



**Figure S1.** Study design, experiment 1. Animals were fed a grass silage (GS) and corn silage (CS) based diet (ad libitum) in a cross over design in feeding period 1 and 2. Animals received the same treatment in each period, either NaCl (n = 7), AEA (n = 7) or 2-AG (n = 6). Arrow indicates blood samples taken on day 8 of each treatment period. Star indicates end point analysis of brain tissue.

**Table S1.** Ingredients and chemical composition (means  $\pm$  SE) of the grass silage (GS) and corn silage (CS) based total mixed ration (TMR) of Experiment 1 and 2.

Component	Experiment 1		Experiment 2
	GS	CS	CS
Ingredient, g/kg of DM			
Grass silage	464.9 $\pm$ 18.1		
Corn silage		570.9 $\pm$ 7.3	558.3
Barley straw		57.7 $\pm$ 13.9	85.4
Grass hey	131.9 $\pm$ 17.1		
Corn, ground	114.9 $\pm$ 18.9	78.7 $\pm$ 11.0	56.8
Wheat, ground	116.5 $\pm$ 1.5	44.4 $\pm$ 0.5	43.6
Extracted soy meal		95.8 $\pm$ 5.2	106.0
Extracted rapeseed meal		134.8 $\pm$ 1.7	132.5
Concentrate <sup>1</sup>	114.4 $\pm$ 5.1		
Mineral/vitamin mix <sup>2</sup>	7.4 $\pm$ 0.1	9.9 $\pm$ 0.1	9.7
Lime stone powder <sup>3</sup>		5.1 $\pm$ 0.1	5.0
Animal feed salt <sup>4</sup>		2.7 $\pm$ 0.0	2.7
Chemical analysis, g/kg of DM			
Crude ash	76.4 $\pm$ 2.1	40.6 $\pm$ 2.3	37.0 $\pm$ 4.0
Crude protein	161.6 $\pm$ 3.9	158.0 $\pm$ 3.5	159.5 $\pm$ 9.5
Crude fiber	190.8 $\pm$ 7.9	164.0 $\pm$ 2.3	161.5 $\pm$ 4.5
Crude fat	28.0 $\pm$ 1.4	34.0 $\pm$ 0.7	35.5 $\pm$ 0.5
Starch	184.2 $\pm$ 20.4	298.0 $\pm$ 7.3	315.5 $\pm$ 1.5
aNDFom	471.4 $\pm$ 17.3	385.4 $\pm$ 5.3	378.5 $\pm$ 13.5
ADFom	235.2 $\pm$ 11.1	198.8 $\pm$ 3.5	191.5 $\pm$ 5.5
ME (MJ/kg of DM) <sup>5</sup>	10.7 $\pm$ 0.2	11.5 $\pm$ 0.1	11.6 $\pm$ 0.1
NEL (MJ/kg of DM) <sup>5</sup>	6.5 $\pm$ 0.1	7.0 $\pm$ 0.1	7.1 $\pm$ 0.1

<sup>1</sup>MF 2000 (Ceravis AG, Regensburg, Germany): 30% extracted soy meal from peeled and steam-heated beans, 25.4% corn grit, 15% malt culms, 6.9% extracted rapeseed meal, 5.1% wheat, 5% sugar beet pulp, 4.9% dried grain pulp, 4.1% beet molasses, 2% NaHCO<sub>3</sub>, 1% CaCO<sub>3</sub>, 0.2% NaCl. Additives per kg original substance: 10,000 IU vitamin A, 1125 IU vitamin D<sub>3</sub>, 40 mg vitamin E, 0.6 mg I, 0.4 mg Co, 50 mg Mn, 75 mg Zn, 0.4 mg Se. Composition: 24% CP, 2.6% crude fat, 5.1% crude fiber, 8% crude ash, 0.73% Ca, 0.5% P, 0.65% Na, 7.1 MJ NEL/kg.

<sup>2</sup>Panto®-Mineral R 8609 (HL Hamburger Leistungsfuttermittel GmbH, Hamburg, Germany): 32.8% CaNaPO<sub>3</sub>, 19.3% CaMg (CO<sub>3</sub>)<sub>2</sub>, 16.7% NaCl, 15.3% CaCO<sub>3</sub>, 6.1% MgO, 3% sugar cane molasses.

Additives per kg original substance: 900,000 IU vitamin A, 200,000 IU vitamin D<sub>3</sub>, 4.5 g vitamin E, 1.5 g Cu, 8 g Zn, 5 g Mn, 60 mg I, 70 mg Co, 50 mg Se. Composition: 20% Ca, 6% P, 8% Na, 6% Mg.

<sup>3</sup>Kreidekalk (Spezialfutter Neuruppin GmbH und Co.KG): CaCO<sub>3</sub>. Composition: 37% Ca.

<sup>4</sup>ESCO Viehsalz (esco - european salt company GmbH, Hannover, Germany) Composition: 99% NaCl, 0.3% Ca, 0.01% Mg, <2 mg/kg Cu, < 2 mg/kg Zn

<sup>5</sup>ME and NEL content of TMR were calculated according to the recommendations of the German Society of Nutrition Physiology (GfE).

