**Supplementary File 1\_STATISTICS**

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| FIGURE | STATISTIC | CONDITION | N | P VALUE | OUTPUT |
| **Figure 1: IGF-1 increases the excitability of IL-L5PNs** |
| Fig. 1B | Paired t-test (two-tailed) | mAHP (ACSF *vs* IGF-1) | N=9  | 0.004 | \*\* |
| mAHP (NVP *vs* NVP+IGF-1) | N=5 | 0.625 | Not significant |
| Unpaired t-test (two-tailed) | mAHP (ACSF *vs* NVP) | N=9 *vs* 5 | 0.529 | Not significant |
| Fig. 1C | Paired t-test (two-tailed) | sAHP (ACSF *vs* IGF-1) | N=9 | 0.004 | \*\* |
| sAHP (NVP *vs* NVP+IGF-1) | N=5 | 0.625 | Not significant |
| Unpaired t-test (two-tailed) | sAHP (ACSF *vs* NVP) | N= 9 *vs* 5 | >0.999 | Not significant |
| Fig. 1E | Multiple t-test (post hoc multiple comparison Holm-Sildak method)  | 25 pA (ASCF *vs* IGF-1) | N=10 | 0.410 | Not significant |
| 50 pA (ASCF *vs* IGF-1) | N=10 | 0.273 | Not significant |
| 75 pA (ASCF *vs* IGF-1) | N=10 | 0.533 | Not significant |
| 100 pA (ASCF *vs* IGF-1) | N=10 | 0.01 | \* |
| 125 pA (ASCF *vs* IGF-1) | N=10 | 0.004 | \*\* |
| 150 pA (ASCF *vs* IGF-1) | N=10 | 0.005 | \*\* |
| 175 pA (ASCF *vs* IGF-1) | N=10 | 0.01 | \* |
| 200 pA (ASCF *vs* IGF-1) | N=10 | 0.005 | \*\* |
| **Figure 2: IGF-1 reduces mIAHP and sIAHP in IL neurons**  |
| Fig. 2B | Paired t-test (two-tailed) | *m*IAHP (ACSF *vs* IGF-1) | N=9 | 0.004 | **\*\*** |
| *m*IAHP (NVP *vs* NVP+IGF-1) | N=7 | 0.578 | Not significant |
| Unpaired t-test (two-tailed) | *m*IAHP (ACSF *vs* NVP) | N=9 *vs* 7 | 0.918 | Not significant |
| Fig. 2C | Paired t-test (two-tailed) | mIAHP time curse (ACSF *vs* IGF-1) | N=9 | <0.0001 | **\*\*\*** |
| *m*IAHP time curse (NVP *vs* NVP+IGF-1) | N=7 | 0.140 | Not significant |
| Unpaired t-test (two-tailed) | *m*IAHP time curse (IGF-1 *vs* NVP+IGF-1) | N=9 vs 7 | <0.0001 | \*\*\* |
| Fig. 2D | Paired t-test (two-tailed) | sIAHP (ACSF *vs* IGF-1) | N=9 | 0.004 | **\*\*** |
| *s*IAHP (NVP *vs* NVP+IGF-1) | N=7 | 0.163 | Not significant |
| Unpaired t-test (two-tailed) | *s*IAHP (ACSF *vs* NVP) | N=9 vs 7 | 0.918 | Not significant |
| Fig. 2E | Paired t-test (two-tailed) | sIAHP time curse (ACSF vs IGF-1) | N=9 | <0.0001 | \*\*\* |
| *s*IAHP time curse (NVP *vs* NVP+IGF-1) | N=7 | 0.301 | Not significant |
| Unpaired t-test (two-tailed) | *s*IAHP time curse (IGF-1 *vs* NVP+IGF-1) | N=9 vs 7 | <0.0001 | \*\*\* |
| Fig. 2G | Paired t-test (two-tailed) | *m*IAHP GDPβs(ACSF *vs* IGF-1) | N=8 | 0.109 | Not significant |
| sIAHP GDPβs (ACSF *vs* IGF-1) | N=8 | 0.023 | \* |
| **Figure 3:** **IGF-1 induces long-term potentiation in IL-PNL5** |
| Fig. 3A | Paired t-test (two-tailed) | EPSC (ACSF *vs* IGF-1) | N=5 | 0.0001 | \*\*\* |
| EPSC (NVP *vs* NVP+IGF-1) | N=5 | 0.244 | Not significant |
| Unpaired t-test (two-tailed) | EPSC (IGF-1 *vs* NVP+IGF-1) | N=5 *vs* 5 | 0.002 | \*\*\* |
| Fig. 3B | Paired t-test (two-tailed) | PPREPSC (ACSF *vs* IGF-1) | N=5 | 0.004 | \*\* |
| Fig. 3D | Paired t-test (two-tailed) | EPSC no stim (ACSF *vs* IGF-1) | N=6 | <0.0001 | \*\*\* |
| PPREPSC no stim (ACSF *vs* IGF-1) | N=6 | 0.645 | Not significant |
| Fig. 3A-D | Unpaired t-test (two-tailed) | EPSC (IGF-1 *vs* IGF-1(no stim)) | N=5 v*s* 6 | 0.002 | \*\* |
| Fig. 3E | Paired t-test (two-tailed) | IPSC (ACSF *vs* IGF-1) | N=6 | <0.001 | \*\*\* |
| IPSC (NVP *vs* NVP+IGF-1) | N=6 | 0.220 | Not significant |
