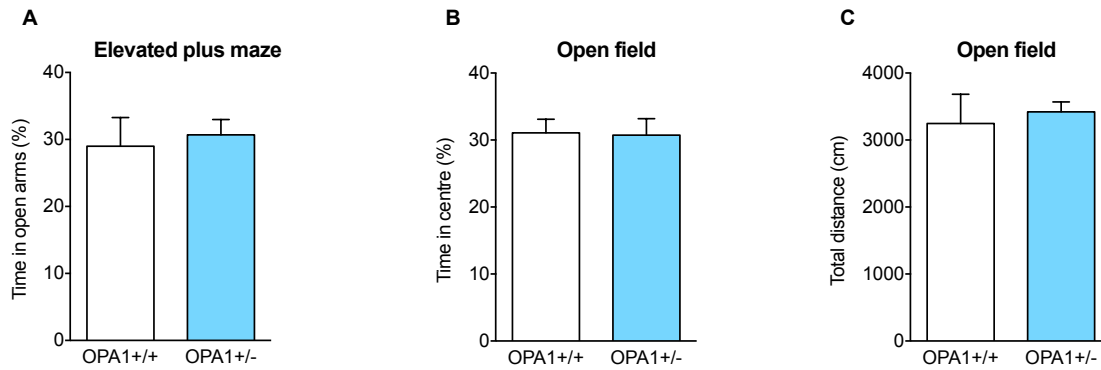


# Supplementary Figure & legends

## Supplementary Figure 1

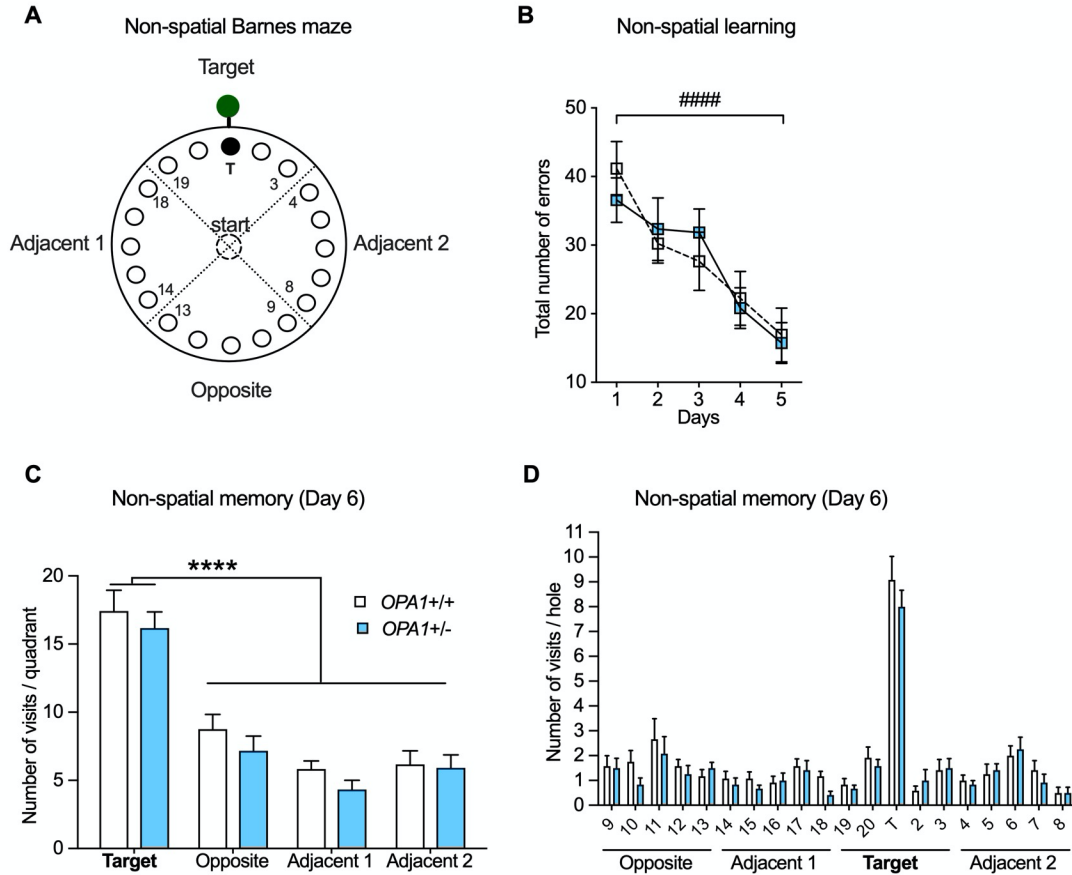


### Supplementary Figure 1

#### Intact anxiety-related and locomotor behavior in *OPA1*<sup>+/-</sup> mice

*OPA1* deficiency has no impact on anxiety-like behavior measured by **(A)** the time spent in the open arms of the elevated plus maze (in %, *OPA1*<sup>+/+</sup>: 29.01±4.27; *OPA1*<sup>+/-</sup>: 30.72±2.28,  $t=0.34$ ,  $df=25$ ,  $p=0.734$ ; t-test). Mice from both genotypes show similar locomotor activity in the open-field, evaluated by **(B)** the time spent in the center area (in %, *OPA1*<sup>+/+</sup>:31.07±2.03; *OPA1*<sup>+/-</sup>: 30.73±2.46,  $t=0.11$ ,  $df=25$ ,  $p=0.915$ ; t-test), and **(C)** the total distance travelled (in cm, *OPA1*<sup>+/+</sup> = 3246 ± 437.7; *OPA1*<sup>+/-</sup> = 3423 ± 145.1,  $p=0.239$ ; Mann-Whitney test). *OPA1*<sup>+/+</sup>,  $n=14$ ; *OPA1*<sup>+/-</sup>,  $n=13$ .

