

## Author's Accepted Manuscript

The two-step development of a duplex retina involves distinct events of cone and rod neurogenesis and differentiation

Ragnhild Valen, Mariann Eilertsen, Rolf Brudvik Edvardsen, Tomasz Furmanek, Ivar Rønnestad, Terje van der Meeren, Ørjan Karlsen, Tom Nilsen, Jon Vidar Helvik



PII: S0012-1606(16)30139-7  
DOI: <http://dx.doi.org/10.1016/j.ydbio.2016.06.041>  
Reference: YDBIO7186

To appear in: *Developmental Biology*

Received date: 11 March 2016  
Revised date: 23 June 2016  
Accepted date: 27 June 2016

Cite this article as: Ragnhild Valen, Mariann Eilertsen, Rolf Brudvik Edvardsen, Tomasz Furmanek, Ivar Rønnestad, Terje van der Meeren, Ørjan Karlsen, Tom Nilsen and Jon Vidar Helvik, The two-step development of a duplex retina involves distinct events of cone and rod neurogenesis and differentiation. *Developmental Biology*, <http://dx.doi.org/10.1016/j.ydbio.2016.06.041>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

## The two-step development of a duplex retina involves distinct events of cone and rod neurogenesis and differentiation

Ragnhild Valen<sup>1</sup>, Mariann Eilertsen<sup>1</sup>, Rolf Brudvik Edvardsen<sup>2</sup>, Tomasz Furmanek<sup>2</sup>, Ivar Rønnestad<sup>1</sup>, Terje van der Meeren<sup>2</sup>, Ørjan Karlsen<sup>2</sup>, Tom Nilsen<sup>3</sup>, Jon Vidar Helvik<sup>1</sup>

<sup>1</sup>Department of Biology, University of Bergen, NO-5020 Bergen, Norway

<sup>2</sup>Institute of Marine Research, Nordnes, NO-5817 Bergen, Austevoll Research Station, and Hjort Centre for Marine Ecosystem Dynamics, NO-5392 Storebø, Norway

<sup>3</sup>UniResearch AS, NO-5006, Bergen, Norway

### Abstract

Unlike in mammals, persistent postembryonic retinal growth is a characteristic feature of fish, which includes major remodeling events that affect all cell types including photoreceptors. Consequently, visual capabilities change during development, where retinal sensitivity to different wavelengths of light (photopic vision), -and to limited photons (scotopic vision) are central capabilities for survival. Differently from well-established model fish, Atlantic cod has a prolonged larval stage where only cone photoreceptors are present. Rods do not appear until juvenile transition (metamorphosis), a hallmark of indirect developing species. Previously we showed that whole gene families of *lws* (red-sensitive) and *sws1* (UV-sensitive) opsins have been lost in cod, while *rh2a* (green-sensitive) and *sws2* (blue-sensitive) genes have tandem duplicated. Here, we provide a comprehensive characterization of a two-step developing duplex retina in Atlantic cod. The study focuses on cone subtype dynamics and delayed rod neurogenesis and differentiation in all cod life stages. Using transcriptomic and histological approaches we show that different opsins disappear in a topographic manner

Download English Version:

<https://daneshyari.com/en/article/10931139>

Download Persian Version:

<https://daneshyari.com/article/10931139>

[Daneshyari.com](https://daneshyari.com)