Title:	Oct4 mediates Müller glia reprogramming and cell cycle exit during retina regeneration in zebrafish
Authors:	Sharma, Poonam (/jspui/browse?type=author&value=Sharma%2C+Poonam) Gupta, Shivangi (/jspui/browse?type=author&value=Gupta%2C+Shivangi) Chaudhary, M. (/jspui/browse?type=author&value=Chaudhary%2C+M.) Mitra, Soumitra (/jspui/browse?type=author&value=Mitra%2C+Soumitra) Chawla, B. (/jspui/browse?type=author&value=Chawla%2C+B.) Khursheed, M.A. (/jspui/browse?type=author&value=Khursheed%2C+M.A.) Ramachandran, Rajesh (/jspui/browse?type=author&value=Ramachandran%2C+Rajesh)
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Abstract:	Octamer-binding transcription factor 4 (Oct4, also known as Pou5F3) is an essential pluripotency-inducing factor, governing a plethora of biological functions during cellular reprogramming. Retina regeneration in zebrafish involves reprogramming of Müller glia (MG) into a proliferating population of progenitors (MGPCs) with stem cell–like characteristics, along with up-regulation of pluripotency-inducing factors. However, the significance of Oct4 during retina regeneration remains elusive. In this study, we show an early panretinal induction of Oct4, which is essential for MG reprogramming through the regulation of several regeneration-associated factors such as Ascl1a, Lin28a, Sox2, Zeb, E-cadherin, and various miRNAs, namely, let-7a, miR-200a/miR-200b, and miR-143/miR-145. We also show the crucial roles played by Oct4 during cell cycle exit of MGPCs in collaboration with members of nucleosome remodeling and deacetylase complex such as Hdac1. Notably, Oct4 regulates Tgf-β signaling negatively during MG reprogramming, and positively to cause cycle exit of MGPCs. Our study reveals unique mechanistic involvement of Oct4, during MG reprogramming and cell cycle exit in zebrafish, which may also account for the inefficient retina regeneration in mammals.
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