Jessica Mountford and the “myopia generation”

You have moved to Perth for this fellowship. Where did you move from? What was that like with COVID-19 restrictions? How has quarantine been treating you?

My family and I have relocated from Melbourne, Victoria so that I could commence my awarded Brian King Fellowship. However, I had previously spent 4 ½ years living in Perth while working at the University of Western Australia, so we were all very excited to make the move back to the west coast.

While living in Melbourne we experienced a total of 112 days of strict lockdown during 2020, and although challenging at first with little children, we adapted rather well. The thing we missed the most was not being able to spend more time outside, as only one person per household could leave for 1hr per day and stay within 5km of our home. Quarantine here has been interesting, we have had to find creative ways to entertain our boys, luckily, we have had a lot of practice in Melbourne. But we cannot wait to get out and experience Perth again!

What is your research background?

I have a strong background in molecular biology, haematology and virology. I completed my PhD at the Australian Centre for Blood Diseases (Monash University), where I discovered a novel role for a lipid kinase (Class II PI3K) in maintaining platelet adhesive function. These findings were used in translational medicine to develop a pharmaceutical drug target for Class II PI3K for the purpose of maintaining haemostasis and preventing heart attack and stroke. Drug trials began in 2020, and subsequent research has suggested it may be effective for use in COVID-19 patients that are at higher risk of developing arterial thrombosis.

Following my PhD, I completed two post-doctoral positions at the University of Western Australia where I worked with Emeritus Professor David Hunt and Dr Wayne Davies on a number of projects including comparative studies on the molecular evolution, function and spectral tuning of visual and non-visual opsin genes, and in particular looking at their evolutionary origin by comparing and contrasting a wide variety of vertebrate species. Additionally, I also worked on projects studying the molecular genetics of inherited retinal diseases. Most notably the work I carried out on myopia, where I screened myopic and aged-matched control subjects from the Raine Eye Health Study group and the Norfolk Island Eye Study group. I detected novel gene variants in the opsin gene *OPN1LW* and both molecular studies and modeling suggested these variants may be responsible for a reduction in transcript stability and therefore may be a contributing factor in the development of myopia.

After completing my post-doctoral studies, I went on to have my two beautiful sons, and was appointed Adjunct Research Associate at both the University of Western Australia and La Trobe University. I currently serve on the Editorial Board of Frontiers in Ecology and Evolution: Frontiers in Behavioral and Evolutionary Ecology, and Frontiers for Young Minds, as well as volunteering for COVID-19 research platform; Crowdfight COVID-19 and as a COVID-19 Expert with the Australian Academy of Science (AAS).

Lions Eye Institute

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What drew you to apply for this fellowship?

Before I left Perth, I held an Honorary position at the Lions Eye Institute and gained an appreciation for the multidisciplinary team comprising of ophthalmologists and researchers within a world-class facility.

Consequently, when I came across an advertisement for the Brian King Fellowship one night, I immediately thought it would be an excellent opportunity to continue my research focus on myopia. I was also very excited at the opportunity to move back to Perth as my time here previously was so lovely.

Can you tell us about your research proposal? Why this particular topic? What do you hope to achieve?

My proposed research titled “The Myopia Generation- Exploring the rise of early-onset myopia following the digital age and a world post COVID-19 lockdown” was inspired by my particular experience being in lockdown in Melbourne and witnessing all of the online learning available to students, as a result of educational institutions being closed. Therefore, as children have increased their screen time, using devices (such as iPads, tablets and laptops), whilst completing schoolwork at home, they are subsequently increasing their environmental risk of developing early-onset myopia indirectly by limiting the amount of time they spend outdoors and in natural light.

As a result, I want to investigate any effects this may pose on long-term eye health in school age children, in particular early-onset myopia. In fact, myopia is rapidly becoming one of the world’s leading causes of distant visual impairment. With prevalence rates as high as 95% in some countries throughout East Asia and 17% here in Australia, cases are rapidly rising worldwide, and is expected to increasingly burden the healthcare system across the globe.

Modelling has predicted approximately 50% of the world’s population will become myopic by the year 2050, with 10% experiencing high myopia, a condition accompanied with ocular diseases such as retinal detachment, myopic maculopathy, retinal atrophy and glaucoma. Furthermore, the sharpest rise of prevalence is occurring in early-onset myopia, within school-age children as young as 6 years of age.

Several factors, both genetic and environmental, have been associated with the development of myopia and even though there has been considerable progress in slowing the progression of myopia and determining the causal factor involved in developing myopia, the exact fundamental mechanism/s in which this occurs remains unknown. During the course of my fellowship, I aim to explore the role between genetic predisposition and environmental factors involved in early-onset myopia by examining models of myopia, DNA databases, patient samples and epidemiological data related to COVID-19 lockdowns.

Given the persistent and highly infectious nature of SARS-CoV-2 and consequently infection with COVID-19 around the globe, this study will prove both significant and timely in combating an increasingly global socio-economic burden.

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Would you like to share a little about your family? Your interests, hobbies, pets?

I have two young boys, River (4) and Bowie (2) and we love spending time outdoors; bushwalking; camping and going the beach. I also love going to local markets, exploring the arts and live music.

I grew up in far north Queensland where I had many pets, including rehabilitated native animals and reptiles, unfortunately the only pets my children have currently, are sea monkeys (brine shrimp), which they adore. My partner is from the South Island of New Zealand and is an avid martial artist that has been practicing judo since a young child, he is looking forward to being able to take the boys with him to practice.

Is there anything else you would like to share?

Lastly, I want to share my excitement and enthusiasm towards commencing my fellowship, working on such an important project in a world-class facility is truly rewarding.