| Unpaired t-test (two-tailed) | IPSC (IGF-1 *vs* NVP+IGF-1) | N=6 *vs* 6 | 0.008 | \*\* |
| Fig. 3F | Paired t-test (two-tailed) | PPRIPSC (ACSF *vs* IGF-1) | N=6 | 0.044 | \* |
| Fig. 3H | Paired t-test (two-tailed) | IPSC (ACSF vs IGF-1) | N=6 | 0.0006 | \*\*\* |
| PPRIPSC no stim (ACSF *vs* IGF-1) | N=6 | 0.327 | Not significant |
| Fig. 3E-H | Unpaired t-test (two-tailed) | IPSC (IGF-1 *vs* IGF-1(no stim)) | N=6 v*s* 5 | 0.004 | \*\* |
| Fig. 3I | Test for normal distribution Kolmogorov-Smirnov testPaired t-test (two-tailed) | % PSP (ACSF *vs* IGF-1) | N=6 | <0.000002 | \*\*\* |
| Fig. 3K | PSP amplitude (ACSF *vs* IGF-1) | N=6 | 0.016 | \* |
| PSP area (ACSF *vs* IGF-1) | N=6 | 0.052 | Not significant |
| PSP Tau ON (ACSF *vs* IGF-1) | N=6 | 0.349 | Not significant |
| PSP Tau OFF (ACSF *vs* IGF-1) | N=6 | 0.108 | Not significant |
| Fig. 3M | One-way ANOVA (post hoc Dunnett’s multiple comparisons test) | AP (ACSF *vs* IGF-1) 5 min | N=6 | 0.640 | Not significant  |
| AP (ACSF *vs* IGF-1) 10 min | N=6 | 0.315 | Not significant |
| AP (ACSF *vs* IGF-1) 15 min | N=6 | 0.005 | \*\* |
| Fig. 3N | Test for normal distribution Kolmogorov-Smirnov testPaired t-test (two-tailed) | AP amplitude (ACSF *vs* IGF-1) | N=6 | 0.031 | \* |
| AP half-width (ACSF *vs* IGF-1) | N=6 | 0.100 | Not significant |
| AP time to rise slope (ACSF *vs* IGF-1) | N=6 | 0.451 | Not significant |
| AP rise slope (ACSF *vs* IGF-1) | N=6 | 0.843 | Not significant |
| AP time to decay slope (ACSF *vs* IGF-1) | N=6 | 0.666 | Not significant |
| AP decay slope (ACSF *vs* IGF-1)  | N=6 | 0.133 | Not significant |
| **Figure 4:** **IGF-1 facilitates the memory of extinction by reducing mIAHP and sIAHP, increasing the firing frequency** |
| Fig.4B | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | **Cond** Session 1 (Saline *vs* IGF-1) | N=11-14 | 0.141 | Not significant |
| **Cond** Session 1 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.984 | Not significant |
| **Cond** Session 1 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.118 | Not significant |
| **Cond** Session 2 (Saline *vs* IGF-1) | N=11-14 | 0.293 | Not significant |
| **Cond** Session 2 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.911 | Not significant |
| **Cond** Session 2 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.166 | Not significant |
| **Cond** Session 3 (Saline *vs* IGF-1) | N=11-14 | 0.332 | Not significant |
| **Cond** Session 3 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.977 | Not significant |
| **Cond** Session 3 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.459 | Not significant |
| Fig.4B | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | **Ext** Session 1 (Saline *vs* IGF-1) | N=11-14 | 0.984 | Not significant |
| **Ext** Session 1 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.719 | Not significant |
| **Ext** 3 Session 1 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.840 | Not significant |
| **Ext** Session 2 (Saline *vs* IGF-1) | N=11-14 | 0.484 | Not significant |
| **Ext** Session 2 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.528 | Not significant |
| **Ext** Session 2 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.992 | Not significant |
| **Ext** Session 3 (Saline *vs* IGF-1) | N=11-14 | 0.688 | Not significant |
| **Ext** Session 3 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | >0.999 | Not significant |
