**Supplementary file 1:**

**Table 1:** Statistical summary of results

|  |  |  |
| --- | --- | --- |
| **Experiment** | **Figure(s)** | **Statistical details** |
| **Western blot protein quantifications** | **Figure 1C** | **AP2γ quantification:**  Student’s t-test, *t*6= 3.26, *p*< 0.01  **Sox2 quantification:**  Student’s t-test, *t6*= 0.33, *p*= 0.75  **Pax6 quantification:**  Student’s t-test, *t6*= 2.58, *p*< 0.05  **Tbr2 quantification:**  Student’s t-test, *t6*= 2.93, *p*< 0.05  nWT juvenile = 4; nAP2γ KO juvenile = 4 |
| **Figure 1D** | **AP2γ quantification:**  Student’s t-test, *t*6= 3.95, *p*< 0.01  **Sox2 quantification:**  Student’s t-test, *t6*= 1.41, *p*= 0.21  **Pax6 quantification:**  Student’s t-test, *t6*= 4.67, *p*< 0.01  **Tbr2 quantification:**  Student’s t-test, *t6*= 2.56, *p*< 0.05  nWT adult = 4; nAP2γ KO adult = 4 |
| **Cell proliferation** | **Figure 1F** | **BrdU+ cells:**  Student’s t-test, *t10*= 2.47, *p*< 0.05  nWT juvenile = 6; n AP2γ KO juvenile = 6; |
| **Figure 1G** | **BrdU+DCX+cells:**  Student’s t-test, *t10*= 2.58, p< 0.05  nWT juvenile = 6; nAP2γ KO juvenile = 6; |
| **Figure 1H** | **BrdU+ cells:**  Student’s t-test, *t8*= 2.67, p< 0.05  nWT adult = 5; nAP2γ KO adult = 5 |
| **Figure 1I** | **BrdU+DCX+cells:**  Student’s t-test, +: *t8*= 3.53, p< 0.01  nWT adult = 5;nAP2γ KO adult = 5 |
| **Juvenile vs Adult comparison** | **BrdU+ cells:**  Two-way ANOVA, *F*(1,18)= 147.8, p<0.001  Bonferroni’s multiple comparisons test:  Juvenile WT vs Adult WT: p<0.001  Juvenile AP2γ KO vs Adult AP2γ KO: p<0.001  nWT juvenile = 6; nWT juvenile = 5  nAP2γKO juvenile = 6; nAP2γKO adult = 5 |
| **Juvenile vs Adult Comparison** | **BrdU+DCX+cells:**  Two-way ANOVA, *F*(1,18)= 186.5, p<0.001  Bonferroni’s multiple comparisons test:  Juvenile WT vs Adult WT: p<0.001  Juvenile AP2γ KO vs Adult AP2γ KO: p<0.001  nWT juvenile = 6; nWT juvenile = 5  nAP2γ KO juvenile = 6; nAP2γ KO adult = 5 |

|  |  |  |
| --- | --- | --- |
| **DCX+ cells density and morphology** | **Figure 2C** | **Short-DCX+ cells density:**  Student’s t-test, *t*6= 3.53, *p<*0.05  nWT adult = 4; nAP2γ KO adult = 4 |
| **Figure 2E** | **Dendritic length of short-DCX+ cells:**  Student’s t-test, *t*6= 5.54, *p<*0.01  nWT adult = 4; nAP2γ KO adult = 4 |
| **Figure 2F** | **Neuronal arborization:**  Genotype’s comparison (WT vs AP2γ KO):  Repeated measures ANOVA, F(1,78)= 70.09, *p<*0.001  nWT adult= 4  nAP2γ KO adult = 4 |
| **Figure 2G** | **Long-DCX+ cells density:**  Student’s t-test, *t*6= 5.87, *p<*0.01  nWT adult = 4; nAP2γ KO adult = 4 |
| **Figure 2I** | **Dendritic length of long-DCX+ cells:**  Student’s t-test, *t*6= 0.05, *p*= 0.96  nWT adult = 4; nAP2γ KO adult = 4 |
| **Figure 2J** | **Neuronal arborization:**  Genotype’s comparison (WT vs AP2γ KO):  Repeated measures ANOVA, F(1,78)= 2.47, *p=* 0.12  nWT adult= 4  nAP2γ KO adult = 4 |
| **3D neuronal reconstruction** | **Figure 2 – Supplement 1A** | **Dendritic length:**  Student’s t-test, *t*6= 0.29, *p*= 0.78  nWT juvenile = 4; nAP2γ KO juvenile = 4 |
| **Figure 2 – Supplement 1B** | **Dendritic length:**  Student’s t-test, *t*7= 0.06, *p*= 0.96  nWT adult = 4; nAP2γ KO adult = 5 |
| **Figure 2 – Supplement 1C** | **Neuronal arborization:**  Genotype’s comparison (WT vs AP2γ KO):  Juvenile phase:  Repeated measures ANOVA, F(1,72)= 1.20, *p*= 0.28  Adulthood:  Repeated measures ANOVA, F(1,84)= 1.12, *p*= 0.29  nWT juvenile = 4; nAP2γ KO juvenile= 4  nWT adult juvenile = 5; nAP2γ KO adult = 5 |

