



Review #2

Proposal Number:	1601083
NSF Program:	EVOLUTIONARY GENETICS
Principal Investigator:	Cahan, Sara I
Proposal Title:	DISSERTATION RESEARCH: Is proteome stability important in shaping thermal limits? A test in the North American forest ant genus <i>Aphaenogaster</i> .
Rating:	Good

REVIEW:

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

Strengths. Cahan et al. propose to evaluate the molecular basis of thermal tolerance in a group of ants whose phylogenetic history has recently been reconstructed. This work is also important because of the interest in climate warming, population expansions along latitude gradients, etc. Much could be learned by examining these ants in greater detail. For these reasons, the work they propose is timely.

Weaknesses. My main concerns are illustrated below under "solicitation-specific review criteria". It's not immediately obvious to me that proteome stability can only result from thermal tolerance (and not some other correlate of latitude in eastern North America). Other concerns about the research include an objective focusing on molecular mechanisms of acclimation and adaptation, when very little in the proposal discusses molecular mechanisms beyond rough descriptions of

protein structure. Although a minor point, I disagree with the statement that direct fitness measurements are difficult to obtain in long-lived species, such as ants. Many groups in the US (and the world) have been measuring fitness in ant colonies (field and lab) for years. As a result, it would be possible to investigate the links between warming, proteomes and fitness.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

Strengths: Nguyen will be exposed to new techniques in proteomics.

Weaknesses: Broader Impacts are barely addressed in a concrete fashion. While a DDIG is a form of BI, I was surprised that the PIs did not develop a brief plan -beyond generalities- for getting the general public excited if not involved about science and/or the research project.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

While this group is currently capable and equipped in carrying out this work, it is not clear that a DDIG is the place for this work to be funded. For example, although this work builds on the dissertation project conducted by Co-PI Nguyen, it will potentially take the work well beyond the confines of a dissertation. As a result, it would take considerably more work than the work proposed here to tease the factors apart that may stabilize proteomes. In other words, the proposed work does not appear to be a capstone on a dissertation or well integrated in a dissertation, but resembles an exploratory project for a post-doctoral grant or a standard NSF grant proposal.

Summary Statement

Although the work was innovative, I was not convinced that this work would essentially provide a capstone on an otherwise excellent dissertation. Broader impacts were poorly developed. As a result, I give the proposal a rating of Good.

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