| **Ext** Session 3 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.680 | Not significant |
| **Ext** Session 4 (Saline *vs* IGF-1) | N=11-14 | 0.892 | Not significant |
| **Ext** Session 4 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.534 | Not significant |
| **Ext** Session 4 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.844 | Not significant |
| **Ext** Session 5 (Saline *vs* IGF-1) | N=11-14 | 0.927 | Not significant |
| **Ext** Session 5 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.543 | Not significant |
| **Ext** Session 5 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.369 | Not significant |
| **Ext** Session 6 (Saline *vs* IGF-1) | N=11-14 | 0.504 | Not significant |
| **Ext** Session 6 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.170 | Not significant |
| **Ext** Session 6 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.820 | Not significant |
| **Ext** Session 7 (Saline *vs* IGF-1) | N=11-14 | 0.978 | Not significant |
| **Ext** Session 7 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.493 | Not significant |
| **Ext** Session 7 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.418 | Not significant |
| **Ext** Session 8 (Saline *vs* IGF-1) | N=11-14 | 0.650 | Not significant |
| **Ext** Session 8 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.302 | Not significant |
| **Ext** Session 8 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.075 | Not significant |
| **Ext** Session 9 (Saline *vs* IGF-1) | N=11-14 | 0.699 | Not significant |
| **Ext** Session 9 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.111 | Not significant |
| **Ext** Session 9 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.502 | Not significant |
| **Ext** Session 10 (Saline *vs* IGF-1) | N=11-14 | 0.429 | Not significant |
| **Ext** Session 10 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.065 | Not significant |
| **Ext** Session 10 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.629 | Not significant |
| **Ext** Session 11 (Saline *vs* IGF-1) | N=11-14 | 0.924 | Not significant |
| **Ext** Session 11 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.663 | Not significant |
| **Ext** Session 11 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.901 | Not significant |
| **Ext** Session 12 (Saline *vs* IGF-1) | N=11-14 | 0.368 | Not significant |
| **Ext** Session 12 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.083 | Not significant |
| **Ext** Session 12 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.761 | Not significant |
| **Ext** Session 13 (Saline *vs* IGF-1) | N=11-14 | 0.356 | Not significant |
| **Ext** Session 13 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.138 | Not significant |
| **Ext** Session 13 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.900 | Not significant |
| **Ext** Session 14 (Saline *vs* IGF-1) | N=11-14 | 0.030 | \* |
| **Ext** Session 14 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.085 | Not significant |
| **Ext** Session 14 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.816 | Not significant |
| **Ext** Session 15 (Saline *vs* IGF-1) | N=11-14 | 0.099 | Not significant |
| **Ext** Session 15 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.021 | # |
| **Ext** Session 15 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.862 | Not significant |
