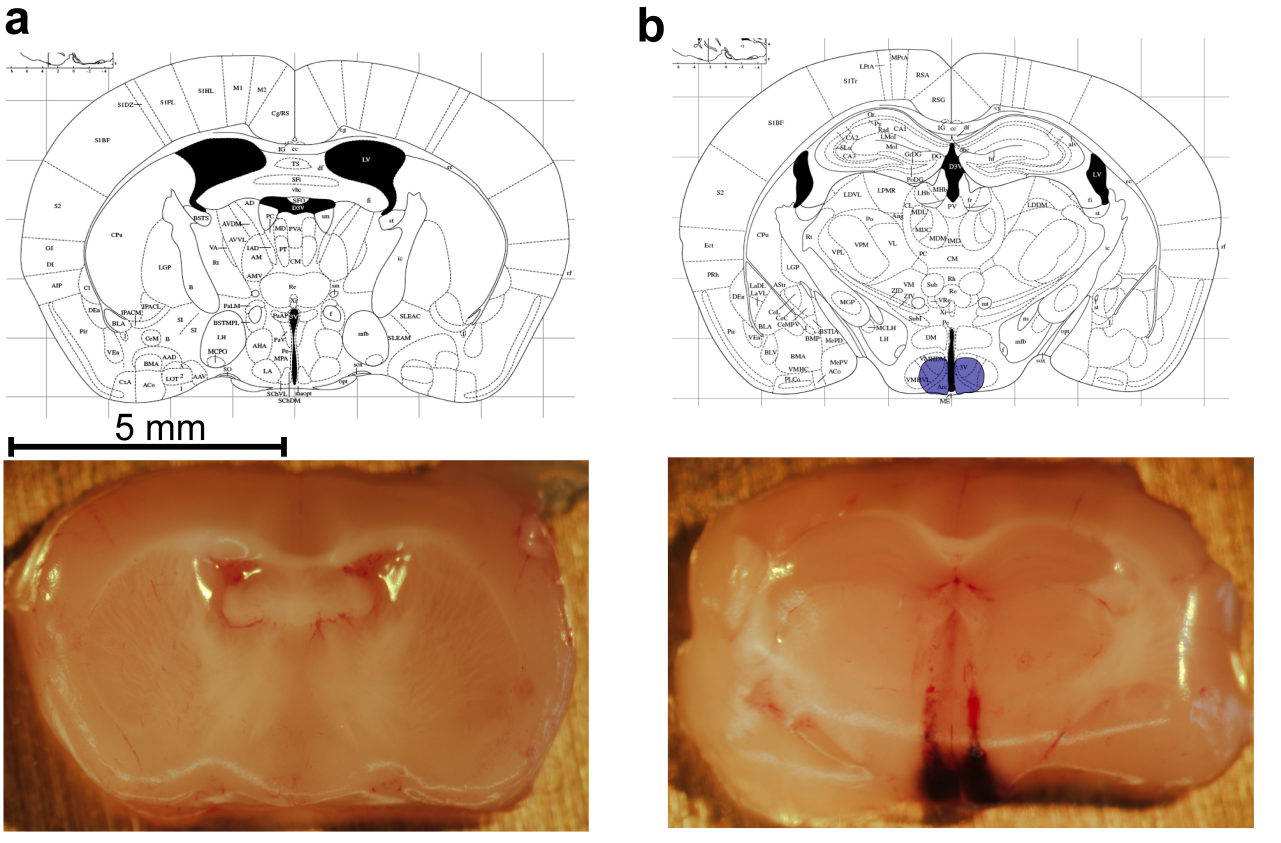
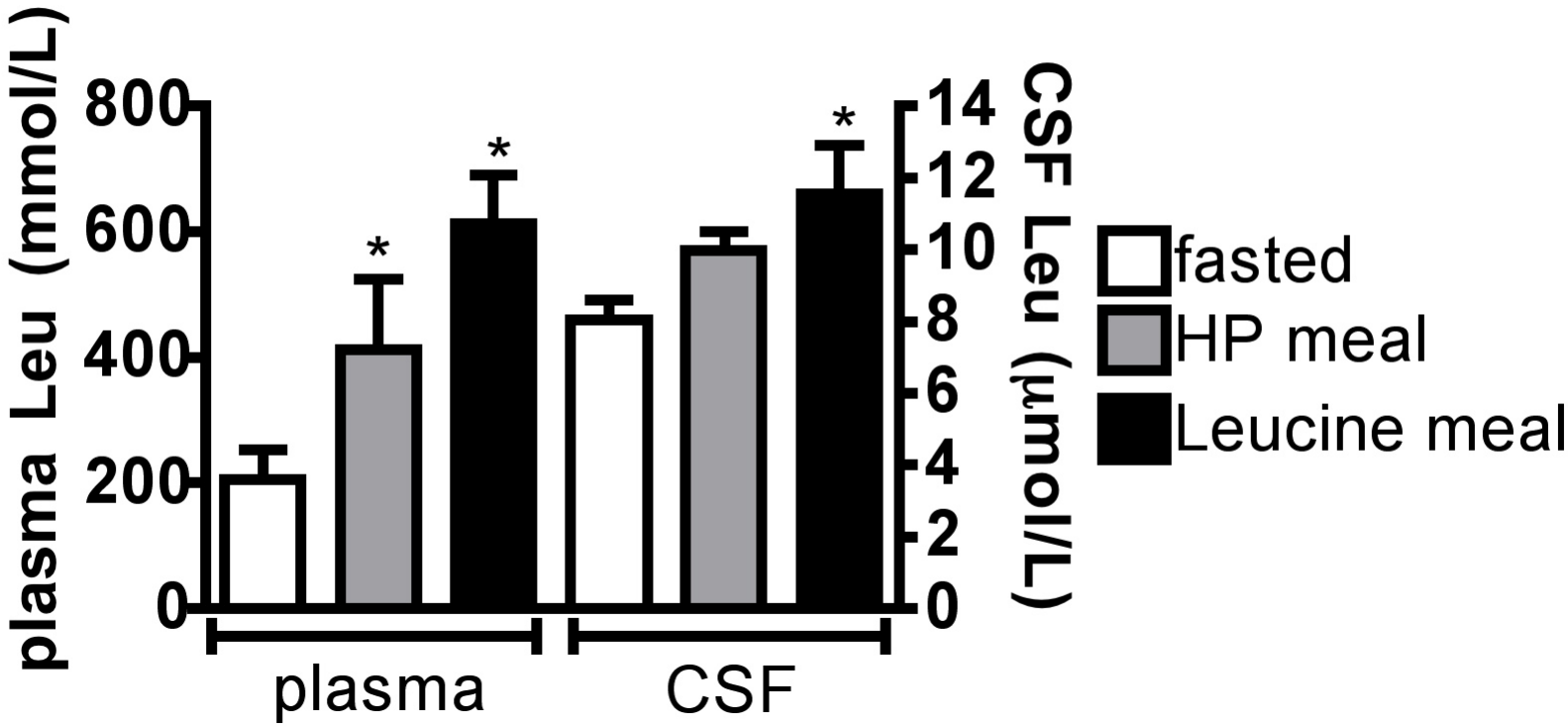
