absent (n = 15 – 19 eyes). IPL: inner plexiform layer; INL: inner nuclear layer; GCL: ganglion cell layer; *** p – value < 0.0002. Error bars indicate standard error of the mean. Scale bars = 20 μm.

Movie 1. Time-lapse of developing retina revealing the timing and pattern of Barhl2:GFP onset in developing neurons from 35 hpf to 50 hpf (10 min / frame). In this transgenic zebrafish line, post-mitotic *barhl2*-expressing cells first generate GFP as they migrate from the apical edge of the developing retina towards the inner retina. GFP positive cells remain in the future amacrine layer.

Movie 2. Time-lapse of developing retina showing the Barhl2:GFP cell generated from asymmetric cell division of an Atoh7:gap43-RFP progenitor. The apical surface is up, whereas the basal surface is down. The time-lapse begins with two sister cells (highlighted with white arrows, t = 0h00min) coming from an *atoh7*-expressing progenitor. One of them migrates back to the apical surface where it divides generating one Barhl2:GFP cell, whereas the other sister remains close to the basal surface, differentiating as a retinal ganglion cell (RGC).

Movie 3. Time-lapse of developing retina showing premature *barhl2* misexpression in *atoh7*-expressing progenitors. Time lapse was performed from 28 hpf to 40 hpf (6 min / frame). In this transgenic zebrafish line Tg(*atoh7:gal4/pUAS:gap43-GFP*) injected with *pUAS:barhl2-T2A-H2B-RFP* construct, misexpression of *barhl2* (H2B-RFP-positive cells) prematurely in dividing Atoh7-positive progenitors apically located was confirmed.

Movie 4. Time-lapse of developing retina showing the Barhl2:GFP positive cells derived from asymmetric divisions of two sister cells expressing Atoh7:gap43-RFP in the *lakritz* (*atoh7-/-*) mutant. The apical surface is up, whereas the basal surface is down. Every frame corresponds to 5 minutes of the time-lapse. The time-lapse begins with two sister cells (S1 and S2, highlighted with asterisks) coming from an *atoh7*-expressing progenitor. The S1 cell (Sister cell 1) migrates towards the apical surface to divide asymmetrically, generating one Barhl2:GFP-positive (S1a) and one Barhl2:GFP-negative cell (S1b). The S2 cell (Sister cell 2) also migrates towards the apical surface to divide asymmetrically, about 3-4 hours after the cell division of Sister cell 1. The division of Sister cell 2 also generates one Barhl2:GFP-positive (S2a) and one Barhl2:GFP-negative cell (S2b).