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Paul Reynolds
Brigham Young University

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RAGE and SAGE: Therapeutic Modalities for COPD

JUNE 25, 2019 BY ADMIN

Paul Reynolds, Physiology and Developmental Biology

Academic Objectives Met and Results Observed

Funding available through this MEG award has provided an opportunity for me to meet many academic objectives I’ve determined to be important at BYU. We have been successful in conducting pilot studies that reveal possible roles for SAGEs in ameliorating mechanisms of lung inflammation induced by and cigarette smoke (CS). Despite improvement in personal air quality during the past few decades, the rationale for studying mechanisms leading to adverse health effects remains important. This MEG award specifically provided opportunities for students to conduct meaningful research that led to the observation that alveolar epithelial cells and bronchiolar epithelial cells experience elevated inflammatory signaling following exposure and that SAGEs may be effective in attenuating inflammation via RAGE abrogation.

I am happy to report that there are clear research directions now possible due to the initial work made possible by this MEG award. In fact, funding of this award made it possible to gather important preliminary data that have been used to successfully obtain and external research grant on the subject matter.

Mentoring Environment

Funding available through the MEG program, and specifically the award I have received in 2016, has allowed for the generation of a more successful mentoring environment. I currently provide mentoring experiences for 24 undergraduates. The students in my lab will continue to be assembled in strata of varying degrees of experience. For example, the students currently working in the lab are committed for an average of about two years. They will be invaluable in the instruction of students that enter the lab during the current year. My goal is to layer the students in such a way that experienced graduate and undergraduate students lead teams of newer individuals so that both mutually benefit. As students progress, they learn not only the methodology of the required techniques, but valuable troubleshooting skills, the ability to technically address scientific questions, and insight regarding how their specific research integrates into pulmonary biology as a whole. In addition to one-on-one and small group interactions with me as the faculty mentor regarding specific research issues, regularly scheduled laboratory meetings and broader discussion groups will continue to aid significantly in the development of these students. Research conducted in this type of mentoring environment will not only buttress their broad BYU undergraduate education, but it will also enhance the students’ motivation and opportunity for continued professional and graduate training at prominent research institutions.

Students Involved and Academic Deliverables

Since receiving this MEG award in 2016, I have mentored 29 undergraduate students within the PDBio department and 9 others in the MMBio, Chem Engineering, and Chem/Biochem Departments. Undergraduates performing research in our labs combined to coauthor ten peer-reviewed manuscripts. Furthermore, 36 undergraduate students have been co-authors on abstracts submitted for presentation at national and international scientific conferences. Five additional manuscripts are in various stages of review or preparation. Lastly, there has been a high rate of success relating to professional schools admission by students that have worked or are currently working in the lab. I anticipate similar success from lab alumni in the future.
Undergraduates:

Publication co-author

1. Black CS
2. Bodine JS
3. Broberg DS
4. Chapman S
5. Dunaway DM
6. Egbert KM
7. Fronk C
8. Gassman JR
9. Gibbs JL
10. Hall PD
11. Harrison ME
12. Jordan C
13. Kimbler B
14. Lewis AL
15. Macdonald JR
16. Maek M
17. Meija C
18. Merrell BJ
19. Milner DC
20. Monson TD
21. Munoz SA
22. Nelson SM
23. Ogden KC
24. Ostergar A

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25. Rayburn ST
26. Salehi ASM
27. Scott D
28. Taylor OJ
29. Trumbull AM
30. Witt JE
31. Wooton DJ
32. Wright TJ

Abstract co-author

1. Bodine JS
2. Broberg DS
3. Caskey B
4. Chapman S
5. Clark JC
6. Davis T
7. Dunaway TM
8. Egbert KM
9. Franson L
10. Hall PD
11. Kimbler B
12. Knowlton N
13. Mejia CA
14. Mejia CF
15. Mella N
16. Milner DC
17. Monson TD
Budget Expenditures

The expenses for the project are categorized as undergraduate travel/salaries and lab supplies. Specifically, about $5,000 has been spent to offset undergraduate travel expenses incurred in relation to the meetings cited above. Approximately $6,000 has been spent on salaries and the remainder, $9,000, on lab supplies necessary for the completion of the work.