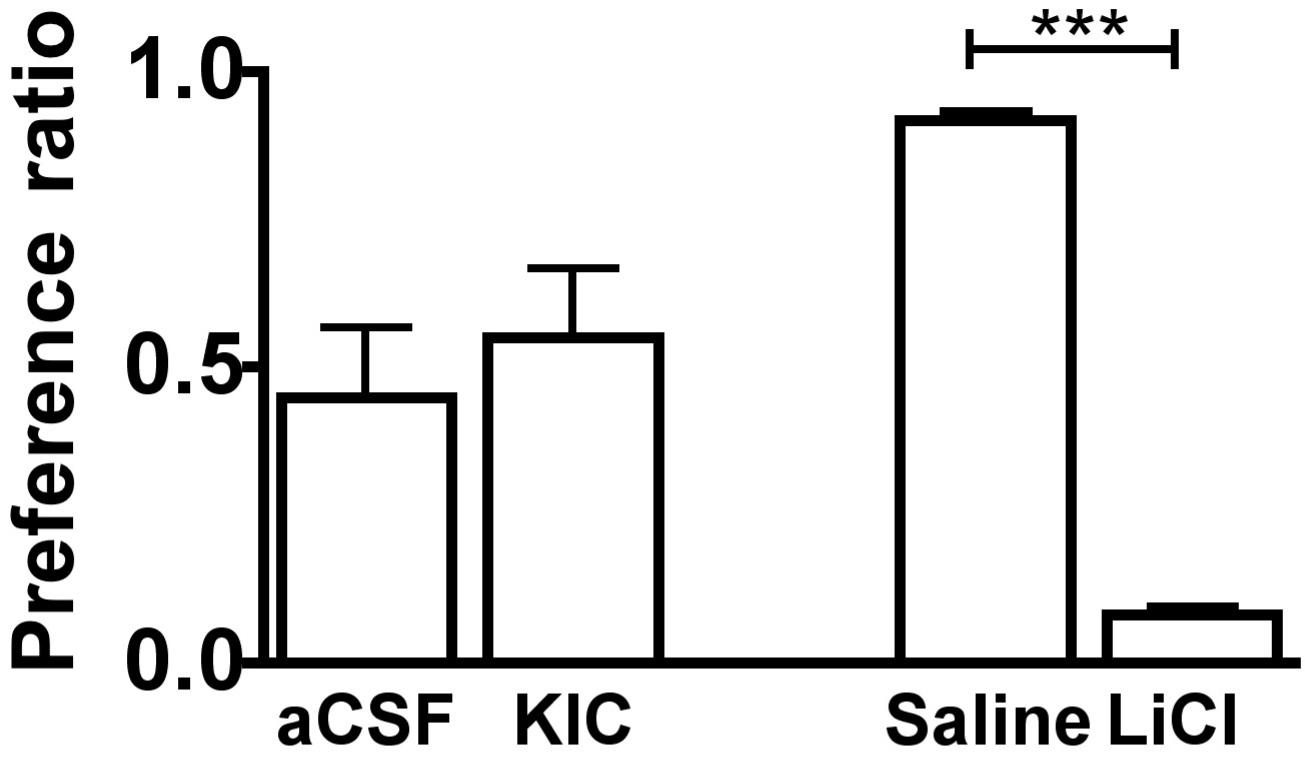


