

Writing a Great Candidacy proposal

The objective of these guidelines is to assist you in preparing an effective candidacy proposal that is clear and focused. Good writing does not save bad ideas, but bad writing kills good ones.

Long before exam day

Ask your fellow graduate students for past examples of successful candidacy proposals. Reading good proposals will give you ideas on layouts and styles that could work for you.

Start thinking of interesting hypotheses leading to projects and experiments that test them. Try to find an appropriate balance between the “sure” (experiments that have a high likelihood of success but still provide new information) and the innovative or risky (experiments that may not succeed but have potential to provide significant new insight). Avoid being too cautious and doing ‘more of the same’. Design experiments to provide new and important information even if the results don’t support your hypothesis. When possible, try to incorporate alternative approaches. Show the reader that you are aware the initial approach may not be successful and that you have a back-up plan.

Discuss your ideas with colleagues. Explaining your ideas will help to clarify and focus them and identify problems. The candidacy document must be your own creation. The supervisor must not edit or revise the document.

General considerations

Everybody is busy, so make your proposal easy to read, with pleasant and attractive presentation. A sloppy presentation is often equated with sloppy science. Examiners that have to struggle with your proposal are likely to be more critical. Clarity and effectiveness of presentation will be criteria for evaluating student proposals. Readers should be able to grasp the important points during a single reading without undue study and re-reading.

Organize your proposal with appropriate headings and sub-headings. Use a simple and obvious numerical classification. For example, Specific Aim 1 may be followed by experimental approaches 1.1 and 1.2.

A good general plan for the research proposal is to set out the goals of the project and present the necessary background in a way that focuses on these goals in the first 3 to 4 pages. The background should provide a concise rationale for a general hypothesis, based on published results. It is important to outline *why* the proposed study is undertaken. Students are strongly encouraged to include diagrams that integrate background, rationale and hypothesis and illustrate the relationships between the various components investigated in the proposal. In the remaining pages, the proposed experiments should be organized as specific aims. Each specific aim should be self-contained with a brief introduction and rationale for the experiments (*i.e.* why are the Aims pursued, why are the experiments chosen). It should include clear statements of how the experiments address the hypothesis.

Each paragraph should begin with a strong lead sentence that is interesting and defines the rest of the paragraph. You should be able to get the sense of a proposal by reading only the lead sentences. The remainder of the paragraph elaborates on the lead sentence. A good lead sentence is more effective than a strong concluding sentence.

Examiners often do their reading in bits-and-pieces. Organize your proposal with this in mind. It can be rather depressing to see dense text without any visual breaks.

Use the first person (I will measure the activity...) and an active voice. Rather than “the enzyme is being inhibited by ATP”, use “ATP inhibits the enzyme”.

Be ruthless when editing your document. Eliminate statements that do not convey anything important. Scientific proposals are not literature; don't use flowery language and rambling sentences.

Do not solely depend on your computer's spell check. “If you can't get the spelling right, you are you expected to get the research right?” Have at least one other person read your proposal for spelling, grammar and logic. When editing your own work, there is a tendency to see what you intended to say, rather than what you actually said.

Avoid the excessive use of abbreviations, acronyms and jargons, especially ones that the non-expert may not understand. If you do use them, define them upon first use. If your proposal contains many abbreviated terms or acronyms, consider adding a table containing the terms and their definitions.

Assume that you are writing for an examiner in a somewhat related field, rather than for an expert directly in your area. Make it easy to read.

Specific considerations

Effective proposals are often divided into the following sections:

BACKGROUND AND SIGNIFICANCE
HYPOTHESIS AND LONG-TERM OBJECTIVES
SPECIFIC AIMS
RESEARCH DESIGN AND METHODS
TIMETABLE

The TITLE of your project is important and sets the first impression. Make it descriptive, specific and reflect the importance of your proposal. A table of contents page can be an effective way to help organize your proposal and to orient an examiner.

BACKGROUND and SIGNIFICANCE: this section should include the big picture, what is known, what is unknown, and why it is essential to find out. Provide a brief outline of the highlights in the background review, including your own contributions, if applicable. Don't drown them in details! You should ask yourself whether each bit of background information is needed. Critically evaluate the relevant literature: this should not be an exhaustive or uncritical list. When a controversy or disagreement exists, discuss fairly all sides. Identify the gaps and

contradictions that you will address. Link these into the rationale for your proposal. Emphasize how your proposal bridges the background review and your hypothesis and objectives. State clearly what is novel, and what is merely confirmatory. This section should not exceed half the allotted pages (and is usually 1/3).

HYPOTHESIS and LONGE-TERM OBJECTIVES: begin with your stated hypothesis and link it to your long-term objectives. Make these concise and specific. Ask yourself what the proposed research is intended to accomplish and what its significance and relevance are?

SPECIFIC AIMS: distinguish these from your hypothesis and objectives. These are the specific projects or studies you will undertake as part of your long-term objectives. Put your specific aims in a logical and sequential order. Indicate the priority you assign to each one.

RESEARCH DESIGN and METHODS: the SPECIFIC AIMS have stated what you propose. Now, you must describe how you propose to achieve them. Consider a brief opening paragraph describing the relationship of the Specific Aim to the Objectives and a one-sentence rationale. Follow this with an outline of the design and methods. Explain why the proposed approach was chosen. Don't repeat descriptions of identical procedures that apply to more than one Specific Aim. Reference, but don't describe well-known or standard procedures. Do describe procedures that are new or unlikely to be known to one or more examiners. For a new method, explain why it is better than a more traditional one. Discuss relevant control experiments; this is too often lacking. Explain your data collection and analysis, the expected outcomes and your interpretation. What conclusions do you expect to be able to draw? Be sure to briefly discuss potential pitfalls and limitations of the proposed procedures and to provide alternative approaches. This may pre-empt serious criticism. Students are expected to employ methodologies that will actually work if the experiments were to be undertaken. Techniques and instrumentation must be relevant to what is proposed. The student can assume that s/he will have access to any existing, published reagents, constructs, antibodies, etc., and these must be properly referenced; the proposal shall include a description of the generation of any other materials required for the proposed experiments.

The proposal is expected to meet the same scholarly standards that apply to published research papers, as is customary for all original student documents. The sources supporting all statements in the proposal concerning facts, reagents or ideas obtained from the literature must be referenced with primary research papers or review articles; the references, with full authorship and title, must provide direct and accurate support. Database sources and accession numbers must also be included for nucleotide and protein sequences. Any text copied from another source must be set off in quotation marks, and the source must be referenced.

TIMETABLE: provide a brief tentative sequence and timetable for the project. Although not essential for a candidacy proposal, thinking about timelines can alert you to issues pertaining to feasibility. Your proposal should be feasible by yourself and a laboratory technician in three to five years. Many candidacy proposals include a lifetime of work and are unrealistically ambitious.

(We wish to thank the Department of Biochemistry for their input in creating this document.)