# Writing exercise S09: Discussion sections

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The key to writing a good discussion section is to put your results into context without being overly repetitive (you’ve already stated your results in the results section). You will want to indicate the potential future directions, implications, and significance of your results.

The following partial discussion section [reproduced from Hart, Elizabeth M et al. “The conserved σD envelope stress response monitors multiple aspects of envelope integrity in corynebacteria.” *PLoS genetics* vol. 20,6 e1011127. 3 Jun. 2024, doi:10.1371/journal.pgen.1011127] has been annotated to indicate what was previously known, what was shown in this work, and implications/significance of the work, with commentary where necessary.

Discussion

The mechanisms required for proper cell envelope biogenesis in the Mycobacteriales order of bacteria remain poorly understood, including those involved in the transport of proteins to the MM and their assembly within this outer envelope layer. We therefore set out to identify factors involved in the assembly of MOMPs in the MM by screening for *Cglu* mutants with reduced levels of PorH exposed on their surface. Mutants inactivating the σD envelope stress response were among the strongest hits in the screen. Although this result did not reveal a discrete set of components involved in MOMP assembly in the MM as we had hoped, it provided us with an opportunity to address outstanding questions related to the regulation of the σD response.

MarP is the site-1 protease of the σD pathway

Prior work investigating the σD response in mycobacteria revealed that RsdA is the anti-sigma factor and that the site-2 protease that helps release σD from RsdA to activate it is Rip1 [[23](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.ref023),[24](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.ref024)]. However, the identity of the site-1 protease that initiates the RIP cascade has remained unknown. Our results provide strong evidence that MarP serves this function. Mutants lacking MarP were hits in our screen along with those inactivated for *sigD* and *rip1* ([**Fig 1D**](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.g001)). Cells deleted for *marP* are also defective in the activation of a σD responsive promoter upon exposure to inducing conditions such as EMB treatment or the inactivation of *pks* (**Figs**[**3C**](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.g003)**and**[**S6**](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.s006)). Furthermore, immunoblotting revealed that RsdA processing is blocked in Δ*marP* cells following EMB treatment ([**Fig 3D**](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.g003)). Thus, the likely signaling cascade for σD activation involves the sequential processing of RsdA by MarP and Rip1 followed by its final cleavage by ClpXP to release σD to transcribe its regulon ([**Fig 2A**](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.g002)) [[75](https://pmc.ncbi.nlm.nih.gov/articles/PMC11175481/#pgen.1011127.ref075)].

### Exercise A.

Read and annotate the discussion section of a paper (You might continue annotating the rest of the discussion from the Hart et al. paper, or pick another paper of your choosing):

1. Where and how do the authors repeat their results?
2. Where and how do they refer to other literature?
3. Where and how do they speculate about future directions/implications of their work?

### Exercise B.

Think about the key points from your own results section – how can you put them into context of the literature? Are there potentially other interpretations of your data?

Write an outline of the key points that you think are important for your discussion section.