

Writing Guide for the Schmidt Lab

In conformance with ICMJE *Uniform Requirements for Manuscripts Submitted to Biomedical Journals*, *AMA Manual of Style*, and *Essentials of Writing Biomedical Research Papers, 2nd Edition*

Includes how to use the automatic, standardized formatting provided by the MS-Word template document *Template_for_Manuscripts_Schmidt_Lab.doc*

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Publication Technical Requirements

- Number all the pages of the manuscript consecutively, beginning with the title page. (If not using the template, choose Insert > Page Numbers > Insert number on first page.)
- Double space all text and use wide margins (already set up in template file).
- Use numerals for all quantities, except at the beginning of sentences or headings, or for pronouns (AMA Style; not specified by ICMJE; for journals such as *Cancer Research* that follow the style set by Council of Science Editors, the CSE recommends spelling out zero and one.)
- Check the Instructions for Authors on the target journal’s website for deviations from this Guide, for their accepted acronyms that don’t need spelling out, for length limits for abstracts, running headings, and other sections, and for whether they require a structured abstract with predetermined subheadings. For an acronym example, “RT-PCR” is not a standard abbreviation for the journal *Cancer Research* (whereas PCR is standard).

Note — At this date it is not entirely clear whether acronyms such as ELISA are standard or not, since ELISA not listed by the Journals of the American Association for Cancer Research Accepted Abbreviations and Acronyms (http://www.aacr.org/pdf_files/Accepted_Abbreviations_Acronyms_2004.pdf), but neither is “DNA” listed. Presumably, familiar terms not listed are accepted as standard, therefore ELISA is accepted. This issue is to be determined.

Title

- Try to include all information that will make electronic retrieval of the article both sensitive and specific. This includes the animal and the study design.

Running heading

- Write a contraction of the title, not a completely alternative title.
- Name the variables.
- You may omit the animal.
- You may use abbreviations for brevity.

Abstract

- Keep abbreviations to an absolute minimum.
- Include all important terms for indexers.

- To satisfy all journals, consider including number of subjects and controls, strains, dosages and routes, tumor yields, latent periods, length of observation periods, and magnitude of effects, where it's convenient to do so.
- For clinical trials, include the items that the CONSORT group identifies as essential (<http://www.consort-statement.org/?=1190>), and include the trial registration number at the end (ICMJE).
- Ensure that all concepts and data in the abstract are included in the text.
- For journals using AMA style, give the following when applicable: absolute results for main outcome measures, such as incidence rates rather than relative risks; confidence intervals whenever possible (if not, provide *P* values); the active moiety of a drug at first mention; and the dates of the study. Avoid proprietary names or manufacturers' names unless they are essential to the study.

Figures

- Capitalize each major word in the figure title (AMA style only). Some publications will print the figure title under the figure in sentence style, followed immediately by the legend.
- For photomicrographs, include a scale bar in the image, because the scale will remain correct when resized during the journal production process. Alternatives that might be acceptable include the following:
 - In the legend give the scale as the width of the photograph.
 - Only state the original magnification in the legend, but be prepared to add the final photographic reduction when it's known.
- Ensure digital images have a resolution of at least 350 ppi. Most digital submissions are rejected because of low resolution. To ensure that color will be clinically correct, submit calibrated color proofs along with the digital files.
- For photographs of pathology specimens or micrographs, send sharp, glossy, black-and-white or color photographic prints, usually 127 x 173 mm (5 x 7 inches).
- Submit illustrations as digital files (EPS, JPG, TIF).
- On the title page, include the number of figures and tables. It is difficult for editorial staff and reviewers to determine whether the figures and tables that should have accompanied a manuscript were actually included unless the numbers of figures and tables are noted on the title page.

Figure legends

- For each photomicrograph, explain the internal scale and identify the method of staining. If the original has been enlarged or reduced, note the original magnification.
- Identify all parts, symbols, abbreviations, mathematical expressions, abscissas, ordinates, units, and reference points on the figure. If they're repeated from a previous figure, you can just reference that figure.
- **Shading of bar graphs** – For some journals, such as *Cancer Research*, avoid gray shading or screening. This is not specified in either URM or AMA style. On the contrary, AMA style requests the *opposite*: “Color or shades of gray should be used instead of patterns and cross-hatching (e.g., diagonal lines) on bars.” Unfortunately, one scheme might not suit all targeted journals.
- **Avoid excessive display of significance marks.** A statistically significant result is not always of practical significance. Also if SE bars from an unpaired t-test or multiple comparisons from an ANOVA overlap, then the difference is not statistically significant ($P < .05$). Therefore you do not need to include marks indicating P values on those points.

