Southern California Branch of American Society for Microbiology

SCASM 2021

RESEARCH POSTER SESSION

Date: October 9, 2021
Location: Online (Zoom)
Deadline for Abstract Submission:
5:00 PM (PST) on Wednesday, September 8, 2021

WHO SHOULD SUBMIT AN ABSTRACT?

The discipline of microbiology is highly diverse, and encompasses many specialized areas, which include but are not limited to, **clinical, ecological, environmental, industrial infectious disease immunology, marine, pharmaceutical, and public health microbiology.** Undergraduate, graduate or post-baccalaureate students, and trainees who are participating in research projects pertaining to any of these specialized areas of microbiology are encouraged to submit an abstract.

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Student Participation Benefits

- All poster presenters will receive an official certificate of participation.

- Attend thought-provoking talks pertaining to microbiology, career development and networking with other microbiologists.

Student Awards

- Total of **3** awards, 1 travel grant (1st prize) and 2 free ASM Student Memberships (2nd. and 3rd prize). The winner of the 1st prize will be asked to record a brief testimony for streaming at the Annual SCASM Fall Meeting on October 23, 2021.

- The travel grant will be awarded to attend and present the poster at the national Annual General Meeting of the American Society for Microbiology (ASM) Microbe conference to be held in Washington, D.C. on June 9 - 13, 2022. The total value of the award is up to **$1500**, toward conference registration and expenses accrued for travel, lodging, and food. In the case that the meeting will be virtual, the travel grant will cover the registration fees only. The trip will be **reimbursed** after the travel or virtual meeting has occurred with the appropriate itemized receipts provided to the SCASM Treasurer.

Judging Criteria

- Criteria for poster judging are listed on the poster evaluation form on page **(7)**.
- The top five posters will be selected for a live presentation at the SCASM Virtual Student Meeting. Based on the scores obtained from the live presentation the best presenter will win the travel grant award. The presenters with the 2nd and 3rd highest cumulative scores will win the ASM Student Memberships.
- There will be judges representing various areas of microbiology. Judges will include microbiology educators/researchers and post-doctoral fellows from academic institutions in Southern California.
- In the event of a tie, the winner(s) will be determined by the votes of 3 alternate judges.

Abstract Guidelines

- Abstracts must be typed in a 12-point font size, with a word limit of 350.
- Abstract must be submitted using the abstraction submission form on page **(6)**.
- Abstract must include the following: title, author including the principal investigator(s), affiliated institution(s), introduction, objectives, methods, materials, results and conclusion(s).
- The reason for the study or how the study came about (e.g., hypothesis, discovery or central question) should be clearly stated.
- Data must be included and must support the stated conclusion(s).

EXAMPLES OF ABSTRACTS THAT MAY BE REJECTED

- Abstracts that are general descriptions of a new product.
- Abstracts that read like advertisements.
- Abstracts that describe future studies.
- Abstracts that do not include data.

*Please see page **(8)** for an example of an acceptable abstract*

ePoster Guidelines

- Poster must include the following sections: title, author including the principal investigator(s), affiliated institution(s), introduction, research question/hypothesis, objectives, methods, materials, results, conclusion(s), acknowledgment(s). Reference(s) section is optional.

  *Please see page **(7)** for the poster judging rubric and page **(9)** for an example of an acceptable poster*

Presentation Guidelines for the 1-minute Poster Presentation Video

- The "1-minute elevator pitch" is an opportunity to quickly and compellingly share the highlights of your poster. This presentation is a scorable item and the selection of the top 5 posters for the live presentations will be influenced by your 1 –minute elevator pitch.

Use the following links below for tips on preparing a quick elevator speech.

https://www.software.ac.uk/home/cw11/giving-good-lightning-talk

Abstract Submission Form

- **Deadline** for abstract submission is at **5:00PM (PT)** on **Wednesday, September 8, 2021.**
- **No more than 3 abstracts per PI/lab can be submitted.**
- **No co-presenters are allowed.**
- Abstract submission forms received after the deadline will be automatically rejected.
- **Notification of abstract acceptance** and invitation to submit an eposter and recorded 1-minute poster presentation video will be sent by email on **Monday, September 13, 2021.**
- **ePoster and 1-minute poster presentation video** must be uploaded by **5PM (PT)** on **Monday, September 27, 2021.**
- Selection of the 5 live presenters will be announced by email by **Friday, October 1, 2021.** Presentation instructions and the evaluation rubric will be sent at that time. The live presentations will be recorded and streamed at the SCASM Annual Fall Meeting on October 23, 2021.

Please use the following link to submit an abstract.

