

FIRST PERSON

First person – Eryn Dixon

First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping early-career researchers promote themselves alongside their papers. Eryn Dixon is first author on 'GDNF drives rapid tubule morphogenesis in a novel 3D *in vitro* model for ADPKD', published in JCS. Eryn is a PhD Student in the lab of Owen M. Woodward at the Department of Physiology, University of Maryland, Baltimore, MD, investigating the responses of epithelial cells to disease and injury, and how these signaling changes ultimately affect renal physiology.

How would you explain the main findings of your paper in lay terms?

In this Tools and Resources paper, we present a new model system that generates kidney tubule-like structures in a dish. We focused on the optimization of this protocol to make it easy and cheap to implement in any research laboratory, finding that a combination of primary kidney cells and a growth factor cocktail supported tubuloid formation. Our proof-of-principle experiments for this new system demonstrate how it can be applied to look at proximate changes in epithelial cells following genetic perturbation of *Pkd2*, a gene whose loss of function is known to cause autosomal dominant polycystic kidney disease (ADPKD). Importantly, this methodology also welcomes opportunities for the expansion of its applications to other genetic diseases of the kidney and tubular disorders.

Were there any specific challenges associated with this project? If so, how did you overcome them?

The biggest challenge in developing a new tool or model system is having to troubleshoot with few references or standard practices. It is really an exercise in creativity and synthesis to read and compare protocols from other techniques and fit together the best approaches with your own initiatives. For example, performing immunocytochemistry within our system, in Matrigel, had many hurdles that we were able to overcome by combining and modifying different fluorescence protocols. Developing this new technique has been an incredibly valuable experience for me as a young scientist.

When doing the research, did you have a particular result or 'eureka' moment that has stuck with you?

During the beginning of this project, I was frustrated and overwhelmed as a naïve graduate student by how many ways that we could make a spheroid. It seemed that any way we manipulated epithelial cells in three-dimensional culture would result in spherical structures. I will always remember the first time we generated the tubule-like structures that characterize our methods today. It was amazing to see how these cells digested from a kidney, in response to a particular combination of growth factors and a specific plating method, generated these complex tubuloid structures with physiologically relevant organization right before our eyes.

Why did you choose Journal of Cell Science for your paper?

Journal of Cell Science and accompanying journals from the Company of Biologists have always been my first resource in



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graduate school for learning about new areas of research, as well as keeping up to date with cutting edge results. It seemed like a great fit for dissemination of a model system whose goal was to look at cellular changes most proximate to genetic alteration in disease.

What motivated you to pursue a career in science, and what have been the most interesting moments on the path that led you to where you are now?

My pursuit of a career in science started during grade school, even though I may not have realized it at the time. From a very early age, I was fortunate enough to have a series of fantastic science teachers and educators that exuded passion for the understanding of complex processes. I specifically remember the first time I saw a skull in elementary school, followed by exposure to other organs in high school and college. I was always fascinated with the structure, organization and design of these tissues, wondering how their development could be so intricate. While this created a strong foundation in biology, it was not until much later, in graduate school, that a career in academic research became more evident. The defining moment for my dedication to this career path came from my training with my mentor, Dr Owen Woodward. From my first day, he set up an environment where I had ownership of a project and through this helped me to establish my active voice in the research process. These experiences combined with my interests in the way research is communicated made this career an obvious and exciting choice. It also has reinforced how critical strong mentors are during graduate school for influencing the trajectory of your future.

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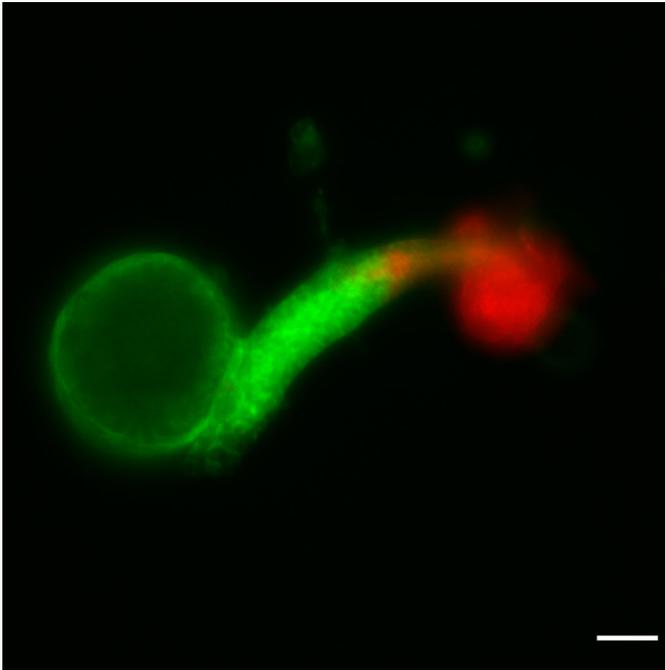


Image of a double fluorescent reporter in our new tubuloid model system for ADPKD, exhibiting the formation of a cyst-like structure from a tubule in culture. Scale bar: 50 μm .

Who are your role models in science? Why?

I was lucky enough to work with one of my science role models on the development of this new technique. Dr Terry Watnick has set an

extraordinary standard through her dedication and brilliance, as reflected in her career in both medicine and research, as well as in her role as the Director of the Baltimore PKD Research and Clinical Core Center. Her reputation and practices were what first interested me in polycystic kidney disease research, paired with her approachability that created my first opportunities to study in kidney-focused laboratories. I have been honored to have had her guidance throughout the research and writing processes of this manuscript. More so, I am excited to pursue a future career in renal research following her example.

What's next for you?

Following my doctoral research, I will be pursuing an academic postdoctoral fellowship focused on learning how to apply single-cell RNA sequencing and spatial transcriptomics in the study of acute kidney injury. This will be an exciting next step on my way to becoming an independent investigator.

Tell us something interesting about yourself that wouldn't be on your CV

Outside of the laboratory, I spend my time riding horses and playing classical alto saxophone.

Reference

Dixon, E. E., Maxim, D. S., Halperin Kuhns, V. L., Lane-Harris, A. C., Outeda, P., Ewald, A. J., Watnick, T. J., Welling, P. A. and Woodward, O. M. (2020). GDNF drives rapid tubule morphogenesis in a novel 3D *in vitro* model for ADPKD. *J. Cell Sci.* **133**, jcs249557. doi:10.1242/jcs.249557