Note – This *not* true for standard deviation (SD) bars or paired t-tests .

- **Show P values on effects only.** If P values are indicated in a graph, do not show them on the baseline or control or on “no effect;” show them only on an effect. If it's not obvious what's being compared, state it in the legend. Sometimes it might be better to emphasis effect size (such as a correlation coefficient) rather than statistical significance.^[1] For multiple treatments that show no difference, put the value of non-significance in the legend or text, rather than marking it on the figure.
- P is always italicized and capitalized.
- Use the following form of notation and punctuation given in this example: $*P < .05$, $**P < .01$, $***P < .001$; a, tumor + anti-NGF vs. tumor + PBS group; b, tumor + anti-NGF vs. tumor + CL-anti-NGF group; by ANOVA. Data show means and SEM.

Note – The zero is omitted because the number cannot be more than one. Spaces appear on both sides of the “<” mark (in the same way that a space appears between a number and the units of measure—“10 um” not “10um”, as these are separate words.

- Include the number of subjects or samples.

Tables

- Type or print each table with double spacing on a separate page.
- Supply a brief title for each.
- Do not use internal horizontal or vertical lines.
- Place explanatory matter in footnotes, not in the heading. Explain all nonstandard abbreviations in footnotes, and use the following symbols, in sequence: *, †, ‡, §, ||, ¶, **, ††, ‡‡
- Identify statistical measures of variations, such as standard deviation and standard error of the mean (for figures also).

Effective Writing

For guidance on writing English sentences, consult the timeless and very accessible little book on English usage and composition, *The Elements of Style* online and searchable at: <http://www.bartleby.com/141/>

Getting started

- ***Finding your message*** – First, work out what the figures and tables would look like. Give each figure a simple, declarative title in the form of a sentence. Most of the content of the paper should be evident from reading these few sentences alone. When the sentences look as if they both tell a story and have a unified message, it's time to start writing.
- Repeat that single message at the end of the Abstract, in the Introduction, in the Results, and in the Discussion. In contrast, everything else but this single sentence belongs in one section *only*.
- ***Use the template document*** – Start writing in a renamed copy of the lab's template MS-Word document. Or select all your current text and paste it in to the template copy. See the section below named *Using the MS-Word Template to Ease Your Workload*.

Paragraphs

- Pare down and sort your paragraphs so that each paragraph has only one message. Keep it to under 150 words (less than half of a double-spaced page).
- ***Topic sentence*** – State the topic and message of every paragraph in the first sentence (or two). Don't rely on the reader to stay with all the accumulating details without knowing where it's headed. For complicated technical subjects, the structure of a paragraph should be more like watching a movie that starts

with the ending, then plays out the whole story as a flashback, finding out how we got to that known conclusion.

- **Conceptual flow** – State the logical link from one idea to the next. To the reader, the reason for placing one sentence after another is not obvious; you need to indicate how the sentences are related. Use these two primary methods:
 - Use transitional words such as “Because,” “Therefore,” “Furthermore,” “In contrast,” “Nevertheless,” “Although,” “For example,” “As a result,” “Surprisingly,” “First, X... Second, Y...,” “Evidence for this is...”
 - Repeat the key term that links one idea to the next, and repeat it early in the sentence. For example: “Digitalis increases the contractility of the mammalian heart. This increased contractility is a result of changes in calcium flux...”

Figure legends

- Write the legend so as to be understandable on its own, *except* for abbreviations that are defined in the text.
- Use *present tense* only, because you’re describing only what’s seen in the figure.
- Don’t repeat information from the text.
- State conclusions directly (in present tense) in the main figure title only, in the same way as you would for a manuscript title. In descriptions and subtitles, state only what is shown—but results may still be indicated. For example, instead of saying “**B.** Biopsy tissues show strong NGF immunopositivity,” say “**B.** Micrograph showing strong immunopositivity visualized with X stain in a representative tissue biopsy.”

Note – This style of writing as prescribed by Zeiger can be difficult to apply to graphs, especially when word count is important. So consider it to be an ideal to aspire to when possible.