| **Ext** Session 16 (Saline *vs* IGF-1) | N=11-14 | 0.428 | Not significant |
| **Ext** Session 16 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.059 | Not significant |
| **Ext** Session 16 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.561 | Not significant |
| **Ext** Session 17 (Saline *vs* IGF-1) | N=11-14 | 0.192 | Not significant |
| **Ext** Session 17 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.141 | Not significant |
| **Ext** Session 17 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.999 | Not significant |
| **Ext** Session 18 (Saline *vs* IGF-1) | N=11-14 | 0.277 | Not significant |
| **Ext** Session 18 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.576 | Not significant |
| **Ext** Session 18 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.816 | Not significant |
| **Ext** Session 19 (Saline *vs* IGF-1) | N=11-14 | 0.253 | Not significant |
| **Ext** Session 19 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.007 | ## |
| **Ext** Session 19 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.340 | Not significant |
| **Ext** Session 20 (Saline *vs* IGF-1) | N=11-14 | 0.578 | Not significant |
| **Ext** Session 20 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.0002 | ### |
| **Ext** Session 20 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.008 | \*\* |
| Fig.4B | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | **Test** Session 1 (Saline *vs* IGF-1) | N=11-14 | 0.117 | Not significant |
| **Test** Session 1 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.060 | Not significant |
| **Test** Session 1 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.973 | Not significant |
| **Test** Session 2 (Saline *vs* IGF-1) | N=11-14 | 0.423 | Not significant |
| **Test** Session 2 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.153 | Not significant |
| **Test** Session 2 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.849 | Not significant |
| **Test** Session 3 (Saline *vs* IGF-1) | N=11-14 | 0.204 | Not significant |
| **Test** Session 3 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.012 | # |
| **Test** Session 3 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.470 | Not significant |
| **Test** Session 4 (Saline *vs* IGF-1) | N=11-14 | 0.043 | \* |
| **Test** Session 4 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.002 | ## |
| **Test** Session 4 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.486 | Not significant |
| **Test** Session 5 (Saline *vs* IGF-1) | N=11-14 | 0.008 | \*\* |
| **Test** Session 5 (IGF-1 *vs* NVP+IGF-1) | N=14-12 | 0.0003 | ### |
| **Test** Session 5 (Saline *vs* NVP+IGF-1) | N=11-12 | 0.850 | Not significant |
| Fig.4D | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | mIAHP (Ext-Saline *vs* Ext-IGF-1) | N=11-7 | 0.049 | \* |
| mIAHP (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-9 | 0.01 | \*\* |
| mIAHP (Ext-Saline *vs* Ext-NVP+IGF-1) | N=11-9 | 0.663 | Not significant |
| Fig.4E | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | sIAHP (Ext-Saline *vs* Ext-IGF-1) | N=11-7 | 0.049 | \* |
| sIAHP (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-9 | 0.0006 | \*\*\* |
| sIAHP (Ext-Saline *vs* Ext-NVP+IGF-1) | N=11-9 | 0.096 | Not significant |
| Fig.4F |  | Correlation between (mIAHP-%freezing) | N=10 | r=0.763 | - |
| Correlation between (sIAHP-%freezing) | N=10 | r=787 | - |
