Appendix 4. Prof. Josephy's Writing Tips

Commonly misspelled words

derivative; electrophilic/ hydrophilic/ nucleophilic/ lipophilic (only one "l"); fluor, fluorescent ("u" before "o"); gauge; inoculate (only one "n"); innocuous (two "n" s); naphthalene ("h"s both before and after the "t"); occurs (single "r"); occurring, occurred (double "r"); parallel; phosphorus (element) vs. phosphorous (+3 oxidation state of phosphorus); separate.

"i" before "e", except after "c", or when sounded as "ay", as in *neighbour* and *weigh*:

yield; receipt; freight (but "protein" is an exception to this rule!)

The word "alot" does not exist.

"In close proximity" is redundant, because "proximate" means "close". Incorrect: "The arginine and glutamate residues are in close proximity". Incorrect: "The arginine and glutamate residues are in proximity" or "The arginine and glutamate residues are close to one another".

Frequently confused words

"its" = *possessive case of the pronoun it*; "it's" = *contraction of "it is"*

Compare: "Virtue is its own reward" *vs* "It's a nice day for a walk."

Note: Contractions ("it's", "don't", "can't", etc.) are best avoided altogether, in formal writing!

The nouns *affect* and *effect*:

An *effect* is a result or consequence. "The main effect of the recent recession was a rise in the unemployment rate." (There is also a noun *affect*, but it is rarely used, except in psychology or psychiatry; it means an emotion or mood: "Her affect was subdued because of chronic depression".)

The verbs *affect* and *effect*:

To *affect* means to influence: "The presence of contaminating proteins affected the yield of the ligation reaction."

To *effect* means to bring about, to accomplish: "The implementation of all of our standard operating procedures has now been effected."

(The verb "to affect" also has another meaning: to pretend: "The actor, although English, affected an Australian accent." This meaning is related to the noun "affectation"; you are unlikely to encounter this meaning in scientific writing.)

The nouns *dependent* and *dependant*:

A dependant (noun) is a person supported by another: "The tax credit is made available to the parent and his or her dependants." Dependent (adjective) means *influenced by*: "The rate of the reaction is dependent on substrate concentration."

The verbs *ensure* and *insure*:

To *insure* is to protect against loss: "I have insured my bicycle against theft." To *ensure* is to make certain: "I have ensured that all the campfires have been put out."

***Than* and *then*:**

than (conjunction used in comparisons) vs. ***then*** (adverb describing temporal order)
Correct: The incubator is warmer than room temperature.
Correct: The cells were lysed and then the lysate was centrifuged.

Numerals and units:

In English, we distinguish between things that can be counted (such as books and bricks) and things that cannot, such as a length of time or a weight of sand. The word "fewer" is used in the former case and the word "less" in the latter. Compare: "Our department hired fewer faculty in 2014 than in 2013." *vs* "My laptop uses less power than my desktop computer."

Counting numbers (integers) less than ten should be *written out as words*. "Our book club has 127 members. Seven members serve on the Board of Directors and three on the Newsletter Committee".

If a quantity is *not* a counting number, then it should be written as a numeral: "The temperature is 4 °C"; not "The temperature is four °C". (After all, the temperature might be 4.14 °C, and it would be absurd to write ""The temperature is four point one four °C"!)

A measure is singular, regardless of size. "1 mL of water was added." "12 mL of water was added." (If we write "12 mL of water were added", this would imply that we added 1 mL of water at a time, 12 times!)

The *best* practice is simply to avoid using measures and units as subjects. Instead, use the substance as the subject. Write: "Water (12 mL) was added" rather than "12 mL of water was added." This construction is simpler and it focuses attention where it belongs: on the subject (water) rather than on the measure and the units.

Common Latin abbreviations:

i.e. = id est = that is: "The test is mandatory; *i.e.*, it must be written."
e.g. = exempli gratia = for example: "Many different countries have hosted the football World Cup, *e.g.*, France, Japan, the U.S.A., and Brazil."
et al. = et alia = and others. "The authors of the paper are Wright, Wakabayashi, et al."

Note that "et" is *not* an abbreviation and is *not* followed by a period.

When writing these abbreviations (or other foreign-language terms), it is standard to use *italic* font.
When speaking, it is best to substitute the English equivalent.

Bibliographies

In your bibliographies, **capitalize only the first word of a title - even if different conventions are used in the journal itself** (some journals capitalize every major word of a title, when typesetting a paper). Include volume and page numbers but not issue numbers; do not include "doi" information.

Correct:
Poon, J.C., and Josephy, P.D., Hydrolysis of S-aryl-cysteinylglycine conjugates catalyzed by porcine kidney cortex membrane dipeptidase, Xenobiotica 42: 1178-1186, 2012.

Incorrect (in several ways):
Poon, J.C., and Josephy, P.D., Hydrolysis of S-Aryl-cysteinylglycine Conjugates Catalyzed by Porcine Kidney Cortex Membrane Dipeptidase, Xenobiotica. 42(12): 1178-86, 2012.
doi: 10.3109/00498254.2012.700427.

In a title and at the beginning of a sentence, the first non-Greek letter after a lowercase Greek letter should be capitalized.