- Avoid saying “ $n = 12$ ” because this could be 12 patients, 12 samples from one patient, or 12 samples from 4 patients. Say “12 patients” or “12 samples.”

Introduction section

- State the known. Then, at the very end, state the unknown, the specific question (or questions) that the experiments answer, and the experimental approach.

- Make it as short as possible. Use no more than one sentence each for the unknown, the question, and the approach.

Materials and Methods section

- When different sets of patients are given different treatments, make it clear whether these are additional patients or a subset of patients, for example, “11 of the 14 patients were given X.”
- State the purpose or reason for any procedure whose relation to the question is not obvious.
- For apparatus and special chemical products such as antibodies, give the manufacturer’s name and address in parentheses (City, State, and Country, if not the U.S.). Identify precisely all drugs and chemicals used, including generic name(s), dose(s), and route(s) of administration.
- Divide subsections based on type of information, such as animal versus clinical. Within subsections, order subheadings chronologically or from most to least important.

Results section

- Use past tense.
- Give the main or most important findings first, and only those pertinent to the question, regardless of whether they support the hypothesis.
- Keep it brief and uncluttered so that the reader can see the forest for the trees.
- State the result first, followed by the supporting data: “X was significantly greater than Y (Fig. 1)”. If there’s no figure, data can appear in this form at the end of the sentence: [94 +/- 3 (SD) vs. 85 +/- 5 mmHg, $P < .02$]. If baseline or control data are reported in a figure or table, you don’t need to report them in the text.
- Avoid relying solely on statistical hypothesis testing, such as P values, which fail to convey important information about effect size. Try to emphasize effect size, rather than statistical significance.^[1]
- Consider summarizing data as mean and standard deviation, rather than standard error, because many readers will misinterpret SE to be an indicator of the variability of the sample, which it is not.
- When summarizing data—if there’s no figure—give numeric results not only as derivatives such as percentages but also as the absolute numbers from which the derivatives were calculated, and specify the statistical methods used to analyze them.

- Present most data in a figure or table, rather than in the text. In the text, don't repeat all the data in the tables or illustrations; emphasize or summarize only the most important observations.
- Indicate the magnitude of an effect by reporting percent change or difference, rather than only absolute values or simply "markedly greater." Avoid qualitative words altogether in the Results section. "Significantly" means strictly "statistically significant," which does not indicate magnitude.
- Avoid nontechnical uses of technical terms such as "random" (which implies a randomizing device), "normal," "significant," "correlations," and "sample" because readers assume these have specific statistical meanings.

Discussion section

- ***In the first paragraph***, state the answers to the questions posed in the Introduction by mirroring the question exactly as it was asked, followed by supporting evidence for each answer. Give the supporting evidence in one or two sentences only, in the form (for two answers): "Evidence for answer A is results X and Y. Evidence for answer B is result Z." At the very beginning, signal the answer by starting with a phrase such as "This study shows," or "Our results indicate."
- Limit the answer to the appropriate population or animal.
- Emphasize the new and important aspects of the study and the conclusions that follow from them. Don't repeat in detail the information given in the Introduction or the Results section.
- Present the most important conclusions and issues first (or in an order dictated by the science), leaving overall impact to the end.
- Separate each new topic or message into its own paragraph, with the first sentence summarizing the point or topic, then follow with supporting evidence and reasoning. Paragraphs that supply only bottom-up reasoning, where the point is only made at the end, are hard to read because the context is not understood from the start. Creating a topic sentence for the beginning of every paragraph allows readers to scan the paragraphs to find and focus on the points of interest to them.
- Explain any results that do not support the answers, discrepancies with others' results, unexpected findings, limitations of the methods, and weaknesses in the study design.

- End with an impact statement emphasizing the importance of the work. Try to avoid simply stating that further studies are warranted. It's stronger to end with a statement of what knowledge you're contributing.

References

- Give direct references to original research sources whenever possible, because review articles don't always reflect original work accurately. On the other hand, extensive lists of references to original work on a topic can use excessive space. Try to discern a small numbers of key original papers that can serve as well as a more exhaustive list.
- Use EndNote, and submit with the manuscript the EndNote library that you used.

