ABSTRACT

Retinal cell loss after injury is an inevitable problem in mammals which ultimately leads to blindness. In contrast, teleost fish such as zebrafish (Danio rerio) has a remarkable tendency to regenerate its damaged tissue and reestablish function. Upon retinal damage, they mount a robust response to generate their lost retinal cell types, restoring vision. Müller glia are the major players in retina regeneration. They respond to injury by changing their physiology, morphology, and biochemistry. They undergo phases of dedifferentiation, proliferation, and finally re-differentiation, all of which requires changes in gene expression. Although many signaling cascades and regulatory pathways have been identified to play roles at different stages of retina regeneration, chromatin remodeling, which is also one of the ways for transcriptional regulation of genome, is not well studied in the case of zebrafish retina regeneration. Our study shows that Histone deacetylases or Hdacs, one of the key epigenetic regulators, are crucial to retina regeneration. Hdacs are transcriptional repressors which cause compaction of chromatin by removal of an acetyl group from histone proteins. It is demonstrated here, that Hdac1 regulates the expression of two regeneration-associated genes, namely, lin-28a and mycb. So far, the role of Hdacs during retina regeneration is not established. This study might help provide a new direction for the regulation of regeneration process.