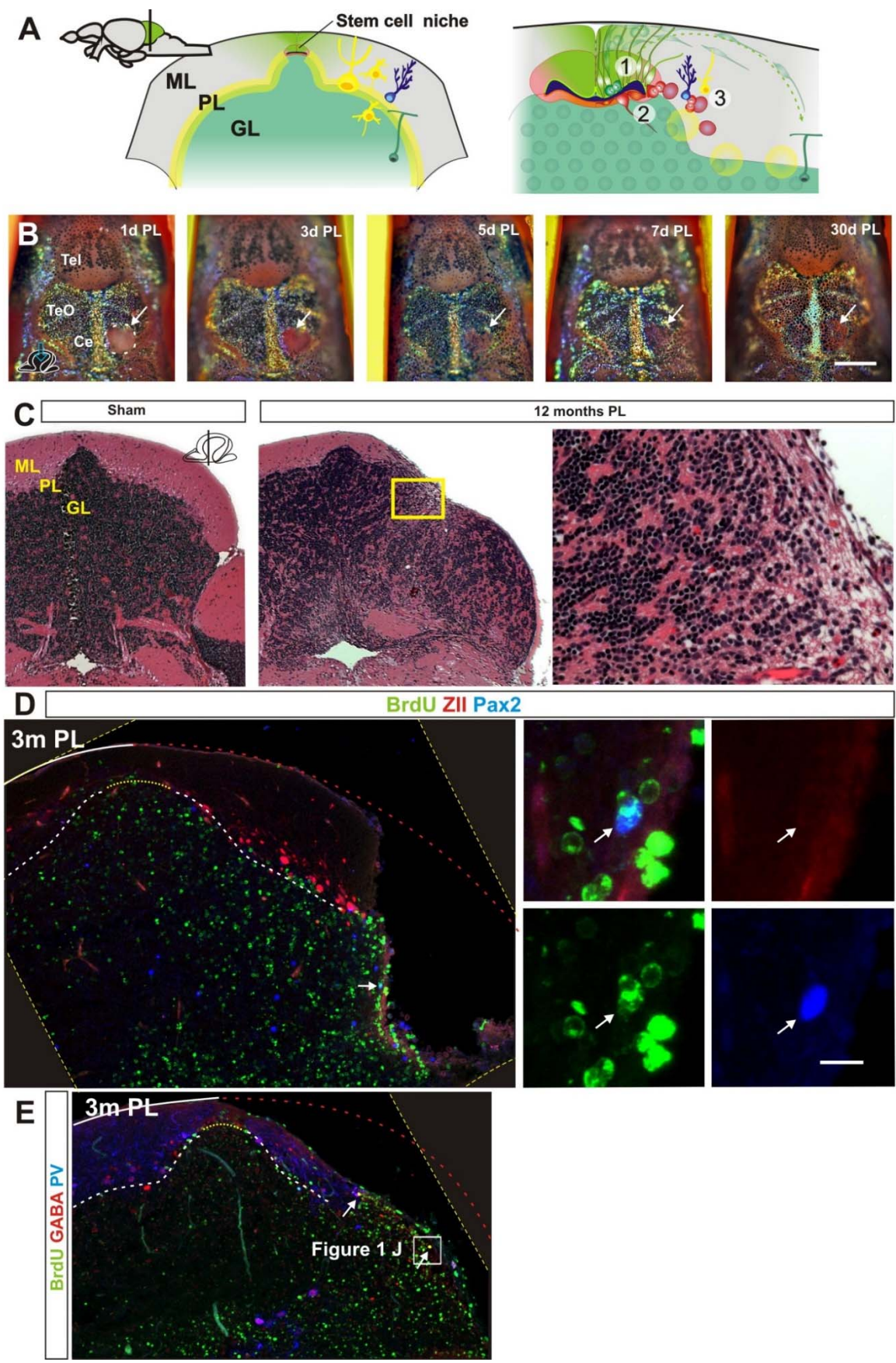
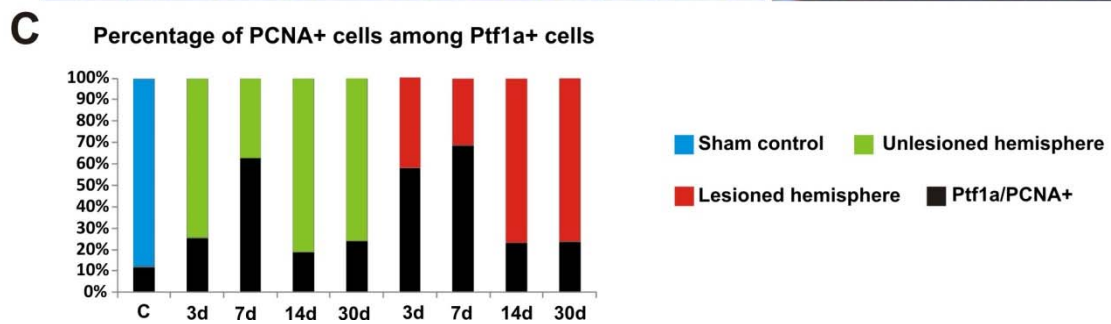
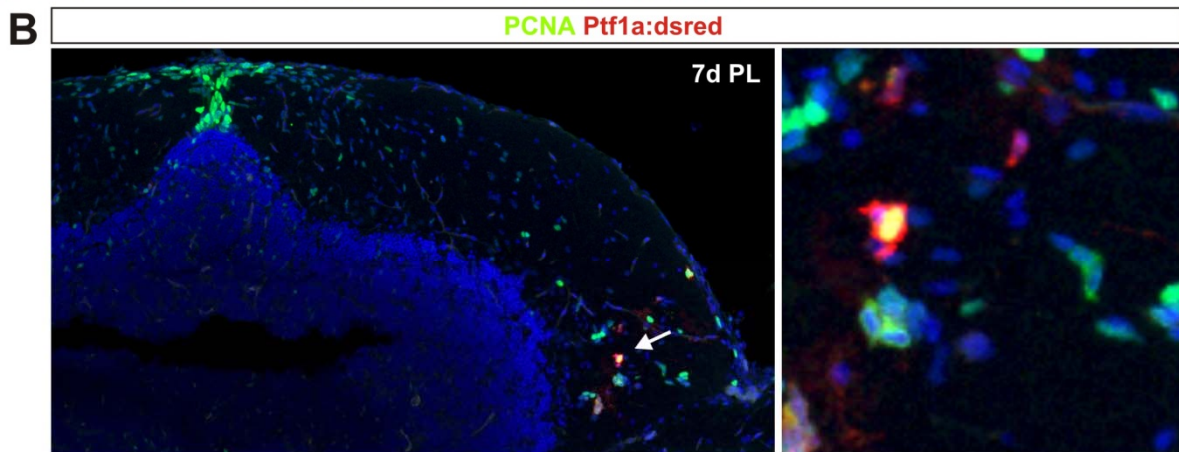
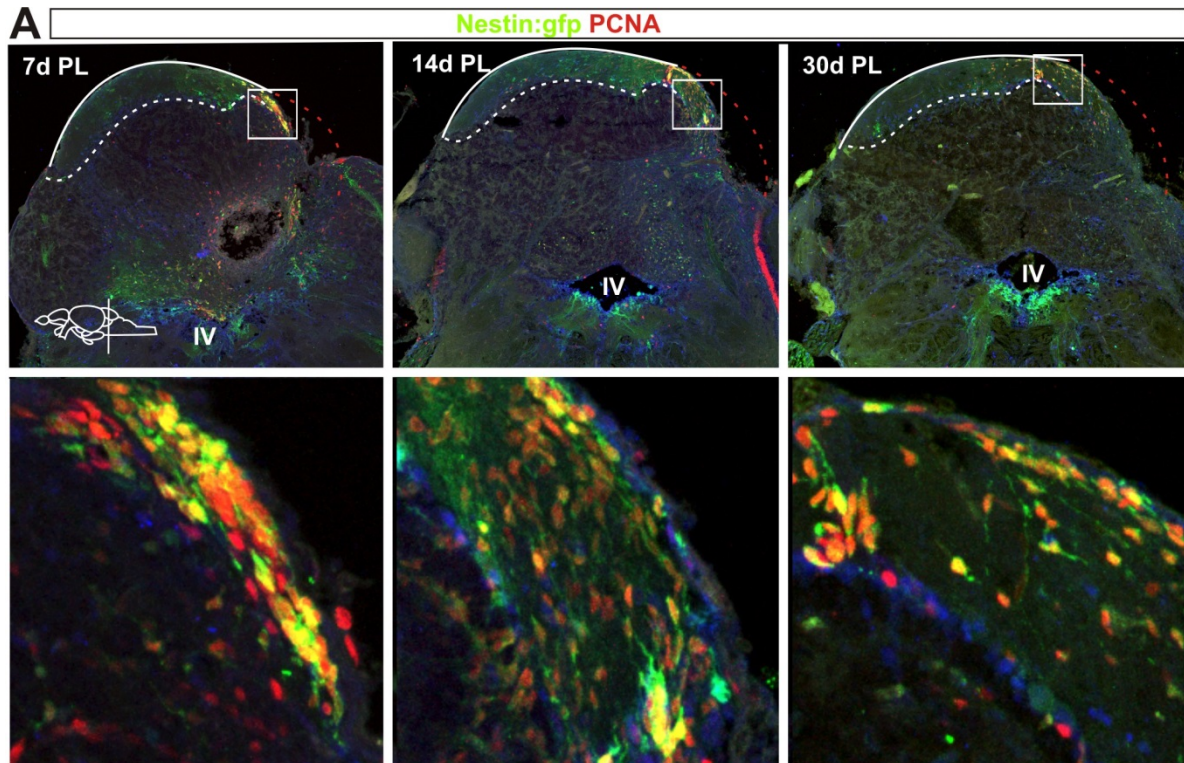


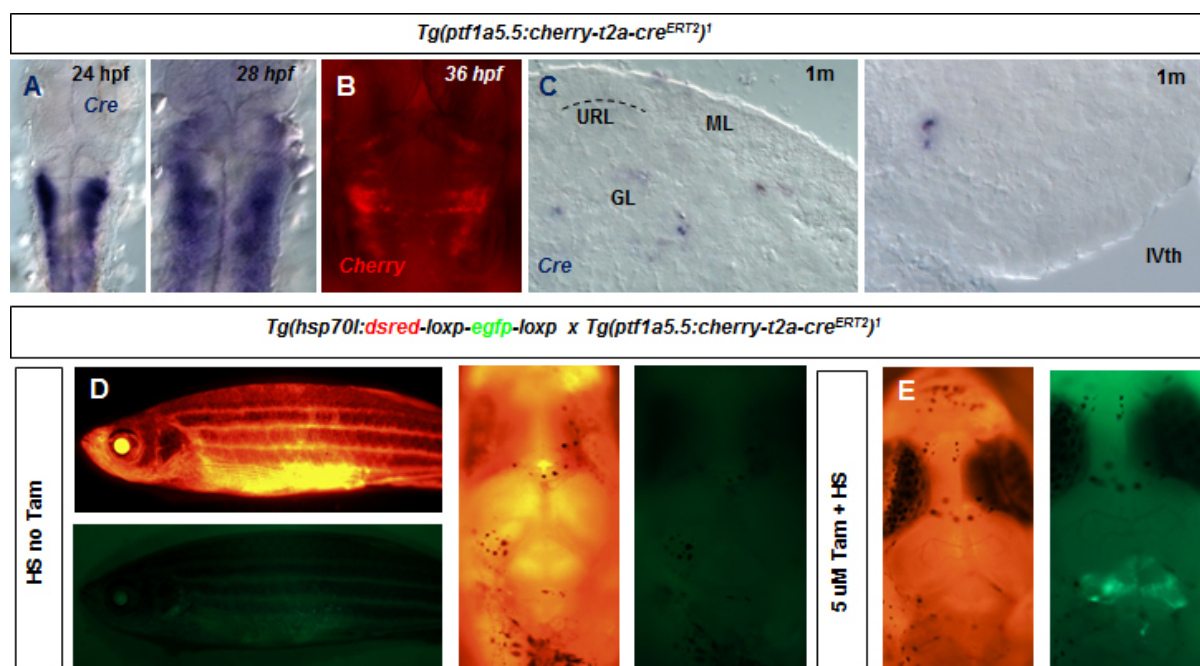
Supplementary figures



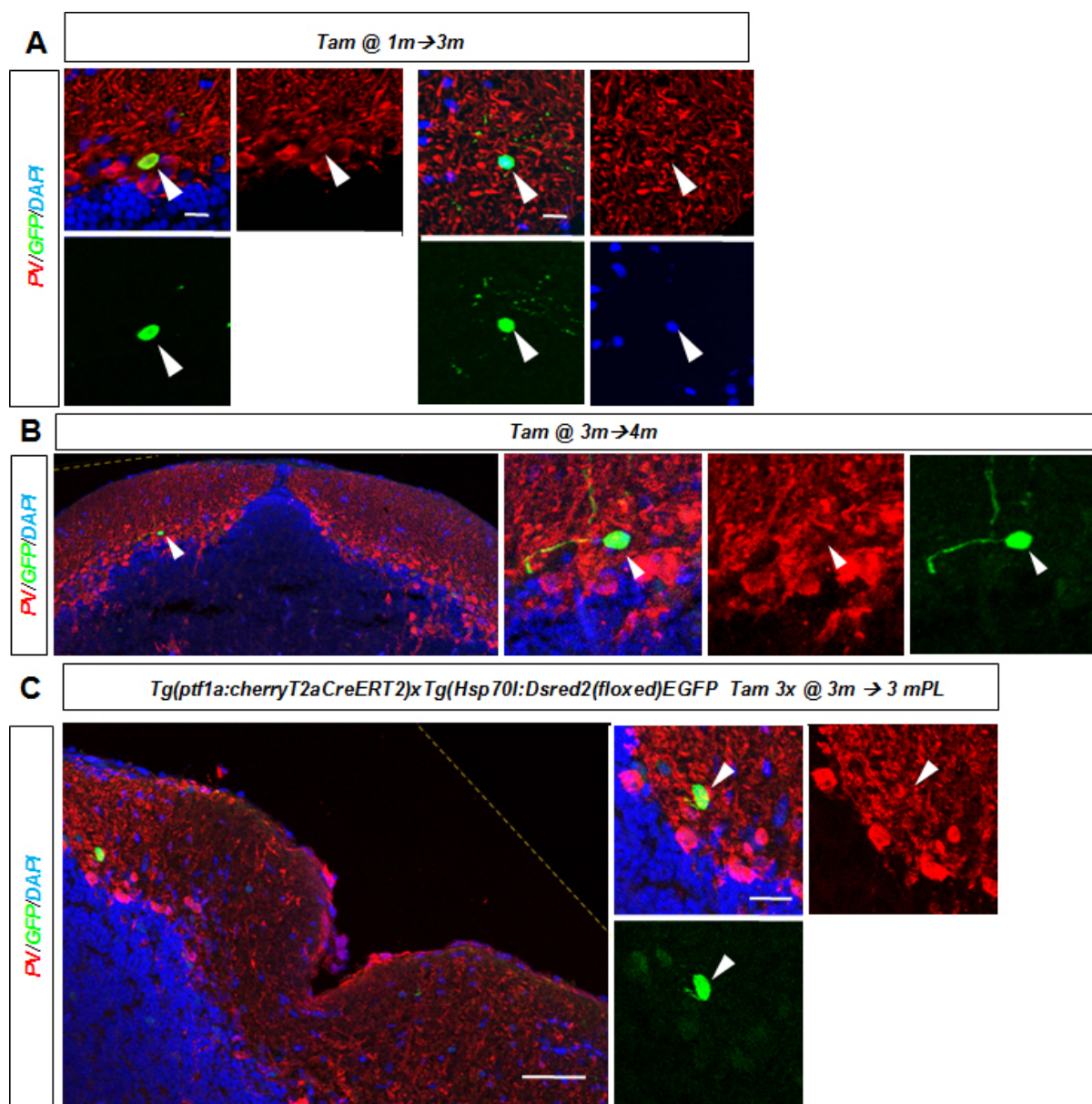
Supplementary Figure 1. A. Overview of the adult stem cell niche in the cerebellum. Stem cells are located around a small out pocketing of the fourth ventricle. 1. Polarized neuroepithelial-like stem cells (green) are restricted to the midline of the dorsal cerebellum. The stem cells give rise to rapidly migrating granule precursors (dark green) that initially migrate dorsolaterally and give rise to granule neurons in a distinct outside-in fashion. 2. Radial glia-like stem and progenitor cells are located ventral to the neuroepithelial-like stem cells and largely quiescent in the adult. 