Abstract

- Provide a brief context or background for the study, the study's purpose, the basic procedures (selection of study subjects or laboratory animals, observational and analytical methods), the main results (giving specific effect sizes and their statistical significance, if possible), and the principal conclusions or implications—in that order. Emphasize new and important aspects of the study or observations.
- State the question you asked, as in the end of your Introduction. Include only results that answer that question. Give data, if at all, only for the most important results. State the answer to the question, as in your first paragraph of the Discussion.
- Streamline the Abstract by incorporating the details of the experiments into the sentences that state the results found.
- Signal the topics by starting a new sentence for the question, for the results found ("We found that..."), and for the answer. The experiments done may be included in the same sentence as the question.
- Use the same verb tenses as the corresponding sections of the text.
- Keep it as short as possible. Consider every word carefully. You're more likely to impress an editor or reviewer with a clear, concise Abstract. Often your entire manuscript will be judged on the Abstract alone.

Title

- Make sure it's complete, specific, and clear. Unclear titles confuse or mislead readers, and give an annoying first impression.

- Try out different versions of your title on colleagues.
- For writing strong titles, see the examples in Hofmann^[2] Section 15.2, page 328, “Strong Titles,” and Zeiger^[3] page 305, “Hallmarks of a Good Title.”
- Announce only the main variables.
- Put the most important word for that journal first. Use a subtitle only if it’s the best way to put an important word first.
- Don’t be too specific if it will use many words—compact necessary details into a well-chosen category term.
- Omit unnecessary words such as “Nature of,” and “Studies of.”
- If your paper has a strong, unambiguous message, assert the message in a phrase or a complete sentence. Otherwise, give the topic in the traditional form of “Effect of X on Y in Z.”

Key Words

- Select important and specific terms.
- Avoid words that appear in the title—indexers will use both title and keywords together. This policy allows you a broader choice of search terms.
- Avoid general words that apply to a very large number of papers.

Polishing your draft for pre-submission review

In the pre-submission review, further editing might be needed for issues that you haven’t foreseen. The review process will go much more smoothly, and won’t put a strain on others, if the manuscript you hand in is already clear, concise, complete, and professional.

- Review your draft as though you were an outside editor. Is it as well constructed as you can make it?
- Perform structural and prose-style editing to ensure the flow of text is clear, concise, and complete.
- Perform low-level copy editing to conform to publication style and correct English usage.
- Run a comprehensive spell check.
- Double check publication technical requirements. For example, is each acronym defined on its first appearance in the text?
- Review the reference section completely to verify all references.

Words commonly misused

- **That. Which.** *That* is the defining, or restrictive pronoun; *which* is the nondefining, or nonrestrictive pronoun. *That* introduces a clause that must be there for the sentence to make sense, usually by defining the noun or phrase preceding it. *Which* introduces a clause that can be omitted without affecting the meaning of the sentence. Because *which* is usually used as a parenthetical expression, the expression must be enclosed between commas. Example:
 - The car was travelling at a speed that would endanger lives.
 - The car, which was travelling at a speed that would endanger lives, swerved onto the sidewalk.
- From *The Elements of Style*: “The use of *which* for *that* is common in written and spoken language. Occasionally *which* seems preferable to *that*. But it would be a convenience to all if these two pronouns were used with precision. The careful writer, watchful for small conveniences, goes *which*-hunting, removes the defining *whiches*, and by so doing improves his or her work.”
- **Can. May.** Use *can* to describe actions or conditions that are possible. Use *may* only to describe situations where permission is being given. Instead of *may*, consider using *can*, *could*, or *might*.

Using the Microsoft-Word Template to Ease Your Workload

1. Start writing by opening a copy of the Schmidt lab’s template for manuscripts (file name: Template_for_Manuscripts_Schmidt_Lab.doc).
2. Save as a new file name.
3. Start typing, or pasting from a previous document, using the existing “prompt” text as a guide to both content and format.
4. Insert new text into the given paragraphs. This will retain the correct formatting, which has been established by creating and applying *styles*. The formatting has all been done for you.
5. For incorrectly formatted text, manually apply the correct pre-set style. You will rarely have to deal with formatting. When you do, it will only be a momentary selection from a short list of styles. That’s all there is to it.

How styles work

Styles are one of the most important and valuable tools for creating documents in Microsoft Word. A style is a collection of formatting commands that's given a

name so it can be easily accessed and all the formatting it contains applied as a group, in a single click. Better yet, when formatting is applied using styles, changing the formatting throughout a long document means changing it just once in the style itself — then it's automatically changed throughout the document wherever the style has been applied.

