

FIRST PERSON

First person – Justin Jacob

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. Justin Jacob is first author on 'Keratin 17 regulates nuclear morphology and chromatin organization', published in JCS. Justin conducted the research described in this article while a PhD candidate in the laboratories of Pierre A. Coulombe (primary) and Michael J. Matunis, PhD (secondary) at Johns Hopkins University, Bloomberg School of Public Health, Department of Biochemistry & Molecular Biology, Baltimore, MD, USA. He is now a supervisory chemist and chemical terrorism coordinator at the Clinical Toxicology Unit in the Public Health Lab Division at the Washington D.C. Department of Forensic Sciences. This unit involves a (1) drug monitoring program and a (2) laboratory response network for a chemical threats program.

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

We discovered that keratin 17 (K17; an intermediate filament protein), which was previously thought to reside and function exclusively in the cell's cytoplasm, can enter the cell's nucleus and play role(s) in influencing the shape of the nucleus and how DNA is 'packaged' in the nucleus. This has downstream impacts on how genes are expressed, particularly genes associated with cell proliferation and cancer.

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

For this study, two major challenges come to mind: (1) my leaving the lab in mid-2019 and (2) country-wide shutdowns of research labs due to the SARS-CoV-2 pandemic. Fortunately, I had the support of very talented scientists in my now-former lab who were able to complete the key final experiments (before and after the pandemic shutdowns) in response to our reviewers' comments.

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

Oh, yes! The initial key observation that led us down this research 'path' occurred when I was in the microscope room. I noticed that it took a shorter amount of time (i.e. fewer 'optical sections' were needed) to image/photograph the nucleus of cells that did not express K17, compared to their 'normal' counterparts (i.e. cells that did express K17). Could it be that the dimensions (2D and/or 3D) of the cell nucleus depend on the expression of this protein (K17)? That one question started it all, leading us to exciting new discoveries and lines of future investigations.

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

We were thrilled when our manuscript was accepted by JCS! JCS is a fantastic, reputable journal that will allow our research to be made available to a broad international molecular and cell biology scientific community, and all JCS articles are free to access after



Justin Jacob

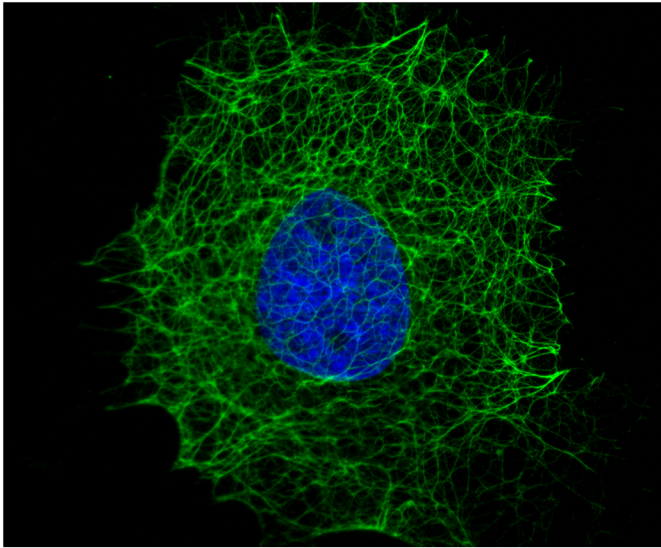
6 months. I also love that JCS offers these 'First Person' interviews/spotlights of manuscript first authors!

Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?

Prior to starting graduate school in 2012, I had several mentors who helped me transition from the 'school world' to the 'working world'. I was an inexperienced, but eager-to-learn, college student/graduate trying to navigate and find my place in the world. I am truly grateful to the following individuals who took a chance on me in the 3–4 years before I started graduate school: Dr John Timothy O'Neill (U.S. Uniformed Services University of the Health Sciences) and Dr Jennifer Knaack, Dr Rudolph Johnson, Dr Michael Rybak, and Mr Daniel Parker (all at the U.S. Centers for Disease Control and Prevention). They taught me how to responsibly apply the scientific method, interpret data, and present those data effectively, with context and with pride. From them, I also learned how to remain resilient when things do not go as expected. I would not be where I am today without their guidance and mentorship.

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?

I have always loved science and mathematics (STEM, in general). I cannot comment on a particular 'moment', but I can say that my interest in STEM started at a young age, due to some very influential teachers in grade school: Mr David Milauskas (6th grade Algebra



One of my very first IF micrographs in Dr Pierre Coulombe's lab, taken when I was a 1st-year rotation student (March 2013). I have always been fond of this image, particularly because it reminds me of the 'Eye of Sauron' from *The Lord of the Rings* trilogy (cell nucleus, blue; K17 intermediate filaments, green).

teacher and Math Team Coach throughout middle school), Ms Pamela Leffler (11th grade AP Biology teacher), and Mr David Zaleski (12th grade AP Physics teacher). Their passion and dedication to educating the next generation(s) of students continues to this day – in fact, they all still teach at the same middle and high schools I attended more than 15 years ago!

Who are your role models in science? Why?

I was incredibly fortunate to have many role models while I was in graduate school in the Department of Biochemistry and Molecular

Biology at the Johns Hopkins University Bloomberg School of Public Health. My primary thesis advisor, Dr Pierre Coulombe, and former postdoctoral colleague in the Coulombe lab, Dr Ryan Hobbs, really helped mold me into the scientist that I am today. Lab meetings, brainstorming discussions, etc. were often very dynamic, informative, and academic. During the final 2–3 years of my PhD program, the Coulombe lab moved to the University of Michigan in Ann Arbor. I was fortunate to be 'accepted' into the lab of Dr Michael Matunis (my secondary advisor) and thus be able to complete my Coulombe lab thesis research at Johns Hopkins. So, I now had two thesis advisors! I am honored to have worked with such a dedicated, intelligent group of research scientists.

What's next for you?

Leaving academia was a very difficult decision for me, but I ultimately decided to take a government job instead of a postdoctoral fellowship position at the National Institutes of Health. Currently, I am the Supervisory Chemist and Chemical Terrorism Coordinator for the Clinical Toxicology Unit in the Public Health Lab Division of the D.C. Department of Forensic Sciences in Washington, D.C. Leaving academia does not mean I do not miss it! But, in the end, I made this decision for personal and professional reasons.

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

Back in September 2014, I had the privilege to meet the United States President, Barack Obama, in Baltimore, MD, along with my father and a close family friend! We were volunteer drivers in President Obama's motorcade; my 15-passenger van contained some members from the media.

Reference

Jacob, J. T., Nair, R. R., Poll, B. G., Pineda, C. M., Hobbs, R. P., Matunis, M. J. and Coulombe, P. A. (2020). Keratin 17 regulates nuclear morphology and chromatin organization. *J. Cell Sci.* **133**, jcs254094. doi:10.1242/jcs.254094