3. Bergmann glia and inhibitory inter-neurons are produced at a low level at the lateral margin of the ventricle. In addition, rare stem cells reside in the cerebellar parenchyma. GL=granule cell layer, ML=molecular cell layer, PL=Purkinje cell layer. **B.** Representative timelapse of a lesioned fish showing rapid wound healing after injury. Dorsal view of the lesion site (hatched white line and white arrow). The injury is fully covered three days after injury and at five days after injury pigment cells are readily detected at the injury site. Ce=Cerebellum, PL=post lesion, Tel=Telencephalon, TeO=Optic tectum. **C.** Hematoxylin and Eosin stained cerebellar cross section from sham injured and injured fish twelve month after injury (n=5/condition). The Purkinje and molecular cell layer has recovered very poorly. No notable fibrotic or glial scarring is detected. GL=granule cell layer, ML=molecular cell layer, PL=Purkinje cell layer. **D.** Cerebellar cross section showing BrdU (green), ZebrinII (Red) and Pax2 (Blue) staining three months after injury. No BrdU/ZII positive cells are detected and very few BrdU/Pax2 positive cells are detected (arrow). **E.** Cerebellar cross section showing BrdU (green), GABA (Red) and Parvalbumin (Blue) staining three months after injury. No BrdU/PV positive cells are detected and very few BrdU/GABA positive cells are detected (arrows). Yellow hatched line show original picture border in rotated in images.



Supplementary Figure 2. A. Confocal maximum projections of cerebellar cross sections showing stem cell activation after injury. *nestin:gfp*⁺ (green) neuroepithelial-like stem cells and proliferating cells labelled with PCNA (red). **B.