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MEETING ABSTRACT

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TMT-opsins differentially modulate medaka brain function in a context-dependent manner

Bruno M. FONTINHA^{1,2}, Theresa ZEKOLL^{1,2}, Miguel GALLACH^{3,6},
Florian REITHOFER^{1,2,6}, Alison J. BARKER⁴, Maximilian HOFBAUER^{1,2,5},
Ruth M. FISCHER¹, Arndt VON HAESELER^{1,2,3}, Herwig BAIER⁴ and
Kristin TESSMAR-RAIBLE^{1,2,6,*}

¹Max Perutz Labs Vienna, University of Vienna, Vienna BioCenter, Vienna, Austria; ²Research Platform "Rhythms of Life", University of Vienna, Austria; ³Center for Integrative Bioinformatics Vienna, Max Perutz Labs Vienna, Austria; ⁴Max Planck Institute of Neurobiology, Martinsried, Germany; ⁵Loopbio GmbH, Kritzensdorf, Austria; ⁶FENS-Kavli Network of Excellence (*contributed equally)

Abstract: Vertebrate behavior is strongly influenced by light. Photoreceptors, encoded by opsins, are present inside the vertebrate brain and peripheral tissues. Their non-visual functions are largely enigmatic. We focus on *tmt-opsin1b* and *-2*, c-opsins with ancestral-type sequence features, conserved across several vertebrate phyla and with partly similar expression. Their loss-of-function mutations differentially modulate medakafish behavior in a context-dependent manner. Specifically, differences in light conditions have differential effects depending on age and frequency of the light changes, part of which are mediated by TMT-opsin1b acting outside the eyes, while the pre-pro-hormone *sst1b* is regulated by daylength via TMT-opsin1b in an eye-dependent manner. Analyses of *tmt-opsin1b/tmt-opsin2* double mutants reveals partial complementation of single mutant behavioral and molecular phenotypes. Our work starts to disentangle the highly complex interactions of vertebrate non-visual opsins, suggesting that *tmt-opsin*-expressing cells together with other opsins provide detailed light information to the organism for behavioral fine-tuning.

Keywords: non-visual opsins – medaka fish – behaviour

*Corresponding author e-mail: kristin.tessmar@mfpl.ac.at