| Fig.4G | Two-way ANOVApost hoc Turkey’s multiple comparisons test) | **25 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.991 | Not significant |
| **25 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.989 | Not significant |
| **25 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | >0.999 | Not significant |
| **50 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.903 | Not significant |
| **50 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.937 | Not significant |
| **50 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.990 | Not significant |
| **75 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.897 | Not significant |
| **75 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.876 | Not significant |
| **75 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | >0.999 | Not significant |
| **100 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.655 | Not significant |
| **100 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.778 | Not significant |
| **100 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.951 | Not significant |
| **125 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.611 | Not significant |
| **125 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.826 | Not significant |
| **125 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.890 | Not significant |
| **150 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.339 | Not significant |
| **150 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.863 | Not significant |
| **150 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.563 | Not significant |
| **175 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.101 | Not significant |
| **175 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.397 | Not significant |
| **175 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.514 | Not significant |
| **200 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.046 | # |
| **200 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.265 | Not significant |
| **200 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.435 | Not significant |
| **225 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.049 | # |
| **225 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.265 | Not significant |
| **225 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.435 | Not significant |
| **250 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.013 | # |
| **250 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.016 | \* |
| **250 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.724 | Not significant |
| **275 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.007 | ## |
| **275 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.017 | \* |
| **275 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.724 | Not significant |
| **300 pA** (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-6 | 0.0003 | ### |
| **300 pA** (Ext-IGF-1 *vs* Ext-Saline) | N=7-10 | 0.0001 | \*\*\* |
| **300 pA** (Ext-NVP+IGF-1 *vs* Ext-Saline) | N=6-10 | 0.903 | Not significant |
| **Figure 5: IGF-1 decreases the frequency of mEPSC** |
| Fig. 5B | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | mEPSC (Ext-Saline *vs* Ext-IGF-1) | N=5-6 | 0.017 | \* |
| mEPSC (Ext-Saline *vs* Ext-NVP+IGF-1) | N=5-6 | 0.973 | Not significant |
| mEPSC (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=6-6 | 0.020 | \* |
