

Supplementary table 1. Summary of parental scores data.

	mean \pm SEM	n	P value
WT dam run 1	9.5 \pm 1.1	10	0.07
WT dam run 2	10.0 \pm 0	10	> 0.1
WT dam run 3	10.0 \pm 0	10	> 0.1
CD38 ^{-/-} dam run 1	6.0 \pm 1.4	10	0.07
CD38 ^{-/-} dam run 2	7.6 \pm 1.3	10	> 0.1
CD38 ^{-/-} dam run 3	8.2 \pm 0.9	10	> 0.1
WT sire run 1	6.1 \pm 0.9	10	< 0.01
WT sire run 2	6.6 \pm 1.0	10	< 0.01
WT sire run 3	7.1 \pm 1.2	10	< 0.01
CD38 ^{-/-} sire run 1	0.9 \pm 0.1	10	< 0.01
CD38 ^{-/-} sire run 2	1.1 \pm 0.5	10	< 0.01
CD38 ^{-/-} sire run 3	0.6 \pm 0.3	10	< 0.01

Supplementary table 2. Summary of parental scores data. P values compared with CD38^{-/-} treated by PBS

	mean \pm SEM	n	P value
30 minutes after injection			
WT + PBS	8.2 \pm 0.75	13	0.001
CD38 ^{-/-} + PBS	1.0 \pm 0.53	13	
CD38 ^{-/-} + OT	5.4 \pm 1.3	8	0.0158
CD38 ^{-/-} + LOT-1	4.1 \pm 1.6	8	0.247
CD38 ^{-/-} + LOT-2	8.9 \pm 0.48	8	0.001
CD38 ^{-/-} + LOT-3	8.4 \pm 0.56	8	0.001
24 hours after injection			
CD38 ^{-/-} + OT	1.6 \pm 1.2	8	0.999
CD38 ^{-/-} + LOT-1	6.5 \pm 1.5	8	0.015
CD38 ^{-/-} + LOT-2	4.3 \pm 1.6	8	0.515
CD38 ^{-/-} + LOT-3	3.0 \pm 1.5	8	0.999

Supplementary table 3A. Rapid test of social acquisition and recognition. The time spent for social investigation in each trial for 1 min

	mean \pm SEM 1 trial	mean \pm SEM 2 trial	mean \pm SEM 3 trial	mean \pm SEM 4 trial	mean \pm SEM 5 trial	n
WT PBS	49 \pm 1.59	50 \pm 1.12	45 \pm 1.54	38 \pm 1.66	50 \pm 0.99	10
WT OT	49 \pm 1.20	47 \pm 2.93	43 \pm 2.47	38 \pm 1.99	48 \pm 1.21	10
CD38 ^{-/-} PBS	41 \pm 1.67	43 \pm 1.83	39 \pm 2.7	36 \pm 1.71	32 \pm 1.85	15
CD38 ^{-/-} OT	40 \pm 2.49	36 \pm 1.16	35 \pm 2.58	29 \pm 1.29	39 \pm 1.63	5
CD38 ^{-/-} LOT-1	36 \pm 3.72	36 \pm 2.93	31 \pm 2.84	27 \pm 1.43	36 \pm 3.26	6
CD38 ^{-/-} LOT-2	39 \pm 3.31	34 \pm 4.18	31 \pm 1.77	32 \pm 3.15	46 \pm 4	5
CD38 ^{-/-} LOT-3	44 \pm 2.47	36 \pm 2.68	37 \pm 5.2	28 \pm 1.93	42 \pm 6.04	5

Supplementary table 3B. The percent changes are illustrated between the 1st and 4th trials. P value compared with CD38^{-/-} treated by PBS

	mean ± SEM	n	P value
WT PBS	22.16 ± 2.06	10	> 0.9999
WT OT	22.14 ± 2.55	10	> 0.9999
CD38 ^{-/-} PBS	19.62 ± 3.7	15	
CD38 ^{-/-} OT	32.88 ± 6.8	5	> 0.9999
CD38 ^{-/-} LOT-1	18.96 ± 10.6	6	> 0.9999
CD38 ^{-/-} LOT-2	18.58 ± 4.35	5	> 0.9999
CD38 ^{-/-} LOT-3	45.14 ± 7.5	5	0.0197

Supplementary table 3C. The percent changes are illustrated between the 4th and 5th trials. P value compared with CD38^{-/-} treated with PBS.

	mean ± SEM	n	P value
WT PBS	23.74 ± 3.11	10	< 0.0001
WT OT	21.81 ± 2.85	10	0.0011
CD38 ^{-/-} PBS	-5.09 ± 3.69	15	
CD38 ^{-/-} OT	32.45 ± 5.69	5	0.0337
CD38 ^{-/-} LOT-1	20.44 ± 9.39	6	> 0.9999
CD38 ^{-/-} LOT-2	28.74 ± 9.69	5	0.0434
CD38 ^{-/-} LOT-3	34.55 ± 16.5	5	0.3752

