Supplementary Figures

Supplementary Figure 1. (A) Effect of PJ-34 on locomotor activity. Distances crossed in an open field were similar between intra-CeA PJ-34-infused, intra-CeA vehicle-infused, intra-BLA PJ-34-infused and intra-BLA vehicle infused rats (one-way ANOVA, F(3,21)=0.2272; p>0.05). (B) Effect of PJ-34 on object-recognition. All groups demonstrated STM and LTM formation as a significant preference to the new objects in the STM and LTM sessions compared to training was found (two-way ANOVA with repeated measures; with main effect of session [F(2,42)=34.33; training vs. STM and training vs. LTM; ***p<0.0001 in both cases], no effect of group [F(3,21)=0.09; p>0.05] and no interaction [F(6,42)=0.44; p>0.05]). No differences in exploratory preferences were observed between the four treatment groups for the training, short term (STM; tested 1.5h after training) or long term (LTM; tested 24 h after training) memory trials (one-way ANOVAs, F(3,21)=0.013; p>0.05;
F(3,21) = 0.076; p > 0.05; F(3,21) = 0.356; p > 0.05 respectively). (C) **Effect of ABT-888 on locomotor activity.** Distances crossed in an open field were similar between ABT-888 treated (7.5 and 15 mg/kg) and Vehicle treated rats (one-way ANOVA, F[2,18] = 0.394; p > 0.05) (D) **Effect of ABT-888 on object-recognition.** All groups demonstrated STM and LTM formation as a significant preference to the new objects in the STM and LTM sessions compared to training was found (two-way ANOVA with repeated measures; with main effect of session [F(2,36) = 16.14; ***p < 0.0001 in both cases]. In contrast, no effect of treatment [F(2,18) = 0.77; p > 0.05] and no interaction [F(4,36) = 0.60; p > 0.05]) were found. No differences in exploratory preferences were observed between the three treatment groups for the training, short term (STM; tested 1.5h after training) or long term (LTM; tested 24 h after training) memory trials (one-way ANOVAs, F[2,18] = 1.006; p > 0.05; F[2,18] = 2.233; p > 0.05; F[2,18] = 2.162; p > 0.05 respectively).

**Supplementary Figure 2.** (A) Mean food intake of rats across sessions are presented (%). No difference was found between groups (unpaired t-test, p > 0.05). (B) ABT-888-treated rats (15 mg/kg IP) spent the same amount of time in the food-associated compartment (change from baseline; sec) compared to controls (vehicle-treated) (unpaired t-test, p > 0.05).
Supplementary Figure 3. (a) The nucleotide sequence of D3ZL1J1 was virtually translated and blasted against all non-redundant GenBank CDS translations+PDB+SwissProt+PIR+PRF excluding environmental samples from WGS projects and the top alignment discovered was with a bacterial transposase: DDE_Tnp_1 (upper panel). Next, the sequence was blasted again only against Human and Mouse (Homo sapiens and Mus musculus, respectively). The top alignments discovered a 100% homology between the sequence and human and mouse proteins (lower panel). (B) The transposase domain in the putative protein encoded by the gene was also identified using Motif scan searching for PeroxiBase profiles [perox], HAMAP profiles [hamap], PROSITE patterns [pat].
Supplementary Figure 4. Detailed timeline of CPP, locomotion and object recognition tests.
Supplementary Figure 5. (A) Left: Image showing GFP expression and DAPI staining within the CeA. The overlay of the amygdala sub-nuclei demonstrates viral infection that is specific to the central amygdaloid nucleus, medial division (CeM). Scale bar: 200µm. Right: Corresponding section from rat stereotaxic atlas (Paxinos and Watson); triangles depict represent micro-infusion sites, and the dotted-line rectangle demarcates the areas included in the fluorescent image. (B) Higher magnification of the injection site image. Scale bar: 50µm. green-GFP, blue-DAPI. Abbreviations: B-Basal nucleus (Meynert); BLA: basolateral amygdala; CeL-Central amygdaloid nucleus, lateral division; CeM-Central amygdaloid nucleus, medial division; cst - Commisural stria terminalis. (C) CeA PARP-1 mRNA levels were measured following infusion of PARP-1 lentiviral shRNAs and scrambled-RNA control constructs. One-way ANOVA found a significant decrease in PARP-1 expression in CeA of rats treated with constructs containing sequences shRNA-2 and shRNA-3 compared to scrambled RNA (*p<0.005, ** p<0.0005). (D) D3ZLJ1 was over-expressed in HEK293 cells infected with D3ZLJ1 over-expressing lentivirus compared to control (****p<0.0001).