**Table S2.** Primer sequences

Gene		Primer sequence (5' to 3')	Accession no.	bp <sup>1</sup>	Efficiency
AGRP	fw				
	d	ACCGTCGCTGAAGAGGATAA	NM_173983.2	214	1.87 <sup>a</sup>
	rev	GCAGAAGGCGTTGAAGAAAC			1.84 <sup>p</sup>
CNR1	fw	AAGCCCG-			
	d	CATGGACATTCGGCTGG	NM_001242341.2	79	1.91 <sup>a</sup>
	rev	AGCAGAGGGCCCCAGCAGAT			1.86 <sup>p</sup>
DAGLA	fw			107	
	d	GGCTCAAAGTGTTCTCTGC	NM_001192583.3		1.85 <sup>a</sup>
	rev	CACAATGTCCAGGTCTCGGA			1.86 <sup>p</sup>
EIE3K	fw	CCAGGCCCACCAAGAAGAA	NM_001034489	125	
	d				1.85 <sup>a</sup>
	rev	TTATACCTTCCAGGAGGTCCATGT			1.81 <sup>p</sup>
FAAH	fw				
	d	TTCCTGCCAAGCAACATACCT	NM_001099102.2	105	1.85 <sup>a</sup>
	rev	CACGAAATCACCTTT- GAAGTTCTG			1.89 <sup>p</sup>
MGLL	fw	GCAACCAGCTGCTCAACAC	NM_001206681.1	154	
	d				--
	rev	AGCGTCTTGTCTGCTCTT			--
NAAA	fw				
	d	CAGCACTACGACCGGGACTT	NM_001100369	100	--
	rev	CCGGGACGACTTTTCTGATC			--
NAPEPL	fw				
	d	AGAGATCACAGCAGCGTTCCAT	NM_001015680.1	95	1.92 <sup>a</sup>
	rev	ACTCCAGCTTCTTCAGGGTCATC			1.92 <sup>p</sup>
NPY	fw				
	d	GTACCCCTCCAAGCCTGAC	NM_001014845.3	191	1.84 <sup>a</sup>
	rev	CCAGCCTAGTTCTGGGAATG			--
PLAAT5	fw				
	d	AAGATCATCCAGCGGACAAAA	NM_001281908.2	100	1.86 <sup>a</sup>
	rev	CGCCGTATCTCAGGTCATTGA			1.86 <sup>p</sup>

PLA2G4E	fw				
	d	AGGGCCTTTGTCTCCAAGTT	XM_024998182	170	--
	rev	ACAAAGAATGCGGTGTCCAG			--
PPIA	fw	GGATTTATGTGCCAGGGTGGTGA	NM_178320		
	d			120	1.92 <sup>a</sup>
	rev	CAAGATGCCAGGACCTGTATG			1.89 <sup>p</sup>

<sup>1</sup> Product size (base pairs)

<sup>a</sup> Arcuate nucleus (ARC), <sup>p</sup> Paraventricular nucleus (PVN)

-- Due to insufficient amount of amplicon products ( $C_t > 30$ ), the efficiency could not be calculated.

AGRP, agouti related neuropeptide; CNR1, cannabinoid receptor 1; DAGLA, diacylglycerol lipase alpha; EIE3K, eukaryotic translation initiation factor 3 subunit K; FAAH, fatty acid amide hydrolase; MGLL, monoglyceride lipase; NAAA, N-acylethanolamine acid amidase; NAPEPLD, N-acyl phosphatidylethanolamine phospholipase D; NPY, neuropeptide Y; PLA2G4E, phospholipase A2 group IVE; PLAAT5, phospholipase A and acyltransferase 5; PPIA, Peptidylprolyl isomerase A

**Table S3.** ANOVA of the effects of treatment, diet, housing and their interactions using the MIXED procedure in SAS (SAS Institute, Cary, NC, USA)

	Treatment	Diet	Time	Treatment x diet	Treatment x time	Diet x time	Treatment x diet x time
Fig. 1A (DMI/BW <sup>0.75</sup> (kg/kg <sup>0.75</sup> ))	$F(2,36) = 7.73$ $P < 0.01$	$F(1,30) = 0.03$ $P = 0.87$	$F(6,106) = 73.3$ $P < 0.001$	$F(2,30) = 0.26$ $P = 0.78$	$F(12,106) = 1.85$ $P < 0.05$	$F(6,113) = 1.50$ $P = 0.18$	$F(12,113) = 0.65$ $P = 0.80$
Fig. 1B (cumulative DMI/BW <sup>0.75</sup> (kg/kg <sup>0.75</sup> ))	$F(2,28) = 4.10$ $P < 0.05$	$F(1,39) = 1.93$ $P = 0.17$	$F(6,88) = 221.09$ $P < 0.001$	$F(2,39) = 0.08$ $P = 0.92$	$F(12,88) = 2.83$ $P < 0.01$	$F(6,136) = 2.53$ $P < 0.05$	$F(12,136) = 0.64$ $P = 0.80$
	Treatment	Diet	Time	Treatment x diet	Treatment x time	Diet x time	Treatment x diet x time
Fig. 2A (Plasma AEA (nM))	$F(2,29) = 0.96$ $P = 0.40$	$F(1,37) = 0.21$ $P = 0.65$	$F(2,40) = 3.41$ $P < 0.05$	$F(2,37) = 0.82$ $P = 0.45$	$F(4,40) = 4.29$ $P < 0.01$	$F(2,75) = 1.52$ $P = 0.23$	$F(4,75) = 0.33$ $P = 0.86$
Fig. 2B (Plasma 2-AG (nM))	$F(2,27) = 1.14$ $P = 0.34$	$F(1,21) = 2.41$ $P = 0.14$	$F(2,37) = 1.44$ $P = 0.25$	$F(2,21) = 0.25$ $P = 0.78$	$F(4,37) = 1.15$ $P = 0.35$	$F(2,44) = 2.32$ $P = 0.11$	$F(4,44) = 2.26$ $P = 0.08$