|  |  |  |
| --- | --- | --- |
| **OF**  (juvenile) | **Figure 3B; Figure 3 – Supplement 2A** | **Distance in center:**  Student’s t-test, *t*22 = 2.64, *p*<0.05  **Average velocity:**  Student’s t-test, *t22*= 0.40, *p*= 0.69  nWT = 13; nAP2γ KO = 11 |
| **NSF**  (juvenile) | **Figure 3C and D; Figure 3 Supplement 2B** | **Latency to touch:**  Student’s t-test, *t*26 = 2.06, *p*<0.05  **Latency to eat:**  Student’s t-test, *t*26 = 2.00, *p =* 0.05  **Food consumption:**  Repeated measures ANOVA, F(1,31)= 0.07, *p=* 0.80  nWT = 16; nAP2γ KO = 17 |
| **TST**  (juvenile) | **Figure 3E** | **Immobility time:**  Student’s t-test, *t27*= 0.23, *p*= 0.82  nWT = 16; nAP2γ KO = 13 |
| **SST**  (juvenile) | **Figure 3F** | **Grooming time:**  Student’s t-test, *t23*= 0.05, *p*= 0.96  nWT = 15; nAP2γ KO = 10 |
| **MWM**  (juvenile) | **Figure 3G** | **Spatial Reference memory task:**  Repeated measures ANOVA, F(1,17)= 0.27, *p*= 0.61 |
| **ORT**  (juvenile) | **Figure 3I and J** | **Object location exploration:**  Student’s t-test, *t17*= 0.79, *p*=0.27  **Object recognition exploration:**  Student’s t-test, *t17*= 3.33, *p*<0.05  nWT = 11; nAP2γ KO = 8 |
| **OIC**  (juvenile) | **Figure 3L** | **Patter separation:**  Two-way ANOVA, *F*(1,62)= 15.26, p<0.001  Bonferroni’s multiple comparisons test:  WTFamiliar Context vsWT Out of Context: p<0.001  AP2γ KO Familiar Context vsAP2γ KO Out of Context:  p = 0.94  WT Out of Context vs AP2γ KOOut of Context: p<0.01  nWT = 16; nAP2γ KO = 17 |
| **CFC**  (juvenile) | **Figure 3N – Q** | **Before Conditioning:**  Student’s t-test, *t31*= 0.56, *p*= 0.58  **Context probe A:**  Student’s t-test, *t31*= 3.60, *p*< 0.01  **Context probe B:**  Student’s t-test, *t31*= 0.70, *p*= 0.49  **Cue Probe:**  Student’s t-test, *t3*1= 1.0.76, *p*= 0.45  nWT = 16; nAP2γ KO = 17 |