Supplemental Figure 1: MBH injection site specificity in mouse. (a) PVN and (b) MBH schematic (Paxinos and Franklin, 2001) and corresponding photographs of dissected sections following a 100 nl injection of india ink into the MBH (PVN section: 0.45 to -1.25 mm posterior to bregma ;MBH section: -1.25 to -2.05 mm posterior to bregma). Arc: arcuate nucleus of the hypothalamus, DM: dorsomedial hypothalamus, LH: lateral hypothalamus, ME: median eminence, PaV: paraventricular nucleus of the hypothalamus, VMH: ventromedial hypothalamus.

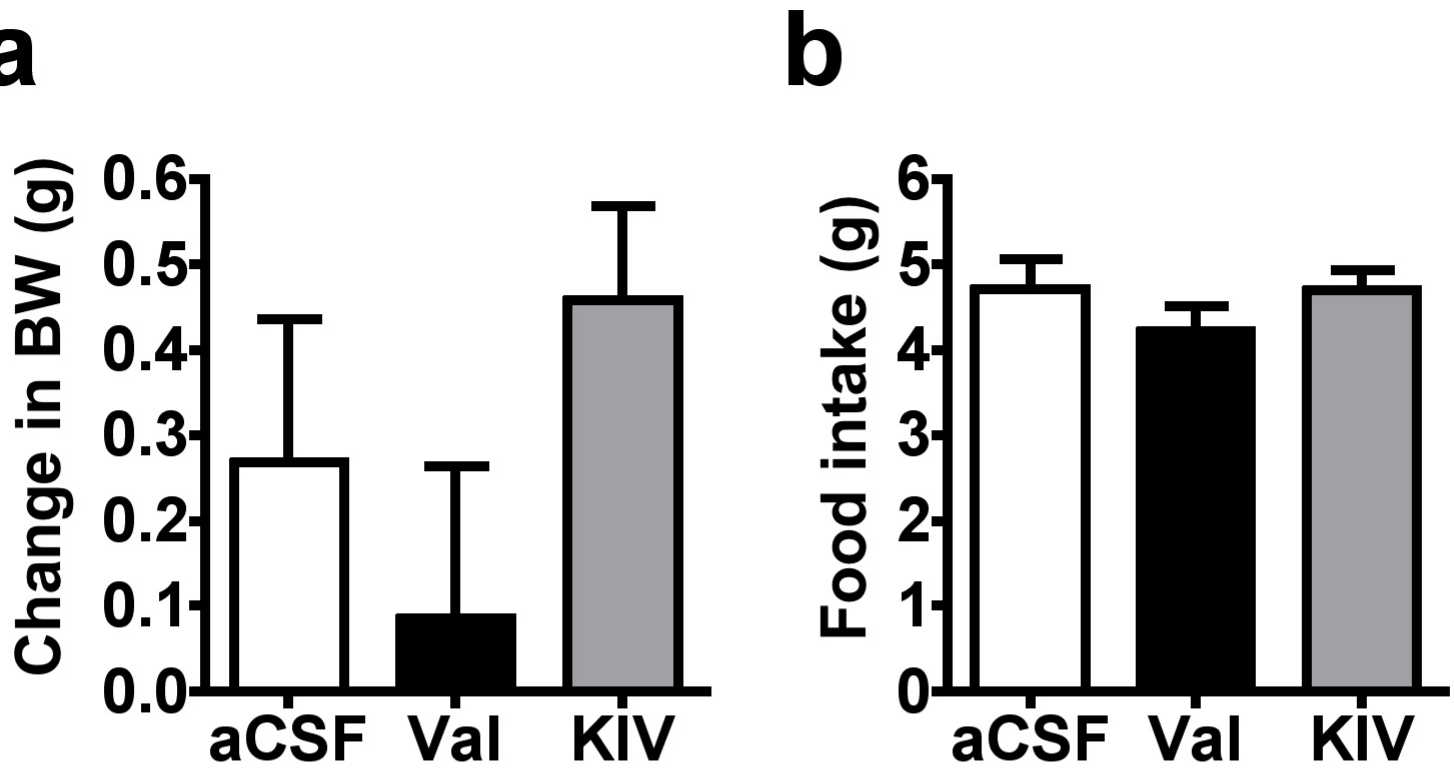


Supplementary Figure 2: Dietary leucine rapidly increases plasma and CSF leucine concentration in rat.

Plasma and CSF leucine concentration in rat following a 24h fast (n=4) and 1h refeeding with a high-protein meal (n=4) or a standard chow 4% leucine-enriched meal (n=4). Data are means ± SEM. *: $P<0.05$ vs. fasted group