## Supplementary Figure 2

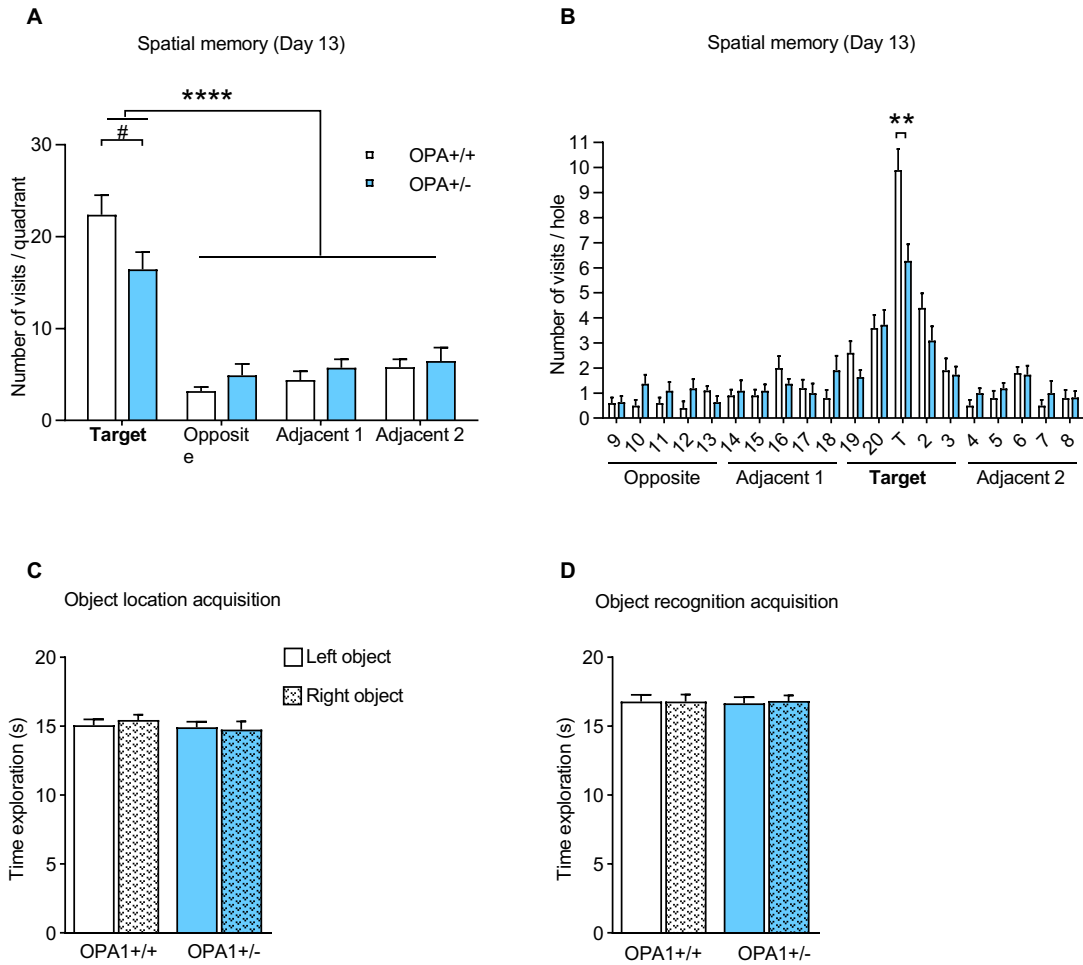


## Supplementary Figure 2

### *OPAI*<sup>+/-</sup> mice display intact performances in the non-spatial Barnes maze

(A) Schematic setup of the non-spatial (cued) Barnes maze. (B) During the five days of training, the number of visits before entering into the escape hole decreased for mice of both genotypes, indicating they learned to locate the escape hole (*session*:  $F_{(4,88)}=17.82$ ,  $####p<0.0001$ ; two-way ANOVA with repeated measures). No difference was found between genotypes ( $F_{(1,22)}=0.002$ ,  $p=0.96$ ). (C) During the non-spatial probe test held 24 hours after training (Day 6), both groups of mice visited more often the holes located in the target quadrant than in each other quadrants ( $F_{(3, 88)}=51.35$ ,  $***p<0.0001$ ) and no difference was observed between genotypes ( $F_{(1,88)}=2.355$ ,  $p=0.128$ ). (D) *OPAI*<sup>+/+</sup> and *OPAI*<sup>+/-</sup> mice exhibited a similar preference for the target hole ( $p=0.3596$ ). *OPAI*<sup>+/+</sup>,  $n=12$ ; *OPAI*<sup>+/-</sup>,  $n=12$ .

### Supplementary Figure 3



### Supplementary Figure 3

#### Long-term spatial memory is less accurate in *OPAI*<sup>+/-</sup> mice than in *OPAI*<sup>+/+</sup> mice

(A) During the spatial memory probe test held 7 days