

Guide to Supplementary Information

1. Supplementary Tables 1-6

2. Supplementary Videos 1-2 and legends

1. Video 1 (QuickTime 17.1M)

2. Video 2 (QuickTime 14.3M)

These bright-field movies show dislocation of the lens placode and formation of ectopic lens in the *hir* mutant embryo (Video 2) as compared with WT embryo (Video 1).

3. Supplementary Discussion 1: ARHGAP18 related genes

4. Supplementary Discussion 2: Why does the *hir* medaka mutant exhibits a unique flattened phenotype rather than a cell proliferation defect?

5. Supplementary Figure 1: Full-scan of Western blots