|  |  |  |
| --- | --- | --- |
| **OF**  (adult) | **Figure 4B and Figure 4 – supplement 1A** | **Distance in center:**  Student’s t-test, *t24*= 2.10, *p*= 0.05  **Average velocity:**  Student’s t-test, *t*24=0.49, *p*= 0.63  nWT = 12; nAP2γ KO = 14 |
| **EPM**  (adult) | **Figure 4C** | **Open arms time:**  Student’s t-test, *t*18= 3.10, *p*< 0.01  nWT = 12; nAP2γ KO = 14 |
| **NSF**  (adult) | **Figure 4D and E; Figure 4 Supplement 1B** | **Latency to touch:**  Student’s t-test, *t17*= 3.66, *p*<0.01  **Latency to eat:**  Student’s t-test, *t17*= 2.76, *p*<0.01  **Food consumption:**  Repeated measures ANOVA, F(1,19)= 0.28, *p=* 0.60  nWT = 10; nAP2γ KO= 9 |
| **FST**  (adult) | **Figure 4F** | **Immobility time:**  Student’s t-test, *t*24= 1.26, *p*= 0.22  nWT = 12; nAP2γ KO = 14 |
| **TST**  (adult) | **Figure 4G** | **Immobility time:**  Student’s t-test, *t*10= 0.64, *p*= 0.54  nWT = 6; nAP2γ KO = 6 |
| **ORT**  (adult) | **Figure 4H and I** | **Object location exploration:**  Student’s t-test, *t19*= 1.80, *p*= 0.08  **Object recognition exploration:**  Student’s t-test; *t19*= 0.26, *p*= 0.79  nWT = 12; nAP2γ KO = 9 |
| **PS**  (adult) | **Figure 4J** | **Patter separation:**  Two-way ANOVA, *F*(1,40)= 21.94, p<0.001  Bonferroni’s multiple comparisons test:  WTFamiliar Context vsWT Out of Context: *p*<0.001  AP2γ KO Familiar Context vsAP2γ KO Out of Context:  *p* = 0.18  WT Out of Context vs AP2γ KO Out of Context: *p*<0.05  nWT = 12; nAP2γ KO = 10 |
| **CFC**  (adult) | **Figure 4K – M** | **Before Conditioning:**  Student’s t-test, *t11*= 0.38, *p*= 0.71  **Context probe A:**  Student’s t-test, *t*11= 2.84, *p*< 0.05  **Context probe B:**  Student’s t-test, *t*11= 0.34, *p*= 0.75  **Cue Probe:**  Student’s t-test, *t*11= 1.26, *p*= 0.24  nWT = 7; nAP2γ KO = 6 |
| **MWM**  (adult) | **Figure 5B and 5C; Figure 5 – Supplement 1** | **Spatial Reference memory task:**  Repeated measures ANOVA, F(1,72)= 1.35, *p*= 0.25  **Behavior flexibility:**  Student’s t-test, *t*18= 6.79, *p* <0.001  **Working memory task:**  Repeated measures ANOVA, F(1,72)= 0.85, *p*= 0.36  nWT = 10; nAP2γ KO = 10 |

|  |  |  |
| --- | --- | --- |
| **Spectral coherence**  **dHip-mPFC** | **Figure 6B** | Two-way ANOVA, *F*(1,9)= 7.32, p< 0.05  Bonferroni’s multiple comparisons test:  **Delta:** WT vs AP2γ KO*p* < 0.05  **Theta:** WT vs AP2γ KO *p* < 0.05  **Beta:** WT vs AP2γ KO *p* < 0.05  **Low gamma:** WT vs AP2γ KO *p* = 0.11  **High gamma:** WT vs AP2γ KO *p* = 0.80  nWT = 6; nAP2γ KO = 5 |
| **PSD values**  **dHIP** | **Figure 6C** | Two-way ANOVA, *F*(1,9)= 3.20, *p* = 0.09  Bonferroni’s multiple comparisons test:  **Delta:** WT vs AP2γ KO*p* = 0.94  **Theta:** WT vs AP2γ KO *p* = 0.07  **Beta:** WT vs AP2γ KO *p* = 0.08  **Low gamma:** WT vs AP2γ KO *p* = 0. 52  **High gamma:** WT vs AP2γ KO *p* = 0.99  nWT = 6; nAP2γ KO = 5 |
| **PSD values**  **mPFC** | **Figure 6D** | Two-way ANOVA, *F*(1,9)= 8.64, p< 0.05  Bonferroni’s multiple comparisons test:  **Delta:** WT vs AP2γ KO *p* < 0.05  **Theta:** WT vs AP2γ KO *p* < 0.05  **Beta:** WT vs AP2γ KO *p* < 0.05  **Low gamma:** WT vs AP2γ KO *p* = 0.08  **High gamma:** WT vs AP2γ KO *p* = 0.60  nWT = 6; nAP2γ KO = 5 |
| **Spectral coherence**  **vHIP-mPFC** | **Figure 6 – Figure 6 supplement 1B** | Two-way ANOVA, *F*(1,8)= 0.02, *p* = 0.88  Bonferroni’s multiple comparisons test:  **Delta:** WT vs AP2γ KO *p* = 0.59  **Theta:** WT vs AP2γ KO *p* = 0.90  **Beta:** WT vs AP2γ KO *p* = 0.99  **Low gamma:** WT vs AP2γ KO *p* = 0.98  **High gamma:** WT vs AP2γ KO *p* = 0.90  nWT = 5; nAP2γ KO = 5 |
| **PSD values**  **vHIP** | **Figure 6 – Figure 6 supplement 1C** | Two-way ANOVA, *F*(1,8)= 2.96, *p* = 0.12  Bonferroni’s multiple comparisons test:  **Delta:** WT vs AP2γ KO *p* = 0.09  **Theta:** WT vs AP2γ KO *p* = 0.77  **Beta:** WT vs AP2γ KO p> 0.99  **Low gamma:** WT vs AP2γ KO p > 0.99  **High gamma:** WT vs AP2γ KO p = 0.86  nWT = 5; nAP2γ KO = 5 |