Correct: γ-Globulin from the same sample but containing no Cu salt served as copper control.
Incorrect: γ-globulin from the same sample but containing no Cu salt served as copper control.

The same rule applies to numerals:

Correct: 1-Naphthol 2-hydroxylase catalyzes the conversion of 1-naphthol to 1,2-dihydroxynaphthalene.
Incorrect: 1-naphthol 2-hydroxylase catalyzes the conversion of 1-naphthol to 1,2-dihydroxynaphthalene.

The most common grammatical errors that one sees in MCB*6500 papers.

1. Failure to use a comma where it is appropriate (especially after an introductory phrase or clause).

Correct: To start the assay, substrate is added to the enzyme at time t=0.
Incorrect: To start the assay substrate is added to the enzyme at time t=0.

Failure to use commas to set off a nonrestrictive phrase or clause:

Correct: Hemoglobin, which is the body's major reservoir of iron, can undergo autoxidation.
Incorrect: Hemoglobin which is the body's major reservoir of iron can undergo autoxidation.
(Note that, when reading these sentences, you would naturally pause at the comma. In most cases, the written comma corresponds to the pause in speech.)

2. **Unnecessary** (intruding) **commas**; *e.g.*, do not use a comma between a single subject and its verb.

Correct: The recombinant protein will be purified by IMAC.
Incorrect: The recombinant protein, will be purified by IMAC.

3. **Comma splice**: joining two independent clauses with a comma.

Correct: Use a semi-colon: "The enzyme assay was highly sensitive; fluorescence spectroscopy was used for detecting the product". Or, as a better solution, join the clauses with an appropriate conjunction: "The enzyme assay was highly sensitive because fluorescence spectroscopy was used for detecting the product."

Incorrect: The enzyme assay was highly sensitive, fluorescence spectroscopy was used for detecting the product.

3. Failure of **subject-verb agreement**; most commonly, this causes difficulties when a phrase or clause comes between the subject and the predicate.

Correct: Misfolded intermediates of this protein cause cytotoxicity. (The subject is "intermediates" (plural), not "protein" (singular).

Incorrect: Misfolded intermediates of this protein causes cytotoxicity.

4. Failure to **hyphenate compound modifiers.** *Compound adjectives* are two or more words that together make an adjective. When they come directly before a noun, they're known as "compound modifiers" and are usually hyphenated: noise-canceling headphones; blunt-end ligation. The hyphen prevents confusion: would a "public school opening" be the opening of a public school, or the public ceremony opening some other type of school? "Public-school opening" makes it clear that we mean the former, not the latter. (I saw a headline recently that referred to an accident causing "non-life threatening injuries!).

Correct: I will need a wake-up call in the morning. *(Wake-up* is a compound modifier of *call*.)
Incorrect: I will need a wake up call in the morning.

Correct: I need to wake up at 6 a.m. (*Wake up* is a phrasal verb and should <u>not</u> be hyphenated.)
Incorrect: I need to wake-up at 6 a.m.

5. Use a **semicolon**, not a comma, to join two independent clauses separated by a conjunctive adverb. The conjunctive adverbs include **accordingly**, **consequently**, **hence**, **however**, **moreover**, **otherwise**, **therefore**, and **thus**.

Correct: The basement membrane does not contribute to selectivity; however, damage to this membrane leads to proteinuria.

Incorrect: The basement membrane does not contribute to selectivity, however damage to this membrane leads to proteinuria.

Note that each student who makes this particular error will be required to contribute $2 to Dr. Josephy's retirement fund.

Appendix 5. Weaknesses that are sometimes seen in MCB*6500/7500 Research Proposals

1. Conclusions from the published literature are simply stated as received facts, *without explaining the evidence on which they are based*, and *without critical analysis* of their limitations or possible alternative explanations.

A good way to provide an integrated overview of a body of literature is by construction of a "synoptic table", as illustrated below.

2. Findings based on studies of specific biological systems (e.g., particular organisms or cell lines) are presented *without identifying the system used*, and without considering whether the results obtained in that system are more generally applicable.

3. *Teleological* reasoning (see below) is invoked to explain biological phenomena; a sound argument should be grounded in an understanding of natural selection and evolution.

4. The hypothesis is weak; that is, *the hypothesis is almost certain to be true*, and so it does not provide new insight; e.g., "using shRNA to knock down expression of protein X will have an effect on the cell's behaviour" - without defining what the effect is predicted to be.

5. In the proposed experiments, particular experimental systems (e.g., particular organisms or cell lines) are chosen for study, without explaining *why* they were chosen and without considering possible *alternatives*.

6. In describing the proposed experiments, statistical issues are not considered. The proposal should indicate (at least in general terms) how many technical replicates and biological replicates of each experiment will be performed, and how the statistical significance of any effects will be assessed.

7. In the proposed experiments, the student has assumed that all of the techniques and measurements will work as planned; pitfalls and obstacles should be anticipated and possible "work-arounds" and alternatives considered.

8. The significance of the proposed work is exaggerated; unjustified claims are made; e.g. "These results will lead to development of a new form of cancer therapy".

9. The Proposal was not carefully proof-read; there are obvious spelling or typographical errors, missing text, etc.

10. The References were not carefully proof-read; there are missing article titles, journal titles, page numbers, etc.