Former StARR scholar Elizabeth "Ellie" McGinn, MD, awarded K38 grant

Elizabeth "Ellie" McGinn, MD, former StARR scholar (2022), and pediatric critical care fellow, was awarded an NIH Stimulating Access to Research in Residency Transition Scholar (StARRTS) K38 grant for her project, 'The Role of Developmental Dysanapsis Throughout the Lifespan in Experimental Bronchopulmonary Dysplasia.' The NIH Stimulating Access to Research in Residency Transition Scholar (StARRTS) K38 grant is designed to support early-stage clinician-scientists during their residency or fellowship training who have completed 1-2 years as a R38 scholar. Dr. McGinn will receive nearly $170,00 over the next two years to support research supplies and professional development activities, including travel to attend workshops and conferences. Dr. McGinn will be paired with mentors during her project who will support her research and career development.

Dr. McGinn provided additional details regarding her project, mentors, and career goals:

What will you be studying with this K38 grant funding?

Bronchopulmonary dysplasia (BPD), the chronic lung disease following preterm birth. BPD is the most frequent complication of prematurity. Infants who develop BPD have substantial early mortality and life-long cardiopulmonary disease; however, mechanisms that cause sustained life-long abnormalities of lung development after premature birth remain poorly understood. Current clinical management of BPD relies on identifying distinct phenotypes affecting the lung compartments: airways, parenchyma, and vasculature. Recent evidence shows that the chronic respiratory failure of BPD may be due to non-synchronous, disproportionate growth of these compartments and may reflect dysanaptic growth in BPD. Dysanapsis is the concept of disproportionate airway and distal lung growth and has recently re-emerged as an important and clinically relevant concept in understanding lung physiology, disease susceptibility, and pathogenesis.

During my time in the R38 Program, I utilized a preclinical model of chorioamnionitis-induced BPD to demonstrate dysanapsis in infant rats after a single antenatal exposure, indicated by spirometry patterns and decreased airway diameters, alveolar surface area, and parenchymal-airway attachments. Given that vascular growth parallels alveolarization during lung development, disruption of airway-airspace growth likely implies disrupted growth of the vasculature, however it remains unknown whether airways, parenchyma, and vasculature have parallel dysanaptic growth in this experimental model. Postnatally, infants with BPD have increased susceptibility to recurrent respiratory infections, but it is

unknown whether dysanapsis affects the long-term trajectory of lung function, and whether dysanapsis in BPD increases lung impairment with postnatal respiratory exacerbations due to impaired peak lung function or accelerated decline in trajectory. This proposal aims to address these knowledge gaps.

How will this help us understand a human disease/condition or help develop a new treatment?

There is growing evidence supporting the perinatal origins of lifelong respiratory disease, aligning with the developmental origins of health and disease hypothesis. Lung function tracks along consistent percentiles from infancy, through childhood, and into adulthood. Understanding risk factors and lung function trajectories will help us treat infants with BPD and understand the development of lifelong lung diseases with significant associated morbidity, including asthma and COPD.

What kind of career development will this grant help you with?

This proposal will help by addressing the current gaps in my skillset and knowledge base through a combination of hands-on research training, didactics and coursework, conferences, and development programs. I am particularly excited to take advantage of some of the courses through the University of Colorado Denver Anschutz Medical Campus, including Statistics for the Basic Sciences and Scientific Writing.

How did the R38/Starr program help you get this grant?

I was initially hesitant to add a year to my residency training, but I can honestly say that participating in the StARR program changed the trajectory of my career. Adding a dedicated year to developing research skills and spending time in the lab was crucial to my development as a physician-scientist.

If your project is successful, where will this lead you next?

My overarching career goal is to optimize lifelong pulmonary health outcomes in children with Bronchopulmonary Dysplasia (BPD) by identifying lung function trajectories based on BPD phenotypes and the impact of severe lung injury episodes during childhood. I would like to develop skills in clinical and translational research to eventually implement true "bench to bedside" research.

What else should we know and would you like our audience to know?

I am incredibly grateful to my mentorship team in the lab—Drs. Erica Mandell, Bradford Smith, Steve Abman, and Christina Sul— for their expert guidance. I would also like to thank the Department of Pediatrics and Dr. Adam Rosenberg (Pediatric Residency Program

Director) for supporting me as the first pediatric resident to participate in the R38 StARR Program. I couldn't be happier to have continued training at the University of Colorado as a Pediatric Critical Care Medicine fellow, and am so grateful to Dr. Ryan Good (PCCM Program Director) and Dr. Eva Nozik (PCCM Section Head) for supporting me in my application and pursuit of the K38 StARRTS Program.