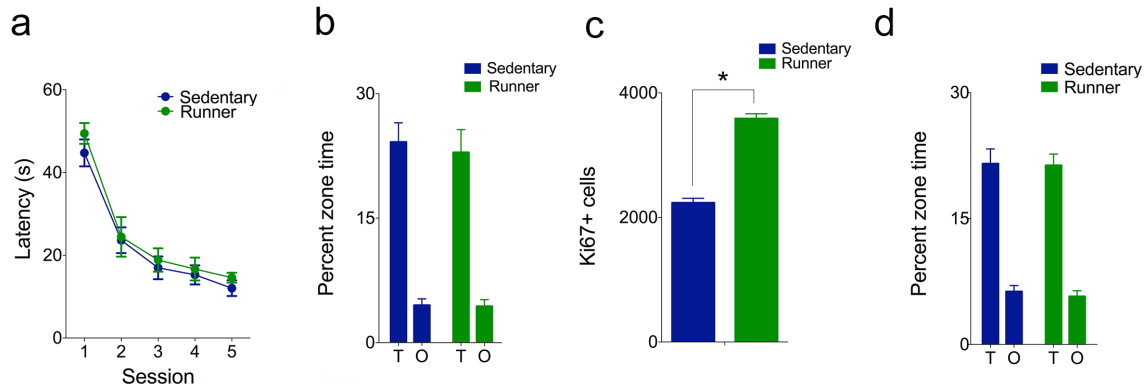
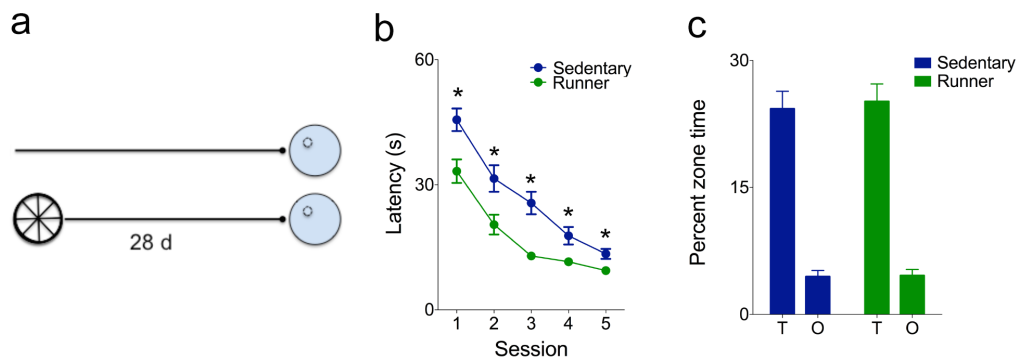