| Fig. 5C | Kolmogorov-Smirnov test | mEPSC (Ext-Saline *vs* Ext-IGF-1) | - | <0.0001 | \*\*\* |
| mEPSC (Ext-Saline *vs* Ext-NVP+IGF-1) | - | 0.003 | \*\* |
| mEPSC (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | - | <0.0001 | ### |
| Fig. 5D | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | mEPSC (Ext-Saline *vs* Ext-IGF-1) | N=6 | 0.781 | Not significant |
| mEPSC (Ext-Saline vs Ext-NVP+IGF-1) | N=5-6 | 0.972 | Not significant |
| mEPSC (Ext-IGF-1 vs Ext-NVP+IGF-1) | N=6-6 | 0.885 | Not significant |
| Fig.5E | Kolmogorov-Smirnov test | mEPSC (Ext-Saline vs Ext-IGF-1) | - | 0.015 | \* |
| mEPSC (Ext-Saline vs Ext-NVP+IGF-1) | - | <0.0001 | \*\*\* |
| mEPSC (Ext-IGF-1 vs Ext-NVP+IGF-1) | - | <0.0001 | ### |
| **Supplementary Figure 1: IGF-1 has no effect on fAHP and fIAHP** |
| Fig. S1B | Paired t-test (two-tailed) | fAHP (ACSF *vs* IGF-1) | N=7 | 0.687 | Not significant |
| fAHP (NVP *vs* NVP+IGF-1) | N=5 | 0.062 | Not significant |
| Unpaired t-test (two-tailed) | fAHP (ACSF *vs* NVP) | N=7-5 | 0.106 | Not significant |
| Fig. S1D | Paired t-test (two-tailed) | *m*IAHP (ACSF *vs* IGF-1) | N=7 | 0.250 | Not significant |
| *m*IAHP (NVP *vs* NVP+IGF-1) | N=6 | 0.687 | Not significant |
| **Supplementary Figure 2: Action potential properties and resting membrane of IL-L5PNs** |
| Fig. S2A | Test for normal distribution Kolmogorov-Smirnov testPaired t-test (two-tailed) or Wilcoxon test | AP amplitude (ACSF *vs* IGF-1) | N=9 | 0.286 | Not significant |
| Fig. S2B | AP threshold (ACSF *vs* IGF-1) | N=9 | 0.781 | Not significant |
| Fig. S2C | AP half-width (ACSF *vs* IGF-1) | N=9 | 0.734 | Not significant |
| Fig. S2D | AP time to rise slope (ACSF *vs* IGF-1) | N=9 | 0.478 | Not significant |
| Fig. S2E | AP max rise slope (ACSF *vs* IGF-1) | N=9 | 0.190 | Not significant |
| Fig. S2F | AP time to decay slope (ACSF *vs* IGF-1) | N=9 | 0.912 | Not significant |
| Fig. S2G | AP max decay slope (ACSF *vs* IGF-1) | N=9 | 0.912 | Not significant |
| Fig. S2H | Rm (ACSF *vs* IGF-1) | N=12 | <0.0005 | \*\*\* |
| **Supplementary Figure 3: Time curse of mIAHP and sIAHP** |
| Fig. S3A | Paired t-test (two-tailed) | mIAHP protocol | N=4 | 0.320 | Not significant |
| sIAHP protocol | N=4 | 0.672 | Not significant |
| Fig. S3B | Paired t-test (two-tailed) | mIAHP time curse (ACSF *vs* washing IGF-1) | N=7 | 0.006 | \*\* |
| mIAHP time curse (ACSF *vs* washing IGF-1) | N=5 | 0.0008 | \*\*\* |
| Unpaired t-test (two-tailed) | mIAHP LTD  | N=7-5 | 0.882 | Not significant |
| Fig. S3C | Paired t-test (two-tailed) | sIAHP time curse (ACSF *vs* washing IGF-1) | N=7 | 0.002 | \*\* |
| Paired t-test (two-tailed) | sIAHP time curse (ACSF *vs* washing IGF-1) | N=5 | 0.003 | \*\* |
| Unpaired t-test (two-tailed) | sIAHP LTD  | N=7-5 | 0.838 | Not significant |
| **Supplementary Figure 4: Protocol of stimulation does not induce plasticity** |
| Fig. S4A | Paired t-test (two-tailed) | % PSP (ACSF before *vs* after stim.) | N=6 | 0.437 | Not significant |
| Fig. S4B | One-way ANOVA (post hoc Dunnett’s multiple comparisons test) | AP (ACSF) 5 min | N=6 | 0.443 | Not significant |
| AP (ACSF) 10 min | N=6 | 0.943 | Not significant |
| AP (ACSF) 15 min | N=6 | 0.988 | Not significant |
| **Supplementary Figure 5: The application of IGF-1 for 10 min is sufficient to induce plasticity** |
