

PERSPECTIVE

Meet Our Editorial Board—*Genesis*. An Interview With, Sally Moody, The George Washington University School of Medicine and Health Sciences, USA

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Biography



Dr. Moody received her PhD in Neuroscience from the University of Florida where she studied the development of the trigeminal system in chick embryos. She was a postdoctoral fellow in the laboratory of Dr. Marcus Jacobson at the University of Utah Department of Neurobiology where she studied axon guidance and learned cell lineage analysis in *Xenopus* embryos. In 1983, she joined the Department of Anatomy and Cell Biology

at the University of Virginia, where she had the good fortune to become a member of the wider *Xenopus* community. In 1992, she moved to the Department of Anatomy and Cell Biology at the George Washington University, in which she served as Chair from 2016 to 2023. Sally's laboratory has worked on several issues concerning the development of the nervous system, including mechanisms that regulate cell fate and genes that cause birth defects, using mouse, chick and *Xenopus*. Her laboratory has been funded by grants from the March of Dimes, ALS Association, Sloan Foundation, NIH, NSF and BSF.

Dr. Moody has published more than 150 scientific articles and reviews, served on several scientific advisory boards, grant review panels and editorial boards. She edited the “*Cell Lineage and Fate Determination*” and “*Principles of Developmental Genetics*” books for Elsevier. She was co-editor with Brian Hall (Dalhousie University) of the *Evolutionary Cell Biology* book series, and co-editor with Abraham Fainsod (Hebrew University) of “*Xenopus, from basic biology to disease models in the genomic era,*” both published by Routledge. Dr. Moody was Editor-in-Chief of *genesis* from 2010 to 2021, and has served on the Board of Directors and in leadership roles of the Society for Developmental Biology, the Society for Craniofacial Genetics and Developmental Biology and the International *Xenopus* Board.

What is your research group studying?

My laboratory is now closed because I retired this past year, and I am happy to report that everyone found exciting new positions where they are carrying on several aspects of the research we have been doing together. For the past 10 years, our focus has

been on understanding the function of various genes involved in the development of craniofacial tissues. In 2004, we discovered that a transcription factor called Six1, one of the vertebrate versions of *Drosophila* *Sine oculis*, is crucial for the development of cranial placodes, including the one that forms the inner ear. We conducted basic developmental biology research to understand how Six1 is activated, and what its targets are.

Shortly after publishing our findings, clinical literature revealed that mutations in this gene cause a hearing loss syndrome in humans called Branchio-oto-renal syndrome. However, mutations in Six1 and its known cofactor Eya1, also first identified in *Drosophila*, account for only about 50% of the patients. We decided to take two approaches to uncover additional candidates using *Xenopus*: to identify Six1 targets during the relevant developmental period and to search for other cofactors.

We collaborated with Francesca Pignoni, who was at Harvard at that time and had identified Eya as a cofactor in *Drosophila*, to find other potential vertebrate cofactors. We compiled a list of about 25 cofactor candidates. Over the past several years, we have been doing a lot of cloning, and conducting overexpression and loss-of-function studies in *Xenopus*, and later in mice, to determine if these putative cofactors bind to Six1 and if their absence causes defects in craniofacial tissues, particularly the inner ear. We have been publishing our findings, hoping that clinicians and clinical geneticists will use them to identify other potential targets in BOR and other deafness syndromes.

What are your thoughts on the future of developmental biology?

A really important area that people are focusing on is understanding childhood syndromes, both genetic and non-genetic. Over the past decade, there has been a significant emphasis on stem cell research due to the need to manipulate cells for regenerative medicine. This field has blossomed, but we still don't fully understand the gene regulatory networks that drive organ differentiation especially in vertebrates. While we get valuable insights from invertebrate model systems, we additionally need vertebrate embryology to identify which candidates are expressed at the right time during organ development to address the underlying causes of developmental syndromes.

With CRISPR technology, we can now knock-out genes in various animal models, not just mice, and knock-in human variants to understand how patients develop different phenotypes. This area is rapidly advancing, and it's where our research is heading. I'm currently working on a manuscript involving the introduction of human variants into frogs, which is complex and challenging to interpret. But we are excited about the possibilities.

Another crucial aspect for the future of developmental biology is collaborative science. My lab, which was open for over 40 years, learned many new techniques as technology evolved. However, not all labs can do everything, and different perspectives on projects from collaborators are essential. For human syndrome research, collaboration with clinician scientists is particularly important. This is where I see many breakthroughs occurring. However, fundamental developmental biology remains incredibly important because there are still many processes we don't understand that have clinical relevance.

What are your favorite pastimes outside of research?

Since I retired, my husband and I have been doing a lot of traveling and outdoor activities. We are enthusiastic hikers, bikers, and kayakers. We've been exploring outdoor activities in places like Antarctica, South America, Cuba and Cape Breton Island. We have been getting outdoors as much as possible because that's what we love. Having two full-time professional jobs didn't allow us to do as much as we wanted while we were younger.

What object is most important to you?

Object? I would say family. I have two adult children and a three-year-old granddaughter, and we spend as much time as possible at family functions, dinners, and vacations together. So, I would say that has always been our primary focus outside of work. I guess "family" is an object if you consider it is a noun!

Data Availability Statement

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.