

Professor Russell Foster: melanopsin signalling to the molecular clockwork

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Expert introduction

Dr. Russell Foster (*Figure 1*) is the professor of Nuffield Laboratory of Ophthalmology, Head of the Nuffield Laboratory of Ophthalmology and the Sleep and Circadian Neuroscience Institute. Prior to this, Russell was at Imperial College where Russell was Chair of Molecular Neuroscience within the Faculty of Medicine. Russell Foster's research spans basic and applied circadian and photoreceptor biology.

He received his education at the University of Bristol under the supervision of Professor Sir Brian Follett. From 1988–1995, he was a member of the National Science Foundation Center for Biological Rhythms at the University of Virginia and worked closely with Michael Menaker. In 1995, he returned to the UK and established his group at Imperial College. For his discovery of non-rod, non-cone ocular photoreceptors he has been awarded the Honma prize (Japan), Cogan award (USA), and Zoological Society Scientific & Edridge-Green Medals (UK). He is the co-author of “Rhythms of Life” a popular science book on circadian rhythms.

Professor Foster's research interests range across the neurosciences but with specific interests in circadian, visual and behavioral neuroscience. This work includes a range of molecular, cellular, anatomical and behavioral aspects, as well as addressing the implications for human performance, productivity and health.

Editor's note

We were honored to have an interview with Russell Foster, Professor of Nuffield Laboratory of Ophthalmology, Head of the Nuffield Laboratory of Ophthalmology and the Sleep and Circadian Neuroscience Institute to share his viewpoints about the significance of sleep and the impressive progress in studying melanopsin signalling.



Figure 1 Russell Foster, Professor of Nuffield Laboratory of Ophthalmology, Head of the Nuffield Laboratory of Ophthalmology and the Sleep and Circadian Neuroscience Institute.

When talked about the significance of sleep and the detriments of sleep deficit, Professor Foster said: “I think the most important to understand is what sleep provides. People think nothing is going on when we sleep, but in fact some areas in brain are more active when we sleep. During sleep the brain is consolidating memory and processing information, so sleep is critical to come up with innovative solution to deal with complex problems. During the sleep the brain is regulating so many other functions in biology, such as clearing toxins from brain to the rest of body and also rebuilding energy reserves. So many abilities to function automatically in day actually depend on a good night of sleep. Therefore, many things will go wrong if we don't get sufficient sleep. For instance, just after few days lack of sleep, we are more incline to lose attention and fall



Figure 2 Professor Russell Foster: melanopsin signalling to the molecular clockwork (1).

Available online: <http://www.asvide.com/articles/1690>

into pessimistic mood in day”.

Besides, Professor Foster shared the latest exploration in your lab. “After the discovery of these years, a big push has been tried to understand how the light interacts with molecular clockwork and some very exciting data have emerged recently about exactly what genes turn on and off in response to light and so finally we’re getting understanding how the light exchanges patterns of gene expression, which in turn changes patterns of behavior. But it also turns out to be very interesting, the sleep behavior itself. For example, if you deliberately stay awake, you’ll build up in the brain adenosine and the adenosine will know and feedback to molecular clock and desensitize to clock light. It’s really a fascinating and complex interaction that how light regulates molecular clock”.

For more detail of the interview, please refer to the following video (*Figure 2*).

Interview questions:

- (I) Nowadays, people are under much more stress than previous, would you like to talk about the significance of sleep and how to improve the sleep quality in people?
- (II) What do you think is the most impressive advance in studying melanopsin signalling? Could it provide insight for the clinical practice, such as for the treatment of some diseases?
- (III) Will the sensitivity of melanopsin signalling retrograde as the age increases?
- (IV) Would you like to share the latest exploration in your lab?

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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