| Fig. S5A | Paired t-test (two-tailed) | % PSP (ACSF *vs* washing IGF-1) | N=4 | 0.0010 | \*\*\* |
| Fig. S5B | One-way ANOVA (post hoc Dunnett’s multiple comparisons test) | AP (ACSF vs IGF-1) 5 min | N=4 | 0.068 | Not significant |
| AP (ACSF vs IGF-1) 10 min | N=4 | 0.013 | \* |
| **Supplementary Figure 6:** **Protocol of behavior** |
| Fig.S6B | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | **Cond** Session 1 (Cond *vs* Ext) | N=7-11 | 0.847 | Not significant |
| **Cond** Session 2 (Cond *vs* Ext) | N=7-11 | >0.999 | Not significant |
| **Cond** Session 3 (Cond *vs* Ext) | N=7-11 | 0.999 | Not significant |
| Fig. S6B  | One-way ANOVA (post hoc Turkey’s multiple comparisons test) | **Test** Session 1 (Cond *vs* Ext) | N=7-11 | 0.361 | Not significant |
| **Test** Session 2 (Cond *vs* Ext) | N=7-11 | 0.040 | **\*** |
| **Test** Session 3 (Cond *vs* Ext) | N=7-11 | 0.0041 | **\*\*** |
| **Test** Session 4 (Cond *vs* Ext) | N=7-11 | 0.0003 | **\*\*\*** |
| **Test** Session 5 (Cond *vs* Ext) | N=7-11 | 0.0006 | **\*\*\*** |
| **Supplementary Figure 7: Hyperpolarized potentials recording after behaviors** |
| Fig. S7A | One-way ANOVA(post hoc Turkey’s multiple comparisons test) | *f*AHP (NAÏVE *vs* EXT) | N=10-6 | 0.006 | \*\* |
| *f*AHP (NAÏVE *vs* Ext-Saline) | N=10-10 | 0.011 | \* |
| *f*AHP (NAÏVE *vs* Ext-IGF-1) | N=10-7 | 0.014 | \* |
| *f*AHP (NAÏVE *vs* EXT-NVP+IGF-1) | N=10-8 | 0.525 | Not significant |
| *f*AHP (EXT *vs* Ext-Saline) | N=6-10 | 0.958 | Not significant |
| *f*AHP (EXT *vs* Ext-IGF-1) | N=6-7 | 0.992 | Not significant |
| *f*AHP (EXT *vs* Ext-NVP+IGF-1) | N=6-8 | 0.227 | Not significant |
| *f*AHP (Ext-Saline *vs* Ext-IGF-1) | N=10-7 | 0.999 | Not significant |
| *f*AHP (Ext-Saline *vs* Ext-NVP+IGF-1) | N=10-8 | 0.456 | Not significant |
| *f*AHP (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=7-8 | 0.408 | Not significant |
| Fig. S7B | One-way ANOVA(post hoc Turkey’s multiple comparisons test) | *m*AHP (NAÏVE *vs* EXT) | N=16-6 | 0.029 | \* |
| *m*AHP (NAÏVE *vs* Ext-Saline) | N=16-13 | 0.028 | \* |
| *m*AHP (NAÏVE *vs* Ext-IGF-1) | N=16-6 | 0.007 | \*\* |
| *m*AHP (NAÏVE *vs* Ext-NVP+IGF-1) | N=16-11 | 0.033 | \* |
| *m*AHP (EXT *vs* Ext-Saline) | N=6-13 | 0.967 | Not significant |
| *m*AHP (EXT *vs* Ext-IGF-1) | N=6-6 | 0.993 | Not significant |
| *m*AHP (EXT *vs* Ext-NVP+IGF-1) | N=6-11 | 0.979 | Not significant |
| *m*AHP (Ext-Saline *vs* Ext-IGF-1) | N=13-6 | 0.786 | Not significant |
| *m*AHP (Ext-Saline *vs* Ext-NVP+IGF-1) | N=13-11 | >0.999 | Not significant |
| *m*AHP (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=6-11 | 0.833 | Not significant |
| Fig. S7C | One-way ANOVA(post hoc Turkey’s multiple comparisons test) | *s*AHP (NAÏVE *vs* EXT) | N=12-6 | 0.313 | Not significant  |
| *s*AHP (NAÏVE *vs* Ext-Saline) | N=12-11 | 0.063 | Not significant |
| *s*AHP (NAÏVE *vs* Ext-IGF-1) | N=12-6 | 0.012 | \* |
| *s*AHP (NAÏVE *vs* Ext-NVP+IGF-1) | N=12-11 | 0.074 | Not significant |
| *s*AHP (EXT *vs* Ext-Saline) | N=6-11 | 0.996 | Not significant |
| *s*AHP (EXT *vs* Ext-IGF-1) | N=6-6 | 0.707 | Not significant |
| *s*AHP (EXT *vs* Ext-NVP+IGF-1) | N=6-11 | 0.998 | Not significant |
| *s*AHP (Ext-Saline *vs* Ext-IGF-1) | N=11-6 | 0.807 | Not significant |
| *s*AHP (Ext-Saline *vs* Ext-NVP+IGF-1) | N=11-11 | >0.999 | Not significant |
| *s*AHP (Ext-IGF-1 *vs* Ext-NVP+IGF-1) | N=6-11 | 0.777 | Not significant |