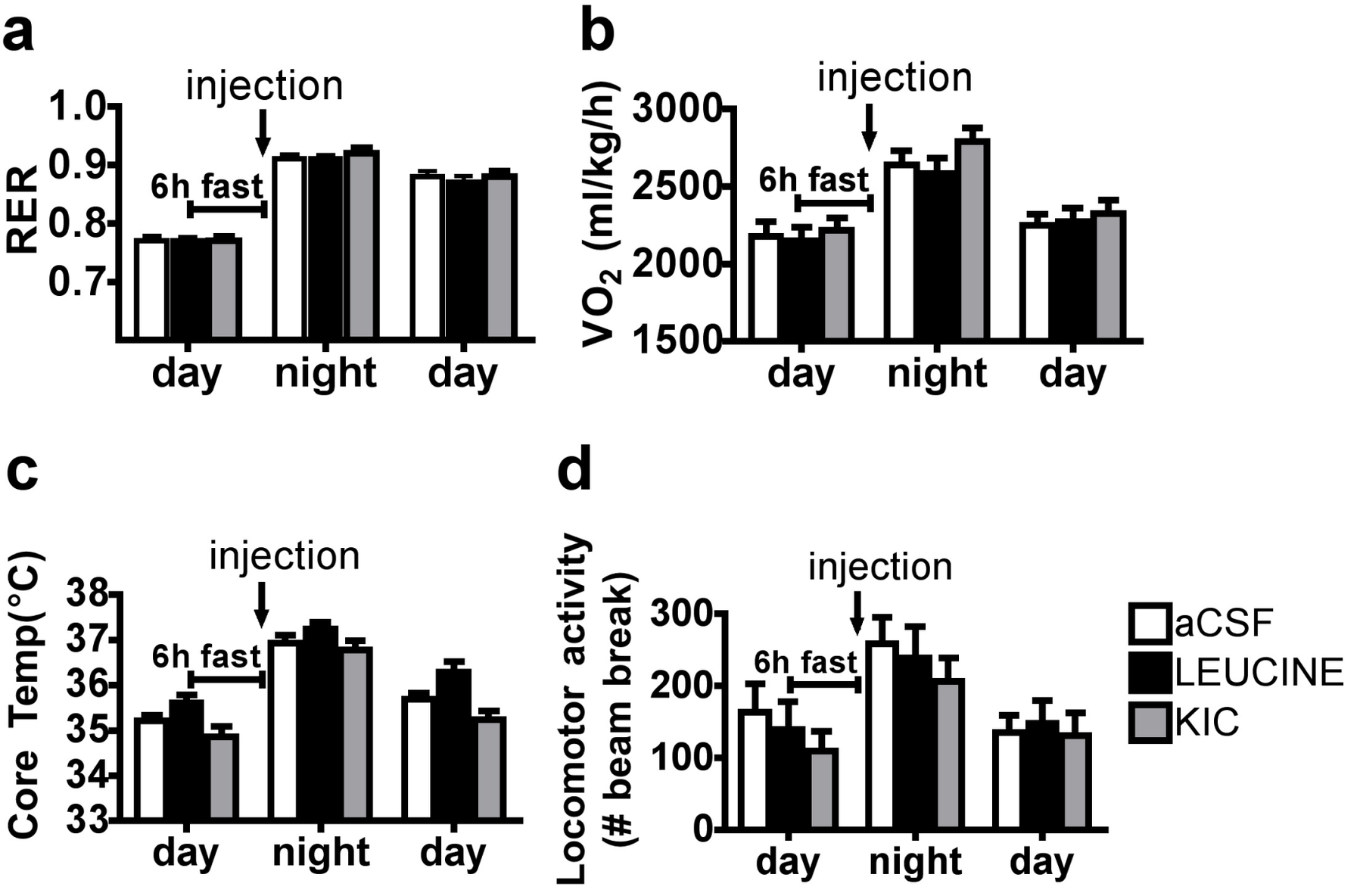


Supplementary Figure 3: icv KIC does not induce a conditioned taste aversion in rat. Preference ratio of drug-paired flavored water during a 2h conditioned taste aversion. Data are means ± SEM, n=4. ***: P<0.001 vs. saline.