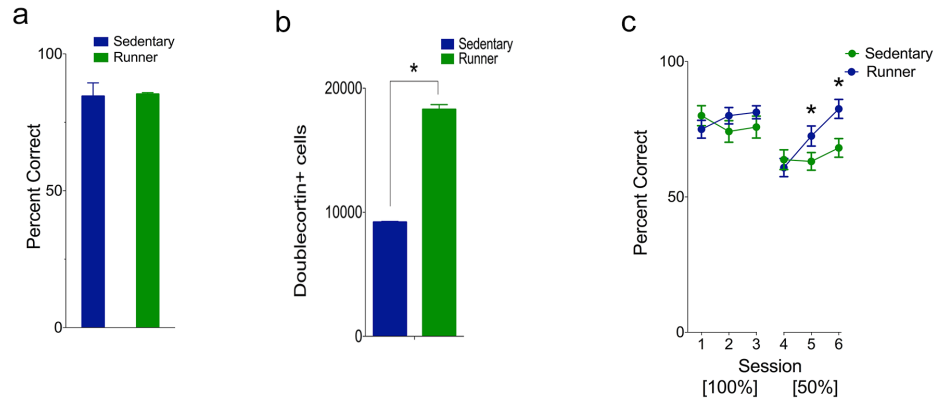
Supplementary Information



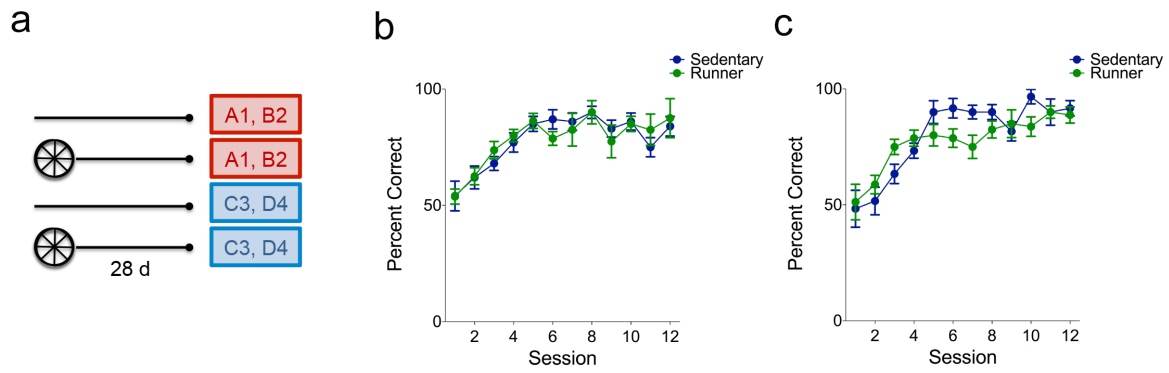
Supplementary Figure 1. **a.** Latency to locate platform in water maze training did not differ in mice assigned to running vs. sedentary group [Main effect of Day: $F_{4,184} = 139.69$, $p < 0.00001$; Group and Group \times Day interaction, $F_s < 1$]. **b.** At the completion of training both runner ($n=24$) and sedentary mice ($n=24$) searched selectively in the zone of the pool that formerly contained the platform [Main effect of Zone: $F_{1,46} = 216.38$, $p < 0.00001$; Group and Group \times Zone interaction, $F_s < 1$]. **c.** Numbers of proliferating (i.e., Ki67⁺) cells were elevated following running [$F_{1,12} = 24.79$, $p < 0.001$]. **d.** At the completion of reversal training both runner and sedentary mice searched selectively in the zone of the pool where the reversal platform had been located [Main effect of Zone: $F_{1,46} = 141.05$, $p < 0.00001$; Group and Group \times Zone interaction, $F_s < 1$]. Data analysis used ANOVA (panels b,c,d) and repeated measures ANOVA (panel a). Data shown are mean \pm SEM.



Supplementary Figure 2. a. Mice were given access to a running wheel (n=15) or remained sedentary (n=16) for 4 weeks prior to water maze training. **b.** Mice that ran before training located the platform more efficiently (Main effects of Day [$F_{4,120} = 61.46, p < 0.00001$] and Group [$F_{4,120} = 29.75, p < 0.00001$]). **c.** At the completion of training, both runner and sedentary mice searched selectively in the zone of the pool that formerly contained the platform [Main effect of Zone: $F_{1,30} = 205.24, p < 0.00001$; Group and Group \times Zone interaction, $F_s < 1$]. Data analysis used ANOVA (panel c) and repeated measures ANOVA (panel b). * $p < 0.05$ by Newman-Keuls post hoc tests for multiple comparisons. Data shown are mean \pm SEM.

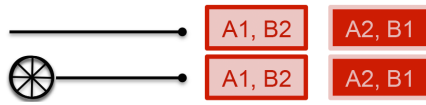


Supplementary Figure 3. a. Mice ($n=12$ sedentary, $n=16$ runner) reached a stable high level of performance at the end of the training period ($F_{1,26} = 0.05$, $p > 0.05$). **b.** Running increased the number of immature neurons in the dentate gyrus [$F_{1,12} = 48.08$, $p < 0.00001$]. **c.** After 4 weeks of running there was no significant difference in retention of the odor context pairings (test sessions 1-3). However, when the odor concentration was decreased performance was reduced in mice that ran after training [Group \times Session interaction: $F_{5,130} = 2.87$, $p < 0.05$]. Data analysis used ANOVA (panel a,b) and repeated measures ANOVA (panel c). * $p < 0.05$ by Newman-Keuls post hoc tests for multiple comparisons. Data shown are mean \pm SEM.

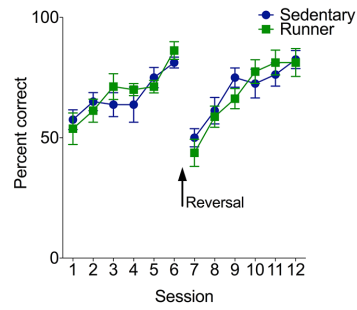


Supplementary Figure 4. a. Mice had access to a running wheel (n=8) for 4 weeks or were housed conventionally (n=8), and then were trained in the odor-context paired associate task (either A1-B2 or C3-D4). **b-c.** Acquisition was similar in runner (n=8) and sedentary (n=8) mice for both odor-context pairs (A1-B2, main effect of session only, $F_{11,154} = 10.73$, $p < 0.00001$; C3-D4, main effect of session only, $F_{11,154} = 16.29$, $p < 0.00001$). Data analysis used repeated measures ANOVA (panels b,c). Data shown are mean \pm SEM.

a



b



Supplementary Figure 5. a. Mice had access to a running wheel for 4 weeks (n=8) or were housed without a wheel (n=8). The mice were then trained in the odor-context paired associates task. After acquiring the A1,B2 pairing the mice were trained in a reversal condition (A2,B1). **b.** There was no significant difference in either the acquisition of the initial odor context pairing or the reversal pairings (Main effect of Session only: $F_{5,140} = 27.92$, $p < 0.00001$; Group \times Session \times Phase interaction: $F_{5,140} = 0.98$, $p = 0.43$). Data analysis used repeated measures ANOVA (panel b). Data shown are mean \pm SEM.

Supplementary Table 1. Odor-context pairings in the training, high interference and low interference conditions.

	Training		High interference		Low interference	
	Context A	Context B	Context A	Context B	Context C	Context D
#1 Coffee	S+	S-	S-	S+		
#2 Cinnamon	S-	S+	S+	S-		
#3 Ginger					S+	S-
#4 Oregano					S-	S+