** Confocal maximum projections of cerebellar cross sections showing a proliferating (green) *ptfla:Dsred*⁺ (red) VZ progenitor in the parenchyma. Proliferating cells labelled with PCNA (green), DAPI (blue). **C.** Quantification of proliferating cells among the pool of *Dsred*⁺ cells. *Dsred* is very stable (many days) in the cells and persist in differentiating cells. The proportion of PCNA⁺ cells is reduced notably 14 days after injury suggesting that majority of *Dsred*⁺ cells are differentiating. (Sham control n=7, 3DPL n=4, 7DPL n=5, 14DPL n=5, 30 DPL n=5).



Supplementary Figure 3. A. *In situ* hybridization and analysis of the expression of the *Cre* transgene in the the *Tg(ptf1a:cherryT2aCreERT2)1* fish line. *Cre* is expressed in the ventricular zone of the embryonic hindbrain and cerebellar primordium. **B.** Expression of cherry in the embryonic hindbrain and cerebellum in the *Tg(ptf1a:cherryT2aCreERT2)1* fish. **C.** Expression of *Cre* in cross section of the cerebellum of a one month old zebrafish. **D.** Heatshocking of *Tg(ptf1a:cherryT2aCreERT2)1*; *Tg(hsp70l:DsRed2(floxed)EGFP)* juvenile zebrafish fish does not result in unconditional recombination (n=12). **E.** Heatshocked tamoxifen treated juvenile fish shows recombined cells (green) in the cerebellum.



Supplementary Figure 4. **A.** Recombined GFP/PV+ Purkinje cell (left) and PV- negative inter-neuron (right) with stellate morphology in the cerebellum 3 months after recombination of a one month old juvenile fish. **B.** A recombined GFP/PV- inter-neuron in the adult cerebellum one month after tamoxifen treatment. **C.** A recombined GFP+ and PV- inter-neuron in the cerebellum three months after injury and tamoxifen treatment of an adult zebrafish. Yellow hatched line show original picture border in rotated in images.