after training (Day 13), mice from both genotypes visited significantly more often the holes located in the target quadrant than those located in the other quadrants ( $F_{(3, 16)} = 48.8$ , \*\*\*\* $p < 0.0001$ ; two-way ANOVA). Moreover, *OPAI*<sup>+/-</sup> visited significantly less often the holes of the target quadrant ( $\#p < 0.05$ , Bonferroni's multiple comparison). (B) This effect was strictly attributable to a difference between *OPAI*<sup>+/-</sup> and *OPAI*<sup>+/+</sup> mice in the number of visits to the target hole ( $t = 3.433$ ,  $df = 19$ , \*\*  $p < 0.01$ ; unpaired t-test), revealing a less precise spatial memory in mutant mice. *OPAI*<sup>+/+</sup>,  $n = 10$ ; *OPAI*<sup>+/-</sup>,  $n = 11$ . ***OPAI*<sup>+/+</sup> and *OPAI*<sup>+/-</sup> mice express similar interest for all objects.** Mice from both genotypes spent the same amount of time exploring the left and right objects during the acquisition phase of the object location (C) and object recognition (D) tasks. Mean exploration time was not different between genotypes, indicating that both groups of mice had a similar interest for each object. *Object location*: *OPAI*<sup>+/+</sup>,  $n = 13$ ; *OPAI*<sup>+/-</sup>,  $n = 12$ ; *Object recognition*: *OPAI*<sup>+/+</sup>,  $n = 14$ ; *OPAI*<sup>+/-</sup>,  $n = 12$ .