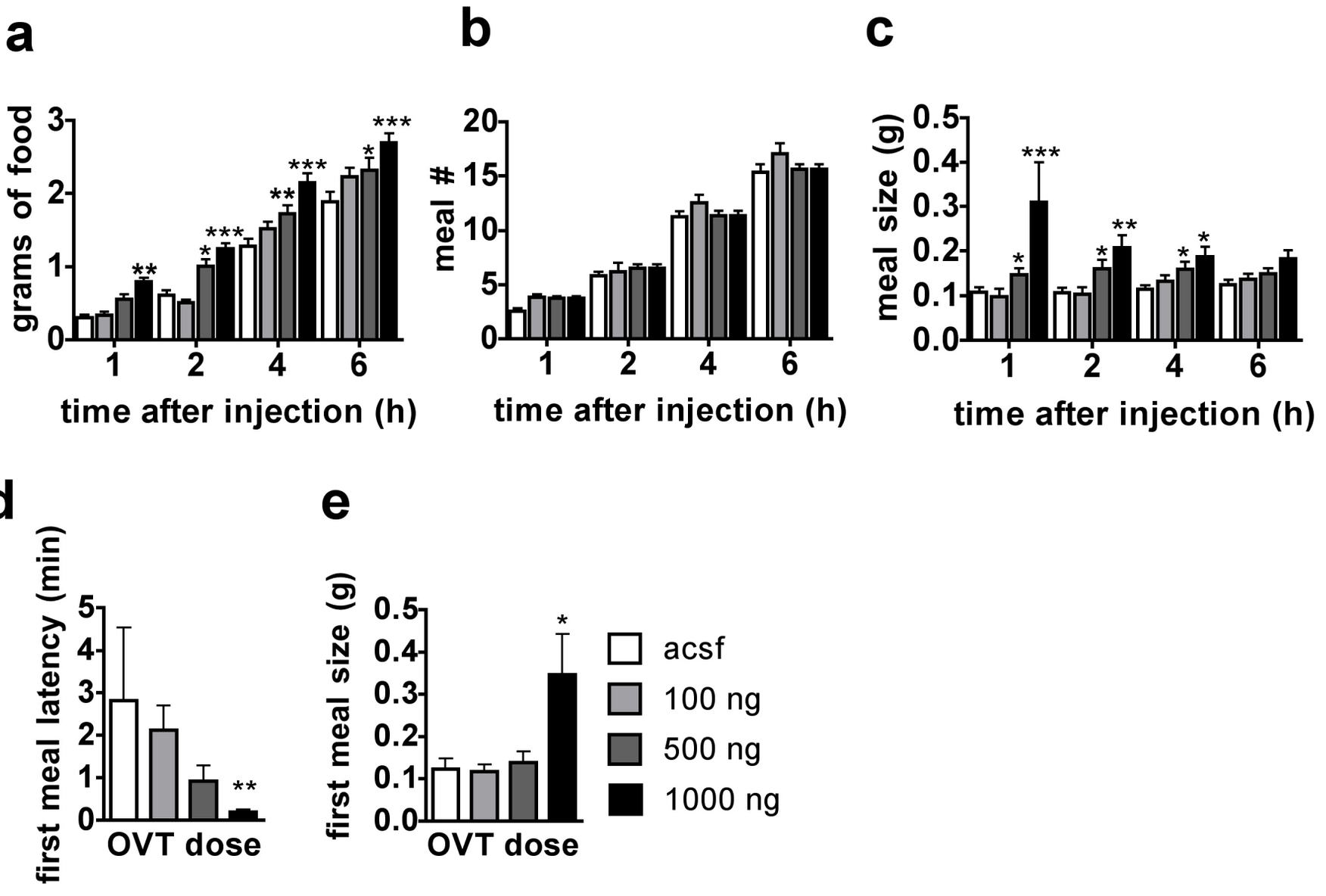


Supplementary Figure 4: MBH valine and KIV injections do not affect food intake and body weight in rat.

(a) 24h change in body weight and **(b)** 24h food intake in rat (n=8-10) following an MBH injection of 200 nl of aCSF, valine or KIV (injection design 1). Data are means ± SEM.

