei*
Datum vs. *data*

Mass nouns are uncountable, undifferentiated mass, or collection of material and are singular.

Examples: *Water, research, evidence*

Wrong: Nanoparticles structures, five-weeks-old mice, Bcl-2, and caspase expressions

Right: Nanoparticle structures, five-week-old mice, Bcl-2, and caspase expression

Singular vs. plural verb form with collective nouns can depend on whether you want to emphasize the actions of the collective as a whole or the individual actions of its members. There are also differences between US and UK English (see appendix).

Parallel Structure

Parallel structure is the repetition of a chosen grammatical form within a sentence to provide clarity and enhance readability; it is used when you connect two or more clauses or phrases for coordinating conjunctions, comparisons, or lists.

Wrong: Ellen likes hiking, the rodeo, and to take afternoon naps.

Right: Ellen likes hiking, attending the rodeo, and taking afternoon naps.
Ellen likes to hike, attend the rodeo, and take afternoon naps.

Infinitives

Infinitives are verbal phrases consisting of *to* followed by a verb used as nouns, adjectives, or adverbs. Some verbs require actors prior to the infinitive, some cannot have an actor, and some go either way. See appendix. An infinitive should never be split.

Wrong: The ageing-associated decrease in paravascular recirculation of CSF and ISF is thought to, at least in part, be responsible for the accumulation of amyloid- β in the brain parenchyma.

Right: The ageing-associated decrease in paravascular recirculation of CSF and ISF is thought to be responsible, at least in part, for the accumulation of amyloid- β in the brain parenchyma.

Compound Words

Hyphenated compound words avoid ambiguity or are used as a compound modifier. Hyphenate a modifier or adjective if before a noun (includes numbers + unit as an adjective). Do not hyphenate if after the noun or if it ends in *-ly*.

Examples: English-language learners vs. English language-learners
A well-known study vs. a study that is well known

Close compound words are two individual words that have an entirely new meaning when combined.

Examples: Keyboard, notepad, airport, grasshopper

Closed compound words typically include preposition/adverbs + nouns or compound words with a prefix. Words with prefixes are usually hyphenated if the word after the prefix starts with a vowel. Compound words are usually closed when used as a noun, hyphenated as an adjective, and open as a verb.

Some commonly confused compound words include *never mind*, *altogether*, and *everyday*.

Wrong: Nevermind

Right: Never mind

Compound word	Meaning
Altogether	Entirely
All together	As a group
Everyday	Common place
Every day	Duration or time

Tip: New compound words often start out open or hyphenated and transition to closed. Google it if unsure!

Numbers

Numerals vs. Spelling

Spell the number if used as the first word or if it is less than 10, counted (not measured), and not in a list. Use a comma to separate thousands.

Units

Use abbreviations unless the number is spelled out or if the unit is not attached to a numeric value. No s to make units plural since considered a collective singular. Use 's or s' if time or money used as possessive adjectives. No period unless imperial units (e.g., ft.)

Space between numeral and symbol/abbreviation except for ', ", °, %, and g.

As Adjectives

Hyphenate numeral and unit if used as an adjective or if between numeral and concentration without *of*.

Examples: **Five centimeters** were allowed for spacing. = We allowed **5 cm** for spacing.
 The cells were grown in a **6-well plate** in the presence of **100-nmol/L dipyridyl**.
 The medication was measured in **milligram** doses.
6 months' gestation

Formatting

Italics

Gene names (protein in standard form)
 Algebraic symbols and mathematical constants
 Foreign words (typically Latin phrases, acronyms and abbreviations are standard form) – journal specific
 Titles of books, journals, magazines, movies, etc. that are stand-alone works

Note: If something is supposed to be italics but is within italics, write in standard form

Bolding

Use to add emphasis (in some forms of scientific writing).

Miscellaneous

Prepositions

Prepositions show the relationship between two nearby words (e.g., *on*, *with*, *at*, *from*, *by*, *for*). Avoid ending a sentence with a preposition (i.e., dangling preposition). Instead, rearrange the sentence or use another word.

Wrong: This is the experiment I told you about.
Where are you going to?

Right: This is the experiment we previously discussed.
Where are you going?

Appendix

Commonly used singular-plural words in science

Singular	Plural
addendum	addenda or addendums
analysis	analyses
antithesis	antitheses
appendix	appendices or appendixes
axis	axes
bacillus	bacilli
bacterium	bacteria
basis	bases
criterion	criteria or criterions
curriculum	curricula or curriculums
datum	data
diagnosis	diagnoses
ellipsis	ellipses
erratum	errata
focus	foci or focuses
formula	formulae or formulas
fungus	fungi or funguses
genus	genera or genuses
hypothesis	hypotheses
index	indices or indexes
locus	loci
matrix	matrices or matrixes
medium	media or mediums
nucleus	nuclei or nucleuses
ovum	ova
parenthesis	parentheses
phenomenon	phenomena or phenomenons
phylum	phyla
radius	radii or radiuses
referendum	referenda or referendums
series	series
species	species

stimulus	stimuli
stratum	strata
swine	swine
syllabus	syllabi or syllabuses
symposium	symposia or symposiums
synopsis	synopses
tableau	tableaux or tableaus
thesis	theses
vertebra	vertebrae or vertebrae
vertex	vertices or vertexes
vortex	vortices or vortexes

Infinitives – verbs with and without actors

With Actors	Without Actors	With or Without Actors
Advise	Agree	Ask
Allow	Begin	Expect
Appoint	Continue	(Would) like
Convince	Decide	Want
Encourage	Fail	Need
Force	Hesitate	
Hire	Hope	
Instruct	Intend	
Invite	Learn	
Incite	Neglect	
Implore	Offer	
Order	Plan	
Permit	Prefer	
Remind	Pretend	
Teach	Promise	
Tell	Refuse	
	Remember	
	Start	
	Try	

Empty words and phrases

Phrases to Leave Out

There are / It is...	The fact that...
I believe...	It is interesting to note that...
In my opinion...	It should be pointed out that...
It appears...	

Concise phrases

Wordy Phrase	Concise Phrase
Adequate number of	Enough
As a matter of fact	In fact
At the present time	Now
By means of	By

Due to the fact that	Because
For the purpose of	For
In a timely manner	On time
In spite of the fact that	Despite
Over the duration of	During
Take into consideration	Consider
Until such time as	Until

Phrasal repetitions

Phrasal repetition	Concise phrase
Small in size, large in size	Small, large
True facts	Facts
Basic fundamentals	Fundamentals
Current trend	Trend
Equal to one another	Equal
Evolve over time	Evolve
Consensus of opinion	Consensus
In the year 2020	2020
Component parts	Component OR parts
Brief summary, brief moment	Summary, moment
During the course of	During
Future plans	Plans
Join together, merge together	Join, merge
Joint collaboration	Collaboration
Unintentional mistake	Mistake

Collective nouns – US vs. UK verb form

US English (Singular)	UK English (Plural)
The team usually wins.	They usually win.
The herd migrates in summer.	The herd migrate in summer.
The WWF invites its members to a meeting.	The WWF invite their members to a meeting.