Using styles not only reduces work time and fussing with formatting. It also ensures consistent usage for everyone in the lab and conforms to a carefully chosen standard. An editor or supervisor can also easily alter the styles to suit any journals that require something different from the norm. But this style selection will probably satisfy most, if not all, journals.

Using the software interface

1. In Word 2003, click on the [AA] styles icon in the formatting toolbar, or choose Format>Styles and Formatting from the menu bar. A new sidebar window will open, displaying Available Styles. In Word 2007, on the Home Tab look at the Styles Group and click on AA Change Styles.
2. At the bottom of the Styles and Formatting window, use the Show menu to make sure Available Styles is selected. Leave it there.

Warning – Do *not* display Available Formatting, Formatting in Use, or All Styles. Doing that will cause needless confusion. Those other options will show all the other irrelevant manual formatting and other styles that might have accidentally been imported into your document when text from other sources was copied into it. You want to completely ignore those, which will clutter up the display and distract you from your purpose.

3. Once you've ensured that only Available Styles is selected, you don't need to open the Styles and Formatting window again. Simply click on the dropdown menu in the style window of the formatting toolbar, next to the font window. When it drops down it will now display only those few styles you want to use, and it will be very easy to just pick one to apply, at those rare times you need to do so. (In Word 2007, click on a style in the Styles Group.)
4. To apply a paragraph style, simply click anywhere in the paragraph, then select the style. You don't need to select the paragraph.

The styles for your manuscript

These are the only styles you should see:

- Article Title

- Body Text
—first line indented, with no spaces between paragraphs, for the body text
- Other Text
—no indentation, for Abstract, Tables, Legends, Title Page, and References
- Heading 1
—for the main section headings (capitalized)
- Heading 2
—for second level subheadings
- Heading 3
—for third level subheadings, to subdivide second level sections as needed

Note – Following a Heading 1, 2, or 3, the text style automatically returns to Body Text for you.

- Inline heading
—to “tag” paragraphs as desired. This one is a *character style*, instead of a paragraph style, so you must first select the text before applying. Use a period at the end.
- Normal (avoid this one)

Warning – Do not use the Normal style. It has to be there in the list because the other styles are all created from it. (Do not use the Footer style, either.)

- Footer (avoid this one)

Tip – You should rarely need to apply a style because the template already provides each section with the appropriate styles as a prototype for you to start up with. Just replace the prompting text with your own. When you break a paragraph, the next paragraph automatically continues with the same paragraph style for the new paragraph. **Usually you’ll only need to apply a new style when you create a subheading** (Heading levels 2, 3, and inline). Following a Heading, the text style automatically returns to Body Text.

Helpful Hints

Breaking paragraphs

Do not add another paragraph break to create an extra line space. The spacing is all done automatically for you. For original research manuscripts we’ve chosen

indented paragraphs without extra line spaces between them (likely the final publication style), because it's much easier to read in a double spaced manuscript.

To break a line of Body Text without inserting a space, use Shift-Enter.

Using the Word Count automatic tool

In Word 2003: From the Menu bar, choose Tools>Word Count. In Word 2007: In the Review tab, in the Proofing group, click the ABC[123] icon (Word Count)

Pasting an existing draft or passage into the document

To automatically apply the correct style to text you just inserted from another source, simply click on the little Paste Options clipboard icon that appears at the very end of the text you just inserted. Choose Match Destination Formatting.

Working with page breaks

To see the visual indicator of a manually-inserted page break, in Word 2003 click on the Show/Hide icon [¶] on the Standard toolbar. In Word 2007, on the Home tab, in the Paragraph group, click on the Show/Hide icon [¶]

To remove a page break, display it, select it, and delete it.

Some journals want each figure legend on a separate page. To add a page break, in Word 2003 choose Insert>Break>Page Break from the Menu bar. In Word 2007, on the Insert tab, in the Pages group, click on Page Break, or on the Page Layout tab, in the Page Setup group, click Breaks.

Warning – Don't use a section break by mistake. Section breaks are for applying different page formatting to a section, like different margins or headers, and different section page numbering.

Using inline headings

You can either format it manually using ***bold italics***, or select the text and choose the Inline Heading character style. Add a period.

References

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2. Hofmann AH, *Scientific Writing and Communication: Papers, Proposals, and Presentations*. Oxford University Press, 2010.
3. Zeiger M, *Essentials of Writing Biomedical Research Papers—2nd ed.*, McGraw-Hill, 2000.