➢ **https://forms.gle/6qLfemnQpkw2zb7C9**

For questions regarding abstract submissions please email:

Edith Porter, MD
Associate Chair and Professor of Microbiology & Immunology
Department of Biological Sciences
California State University, Los Angeles
Email: eporter@calstatela.edu

ePoster and Poster Presentation Evaluation Form

Judge's Name: _____
Poster Category (check box): ☐ Undergraduate ☐ Graduate/Post-baccalaureate
Poster Number: _____
Poster Title: _____

1= Poor, **2**= Fair, **3**= Good, **4**= Excellent, **5**= Outstanding

REVIEW CRITERIA	Please circle the score for each category				
Abstract – includes summary of pertinent details according to poster abstract guidelines.	1	2	3	4	5
Introduction and Statement of the Research Question/Hypothesis – clearly states the research question/hypothesis with appropriate background to the bigger picture.	1	2	3	4	5
Objectives – are clearly stated and addressed by the experimentation.	1	2	3	4	5
Methodology – methods/techniques are appropriate and properly applied.	1	2	3	4	5
Results – logical, clearly presented, and appropriately summarized.	1	2	3	4	5
Conclusions, Future Research – based on given results, emphasizes significance and possible implications of study.	1	2	3	4	5
Overall Organization of Poster – graphics, photographs, other visual aids, and text are well prepared, clean, free of errors, and appropriate for the presentation, acknowledgements included.	1	2	3	4	5
1-minute elevator pitch – engaged presentation that reflects the poster and is free of jargon.	1	2	3	4	5
Total Score					

Example of an Acceptable Abstract

Effect of the antimicrobial peptide hBD-2 on flagellin gene expression in *Pseudomonas aeruginosa*

Brent Beadell[1], Kevin Parducho[1], Mabel Bush[1], and Edith Porter[1]
[1]Department of Biological Sciences, California State University Los Angeles, Los Angeles, CA 90032

Introduction: The ubiquitous Gram-negative rod-shaped motile bacterium *Pseudomonas aeruginosa* (PA) is an opportunistic pathogen that causes infection in the airways primarily in immunocompromised individuals. PA is known for its multitude of resistance mechanisms against antibiotics. One of the key mechanisms of resistance stems from its ability to form biofilms on host epithelial surfaces limiting the diffusion of antibiotics. Biofilm production is regulated by quorum sensing and involves early cessation of flagella expression followed by an upregulation of exopolysaccharide production. In immunocompetent individuals, likely due to their epithelial cells mounting effective immune responses, PA typically does not form biofilms. Preliminary data from our laboratory indicate that the epithelial antimicrobial peptide, human β-Defensin-2 (hBD-2), reduces biofilm production possibly through quorum sensing interference. We hypothesize that if PA biofilm inhibition occurs in the presence of hBD-2 via quorum sensing, then flagellin gene expression should be upregulated paralleled with a down regulation genes involved in biofilm production. **Objective:** This study aimed to quantify the relative expression of *pslA*, a gene involved in exopolysaccharide synthesis, and *flgF*, a gene coding for flagellin, in PA after exposure to varying concentrations of hBD-2. **Methods:** Mid-logarithmic growth phase PA was incubated at ~ 2 × 10^8 CFU/mL in 10% MH / 140 mM NaCl in the presence and absence of 0.25 and 0.5 microM hBD-2 for 2 h. Thereafter, bacteria were dislodged by addition of 1 mm glass beads and 10 min vortexing. This was followed by RNA extraction, cDNA synthesis, and real time PCR with SYBR Green technology probing for the target genes *pslA,* and *flgF* and the housekeeping gene *gapA*. **Results:** *flgF* gene expression was over 50 fold times increased by both, 0.25 µM and 0.50 µM hBD-2 treatments and *pslA* gene expression was increased 2 -3 times compared to the solvent control. **Conclusion:** If confirmed, the substantial increase in flagellin gene expression in the presence of hBD-2 would be consistent with biofilm inhibition of PA through a quorum sensing pathway. Understanding the antimicrobial peptide mediated interference with biofilm could lead to novel clinical treatments against biofilm forming microbes, in particular PA.

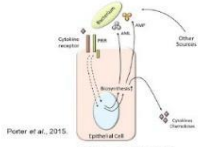
Example of an Acceptable Poster

Effect of the Antimicrobial Peptide hBD-2 on Flagellin Gene Expression in *Pseudomonas aeruginosa*

Brent Beadell, Kevin R. Parducho, Mabel Bush, and Edith Porter,
Department of Biological Sciences, California State University Los Angeles, Los Angeles, CA 90032

INTRODUCTION

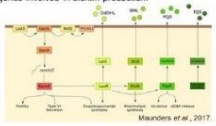
- The ubiquitous Gram-negative rod-shaped motile bacterium *Pseudomonas aeruginosa* (PA) is an opportunistic pathogen that causes infection in the airways primarily in immunocompromised individuals (CDC 2018).
- PA is known for its multitude of resistance mechanisms against antibiotics. One of the key mechanisms of resistance stems from its ability to form biofilms on host epithelial surfaces limiting the diffusion of antibiotics.
- Biofilm production is regulated by quorum sensing and involves early cessation of flagella expression followed by an upregulation of exopolysaccharide production. In immunocompetent individuals, likely due to their epithelial cells mounting effective immune responses, PA typically does not form biofilms (Bassetti et al 2018).
- One of the first lines of defense against PA is found in the innate immune response involving the release of antimicrobial peptides (AMPs) by epithelial cells and phagocytes.
- Preliminary data from our laboratory indicate that the epithelial antimicrobial peptide, human β-Defensin-2 (hBD-2), reduces biofilm production possible through quorum sensing interference.
- Our laboratory is interested in exploiting these AMPs and AMLs for use in novel vaccine and drug creation against PA.