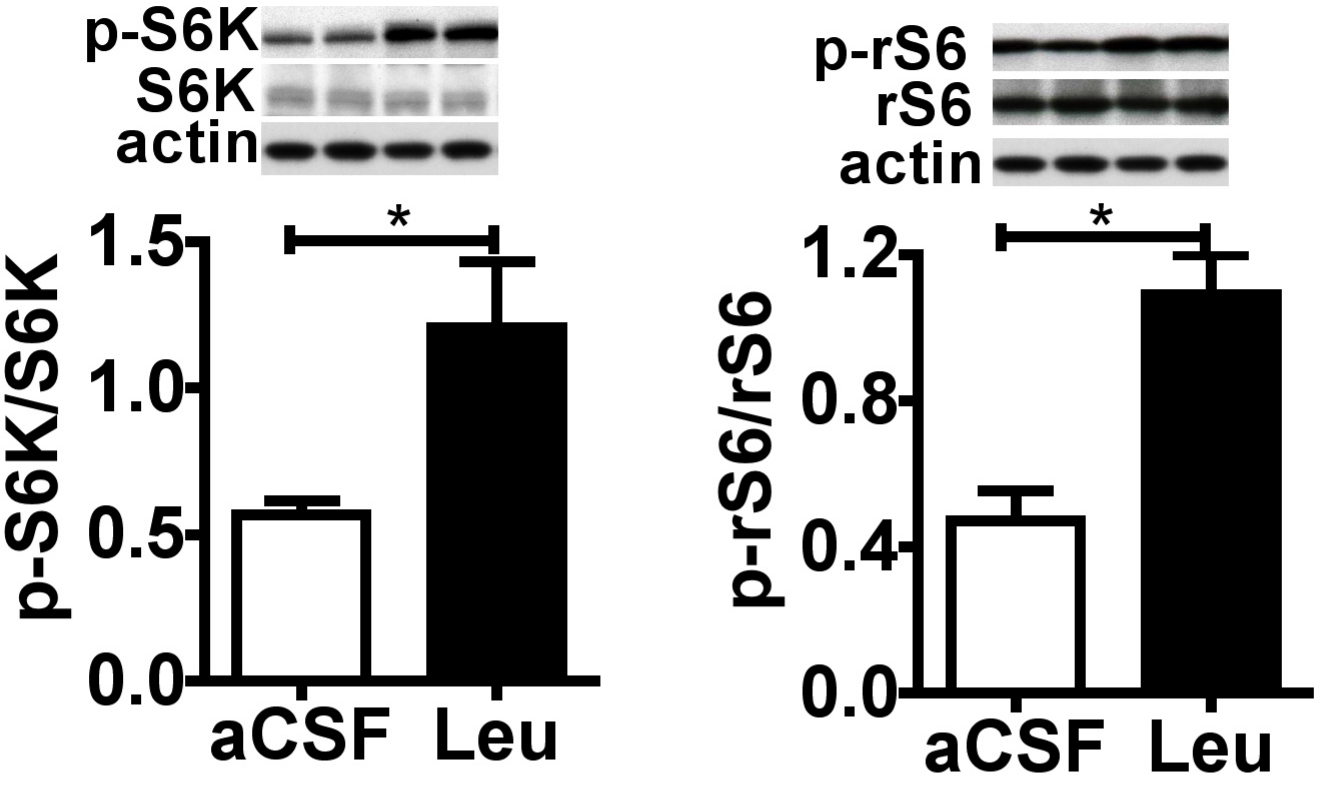


Supplementary figure 5: MBH Leucine and KIC injection do not affect energy expenditure in mouse.
(a) respiratory quotient, **(b)** oxygen consumption, **(c)** core temperature and **(d)** locomotor