

Regeneration in zebrafish lateral line neuromasts: Expression of the neural progenitor cell marker Sox2 and proliferation-dependent and -independent mechanisms of hair cell renewal

Hernández, Pedro P.

Olivari, Francisco A.

Sarrazin, Andrés F.

Sandoval, Pablo C.

Allende, Miguel L.

Mechanosensory hair cells are essential for audition in vertebrates, and in many species, have the capacity for regeneration when damaged. Regeneration is robust in the fish lateral line system as new hair cells can reappear after damage induced by waterborne aminoglycoside antibiotics, platinum-based drugs, and heavy metals. Here, we characterize the loss and reappearance of lateral line hair cells induced in zebrafish larvae treated with copper sulfate using diverse molecular markers. Transgenic fish that express green fluorescent protein in different cell types in the lateral line system have allowed us to follow the regeneration of hair cells after different damage protocols. We show that conditions that damage only differentiated hair cells lead to reappearance of new hair cells within 24 h from nondividing precursors, whereas harsher conditions are followed by a longer recovery period that is accompanied by extensive cell division. In order to characterize the cell population tha