Porter *et al.*, 2015.

HYPOTHESIS

- If PA biofilm inhibition occurs in the presence of hBD-2 via quorum sensing, then flagellin gene expression should be upregulated paralleled with a down regulation genes involved in biofilm production.


Maunders *et al.*, 2017.

OBJECTIVE

- This study aimed to quantify the relative expression of pslA, a gene involved in exopolysaccharide synthesis, and flgF, a gene coding for flagellin, in PA after exposure to varying concentrations of hBD-2.

EXPERIMENTAL APPROACH

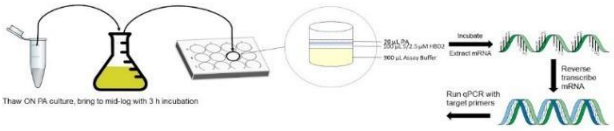
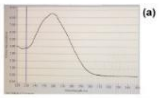


Figure 1. Experimental assay set up. *Snap frozen PA cultures were brought to mid-log phase followed by subsequent incubation with varying concentrations of hBD-2 in 10% Mueller Hinton in 140 mM NaCl for 2 h before RNA extraction was performed for eventual gene expression analysis*


(a)

Sample ID	ng/µL	A260	A280	260/280	260/230
0.001% AA - 1	304.14	7.603	3.596	2.11	2.27
0.001% AA - 2	199.02	4.975	2.291	2.17	2.27
0.25 uM - 1	339.71	8.493	4.100	2.07	2.27
0.25 uM - 2	298.42	7.461	3.564	2.09	2.18
0.50 uM - 1	299.51	7.488	3.630	2.06	2.18
0.50 uM - 2	308.08	7.702	3.631	2.12	2.18

(b)

Figure 2. Representative RNA samples concentration and purity after extraction. *After subjecting sample wells to vortexing with 1 mm glass beads to dislodge biofilm cells bacterial RNA was extracted with Qiagen RNeasy Minikit and treated with TurboDNAse to remove genomic DNA contamination. **(a)** illustrates a representative sample of RNA absorbance curve measured with Nanodrop. **(b)** shows representative concentration and purity nanodrop data collected for all extracted RNA samples from one experiment.*

RESULTS

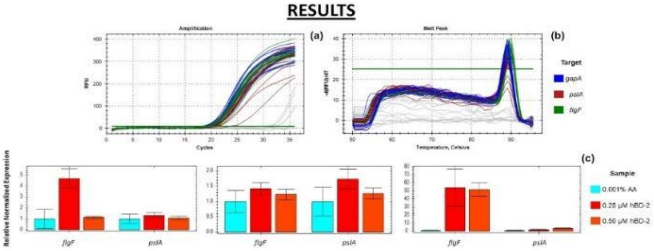


Figure 3. PCR with target primer amplification and relative normalized gene expression. ***(a)*** *Representative image of PCR amplification results with target primers from one experiment. **(b)** Shows the corresponding melt curve associated with the amplification curve. **(c)** Relative normalized gene expression of flagellar basal body gene flgF and biofilm exopolysaccharide associated gene pslA. Shown are data from 3 separate experiments each conducted in duplicates. Upregulation of flgF expression can be seen across all experiments.*

CONCLUSION

- This data suggests an increase in the gene expression of flagella related genes in the presence of hBD-2 consistent with biofilm inhibition of PA through a quorum sensing pathway.
- Additional later time points are needed to better assess the effects of hBD-2 on the exopolysaccharide production which normally follows the secession of flagella expression.
- It might be worthwhile to probe other gene targets associated with the planktonic versus biofilm state in PA cell differentiation.
- Western blots targeting the biofilm regulator RsmA could help further elucidate an interference of hBD-2 with biofilm formation in PA.

SIGNIFICANCE

- This research may help understand how to utilize HBD-2 and for generating novel vaccines through induction of its expression and therapeutic drugs exploiting its mode of action against PA .

REFERENCES

- *Pseudomonas Aeruginosa in Healthcare Settings | HAI |CDC*. 9 Mar.2018, https://www.cdc.gov/hai/organisms/pseudomonas.html.
- Bassetti, Matteo, *et al.* "How to Manage Pseudomonas Aeruginosa Infections." *Drugs in Context*, vol. 7, May 2018. doi:10.7573/dic.212527.
- Porter *et al.* "Antimicrobial Lipids: Emerging Effector Molecules of Innate Host Defense." *World Journal of Immunology*, vol. 5, 51-61, 2015. doi: 10.5411/wji.v5.i2.51.
- Maunders, Eve, and Martin Welch. "Matrix Exopolysaccharides; the Sticky Side of Biofilm Formation." *OUP Academic*, Oxford University Press, 12 June 2017, academic.oup.com/femsle/article/364/13/fnx120/3866592.

ACKNOWLEDGEMENTS

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