activity in mouse (n=8) following an MBH injection of aCSF, Leucine or KIC (injection design 1). Data are means ± SEM.

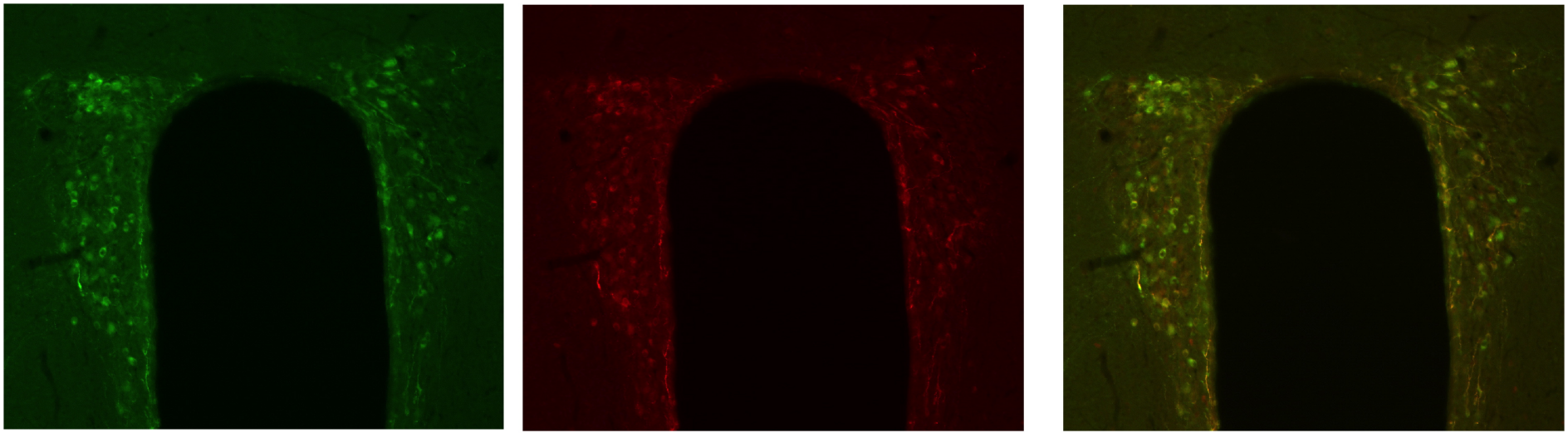


Supplementary figure 6: IVth icv OVT dose-dependently increases food intake in mouse.