Supplementary table 4. Tail suspension test. The immobility time by male and female. P value compared with CD38^{-/-} treated with PBS.

	mean ± SEM	n	P value
Males			
WT + PBS	144.3 ± 9.95	15	0.0008
WT + OT	158.8 ± 7.2	5	
CD38 ^{-/-} + PBS	76.4 ± 9.12	18	0.009
CD38 ^{-/-} + OT	152.8 ± 25.12	5	0.0211
CD38 ^{-/-} + LOT-1	88.2 ± 18.24	6	> 0.9999
CD38 ^{-/-} + LOT-2	144.6 ± 26.28	6	0.0330
CD38 ^{-/-} + LOT-3	135.1 ± 19.48	6	0.1234
Females			
WT + PBS	169.1 ± 8.65	10	< 0.0001
WT + OT	166.5 ± 33.92	5	0.0011
CD38 ^{-/-} + PBS	53.7 ± 10.27	10	
CD38 ^{-/-} + OT	137.7 ± 33.51	5	0.0337
CD38 ^{-/-} + LOT-1	75.4 ± 18.35	5	> 0.9999
CD38 ^{-/-} + LOT-2	135.5 ± 15.54	5	0.0434
CD38 ^{-/-} + LOT-3	114.9 ± 14.37	5	0.3752

Supplementary table 5. Elevated plus maze test. The time in open arms and distance travelled in open arms. P value compared with CD38^{-/-} treated with PBS.

	mean ± SEM	n	P value
Time travelled in open arms			
WT + PBS	42.77 ± 10.93	10	> 0.9999
WT + OT	75.45 ± 20.73	4	0.3008
CD38 ^{-/-} + PBS	27.5 ± 9.1	5	
CD38 ^{-/-} + OT	52.08 ± 15.58	6	> 0.9999
Distance travelled in open arms			
WT + PBS	0.94 ± 0.26	10	> 0.9999
WT + OT	1.06 ± 0.3	4	> 0.9999
CD38 ^{-/-} + PBS	0.66 ± 0.25	5	
CD38 ^{-/-} + OT	1.29 ± 0.43	6	> 0.9999

Supplementary table 6. Sucrose preference test. The preference for 1% sucrose solution consumption. P value compared with CD38^{-/-} treated with PBS

	mean ± SEM	n	P value
Females			
WT + PBS	0.67 ± 0.04	13	> 0.9999
WT + OT	0.63 ± 0.05	6	> 0.9999
CD38 ^{-/-} + PBS	0.72 ± 0.05	20	
CD38 ^{-/-} + OT	0.72 ± 0.04	5	> 0.9999
Males			
WT + PBS	0.78 ± 0.04	10	< 0.0001
WT + OT	0.77 ± 0.03	10	< 0.0001
CD38 ^{-/-} + PBS	0.46 ± 0.04	7	
CD38 ^{-/-} + OT	0.68 ± 0.05	7	0.0068
Males 30 min after injection			
CD38 ^{-/-} + PBS	0.46 ± 0.04	7	
CD38 ^{-/-} + OT	0.69 ± 0.05	7	0.0128
CD38 ^{-/-} + LOT-1	0.58 ± 0.05	5	> 0.9999
CD38 ^{-/-} + LOT-2	0.69 ± 0.05	5	0.0293
CD38 ^{-/-} + LOT-3	0.53 ± 0.04	5	> 0.9999
Females 24 hours after injection			
CD38 ^{-/-} + PBS	0.46 ± 0.04	7	
CD38 ^{-/-} + OT	0.43 ± 0.04	5	> 0.9999
CD38 ^{-/-} + LOT-1	0.69 ± 0.06	5	0.0304
CD38 ^{-/-} + LOT-2	0.53 ± 0.06	5	> 0.9999
CD38 ^{-/-} + LOT-3	0.43 ± 0.04	5	> 0.9999

Supplementary table 7. Locomotor activity in mouse pups. P value compared with CD38^{-/-} treated with PBS

	mean ± SEM	n	P value
WT + PBS	3.7 ± 0.71	25	0.0001
CD38 ^{-/-} + PBS	7.5 ± 0.3	25	
CD38 ^{-/-} + OT	4.2 ± 0.6	10	0.0811
CD38 ^{-/-} + LOT-1	5.3 ± 0.86	10	> 0.9999
CD38 ^{-/-} + LOT-2	2.9 ± 0.8	10	0.0009
CD38 ^{-/-} + LOT-3	2.5 ± 0.78	10	0.0002