

ABSTRACT

Lower vertebrates such as fishes and frogs have the ability to regenerate damaged central nervous system. They show a strong regenerative response to retinal injury that can result back in the restoration of visual function, Müller glia, being the key to this regenerative response. If we have a thorough understanding of molecular mechanisms involved in retina regeneration in such lower vertebrates, it can help us design strategies for improving Müller glia dedifferentiation and regeneration of retina in human and help in recovery from retinal damage and vision loss. Many genes are now well established for their important roles in the regeneration of retina in zebrafish (*Danio rerio*); however, roles of epigenetic regulation of genes in this context are not understood clearly. Understanding the epigenetic regulation of a gene is as important as understanding their role in retina regeneration. Here we are investigating some of the roles of epigenetic regulators during zebrafish retina regeneration by studying DNA methyltransferases (Dnmts), a family of enzymes which catalyse DNA methylation. Induction of dnmts and their roles during retina regeneration were examined, and the candidate genes that may be epigenetically regulated by Dnmts during retina regeneration were identified. It was observed that Dnmts are regulated during embryonic development in eyes and are also regulated during the retina regeneration. When Dnmts were blocked using Azacytidine (a pharmacological Dnmts blocker) the increase in proliferation of Müller glial cells was observed, and the increase in proliferation is more significant when we blocked the Dnmts in early de-differentiation phase. Various retina regeneration associated genes are observed to be down regulated or up regulated when Dnmts are blocked during retina regeneration.