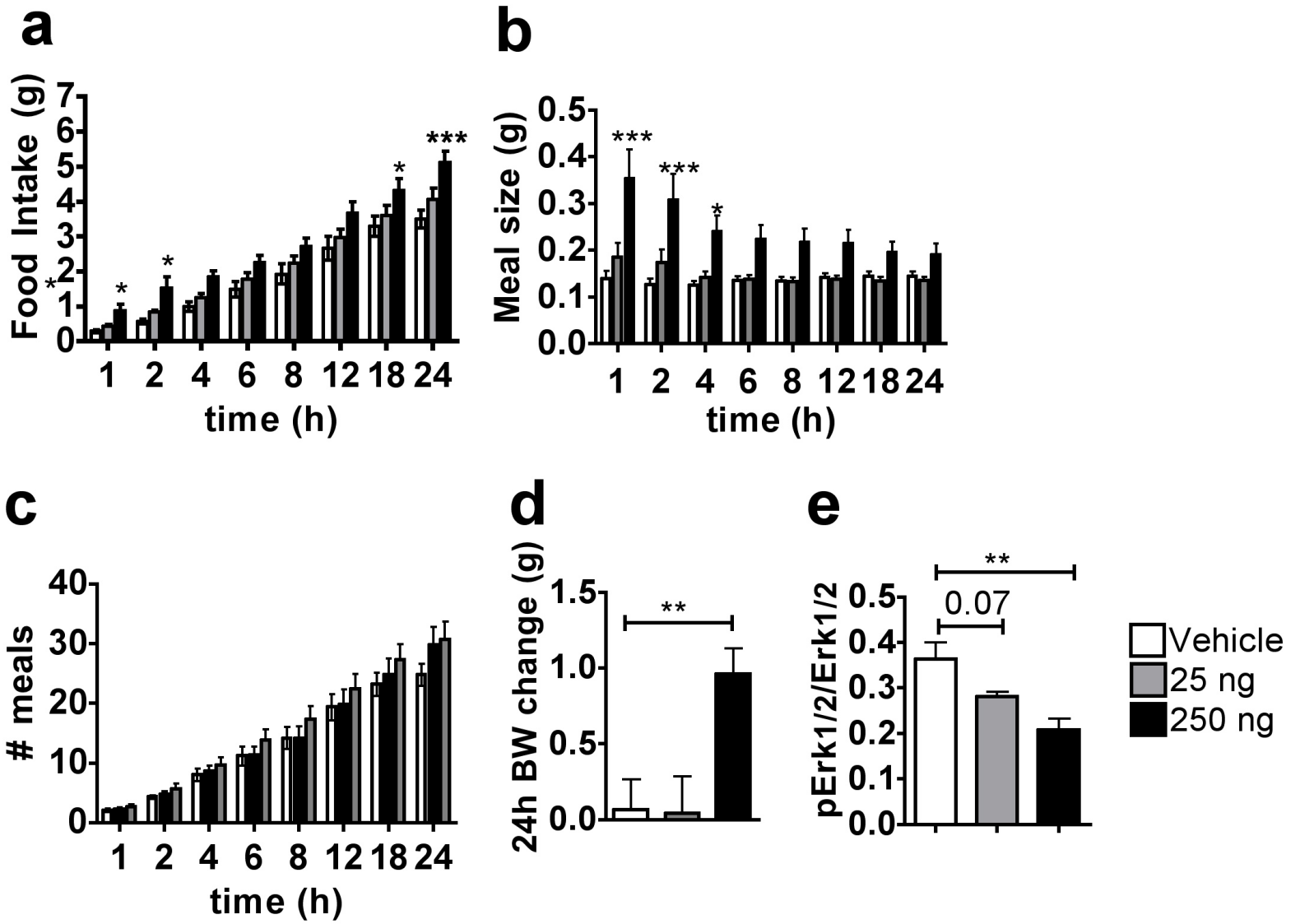
(a) cumulative food intake, **(b)** cumulative meal number, **(c)** mean meal size, **(d)** first meal latency and **(e)** first meal size in mice (n=9) following a IVth icv injection of oxytocin receptor antagonist OVT (injection design 4). Data are means ± SEM. *: P<0.05 vs. aCSF ; **: P<0.01 vs. aCSF ; ***: P<0.001 vs. aCSF .



Supplementary figure 7: MBH Leucine activates MBH p70 S6 kinase1 pathway. MBH p70 S6 kinase1 Thr389 phosphorylation and S6 ribosomal protein Ser235/236 phosphorylation in mouse 45 min after an MBH injection of aCSF (n=4) or leucine (n=4-5) (injection design 1). All data are means ± SEM. *: P<0.05 vs. aCSF.



Supplementary figure 8: Refeeding rapidly activates Erk1/2 signaling in PVN oxytocin neurons.
Immunofluorescence showing colocalization (yellow, right) of oxytocin (Cy2, green, left) and phospho- Thr202/Tyr204 Erk 1/2 (Cy3, red, middle) in PVN slices of mice immediately after 60 min refeeding a standard-chow meal following an overnight fast.



Supplementary figure 9: MBH U0126 increases food intake and body weight in mouse.

(a) cumulative food intake, **(b)** mean meal size, **(c)** cumulative meal number, **(d)** 24h body weight change and **(e)** MBH Erk 1/2 Thr202/Tyr204 phosphorylation in mouse (n=6 to 11) following an MBH administration of MEK inhibitor U0126 (injection design 6). Data are means ± SEM. *: P<0.05 vs. aCSF ; **: P<0.01 vs. aCSF ; ***: P<0.001 vs. aCSF .