**Table S1 Detailed statistics**

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| **Figure** | **Comparison** | | **Statistical test** | **P value** |
| **Fig 3F** | Crista vs Neuromast | Antero | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P=0.6620 |
| Crista vs Pronephric duct | Antero | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Crista vs Spinal cord | Antero | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Crista vs Epidermal cell | Antero | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Neuromast vs Pronephric duct | Antero | two-tailed unpaired Student’s t-test | P＜0.0001 |
| Retro | two-tailed unpaired Student’s t-test | P＜0.0001 |
| Neuromast vs Spinal cord | Antero | two-tailed unpaired Student’s t-test with Welch's correction | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Neuromast vs Epidermal cell | Antero | two-tailed unpaired Student’s t-test | P＜0.0001 |
| Retro | two-tailed unpaired Student’s t-test with Welch's correction | P＜0.0001 |
| Pronephric duct vs Spinal cord | Antero | two-tailed unpaired Student’s t-test | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Pronephric duct vs Epidermal cell | Antero | two-tailed unpaired Student’s t-test with Welch's correction | P=0.0389 |
| Retro | two-tailed unpaired Student’s t-test with Welch's correction | P＜0.0001 |
| Spinal cord vs Epidermal cell | Antero | two-tailed unpaired Student’s t-test with Welch's correction | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | p=0.2432 |
| **Fig 4B** | ctr vs *kif3b* mutant | Antero | two-tailed unpaired Student’s t-test | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| ctr vs *kif17* mutant | Antero | two-tailed unpaired Student’s t-test with Welch's correction | P＜0.0001 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| ctr vs *bbs4* mutant | Antero | two-tailed unpaired Student’s t-test with Welch's correction | p=0.0002 |
| Retro | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| **Fig 4F** | ctr vs *ttll3* mutant | Antero | two-tailed unpaired Student’s t-test | P=0.0021 |
| Retro | two-tailed unpaired Mann-Whitney test | ns |
| **Fig 4G** | ctr MO vs *ccp5* MO | Antero | two-tailed unpaired Student’s t-test | P＜0.0001 |
| Retro | two-tailed unpaired Student’s t-test | P=0.0239 |
| ctr MO vs *ttll6* MO | Antero | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Retro | two-tailed unpaired Student’s t-test | P＜0.0001 |
| **Fig 5K** | ctr vs *ift88* MO | Antero | two-tailed unpaired Mann-Whitney test | P＜0.0001 |
| Retro | two-tailed unpaired Student’s t-test | P＜0.0001 |