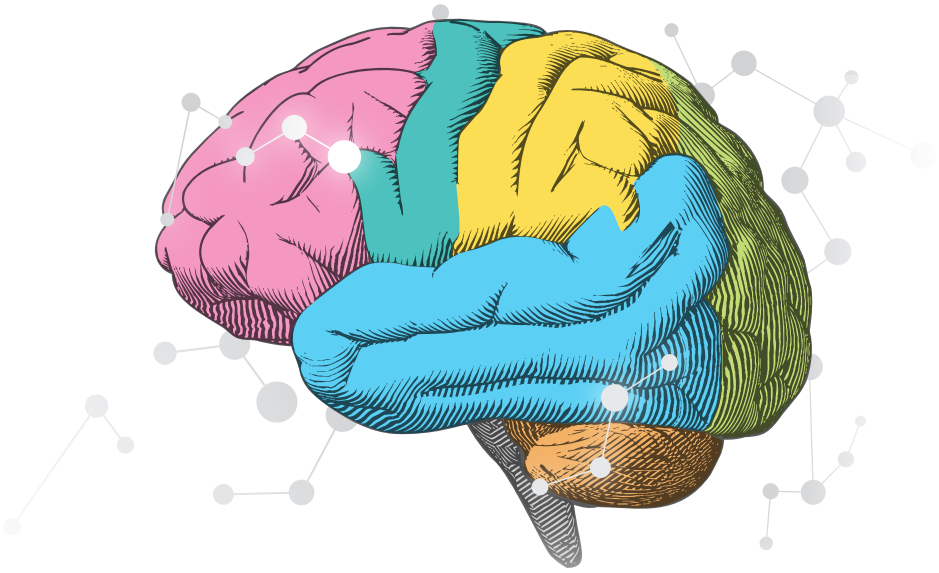
Signaling Pathways in Behavioral Neuroscience

Behavioral neuroscience is an interdisciplinary field that studies the biological basis of behavior, thought, and emotion. Many neural mechanisms shape these responses, and Cayman offers a range of products to better understand how these signaling pathways relate to brain function and disorders.

Study Signaling Pathways in Behavioral Neuroscience

- The reward circuit
- Learning & memory
- Sleep & biological rhythms
- Perception & mood
- Appetite regulation



Dopamine Receptor Signaling

Dopamine has important roles in reward, motivation, pleasure, and learning and memory.

Dopamine Receptor Signaling Modulators

Item No.	Product Name	Summary
19530	Fluspirilene	A dopamine D_2 and D_3 receptor antagonist (K_is = 1.5 and 1.1 nM, respectively)
15622	GBR 12909 (hydrochloride)	An inhibitor of dopamine uptake (IC_{50} = 1-51 nM), leading to consequent stimulation of dopamine receptors
25331	SCH 39166 (hydrobromide)	A dopamine D_1 receptor antagonist (K_i = 5 nM) that inhibits food intake in rats and reduces ethanol intake in alcohol-preferring rats
24961	Zuclopenthixol	A dopamine receptor antagonist (K_is = 9.8 and 1.5 nM for D_1 and D_2 receptors, respectively) that enhances memory retrieval in rats

See all tools for dopamine receptor signaling at www.caymanchem.com

Serotonin (5-HT) Receptor Signaling

5-HT has important roles in mood, wellness, appetite, learning and memory, and sleep.

5-HT Receptor Signaling Modulators

Item No.	Product Name	Summary
14572	Citalopram (hydrobromide)	An SSRI (IC_{50} = 1.8 nM for 5-HT reuptake in rat brain synaptosomes)
14998	Paroxetine (hydrochloride)	An SSRI (K_i = 0.04 nM) that has been used in formulations for the treatment of depression and anxiety
14839	Sertraline (hydrochloride)	An SSRI that inhibits monoamine uptake by the serotonin transporter (SERT; IC_{50} = 70 nM) and has been used in formulations for the treatment of depression and anxiety
21547	Vilazodone (hydrochloride)	An SSRI and a partial agonist of 5-HT_{1A} (IC_{50}s = 0.2 and 0.5 nM, respectively) that has been used in formulations for the treatment of depression

See all tools for 5-HT receptor signaling at www.caymanchem.com

Psychedelic Therapy with Psychoactive Substances

Some psychedelics are demonstrating benefits in clinical studies for the treatment of disorders that are resistant to other therapies.

Psychedelic Therapeutic Agents

Item No.	Product Name
20083	Ibogaine (hydrochloride)
11630	Ketamine (hydrochloride)
36791	2-bromo LSD (solution)
28289	LSD (D-tartrate) (solution)
13971	3,4-MDMA (hydrochloride)
13959	N,N-DMT
14041	Psilocybin

GABA Receptor Signaling

GABA is the major inhibitory neurotransmitter in the brain. It helps regulate mood and anxiety and has roles in sleep.

GABA Receptor Signaling Modulators

Item No.	Product Name	Summary
18600	(±)-Baclofen	A $GABA_B$ receptor agonist (IC_{50} = 180 nM) that reduces cocaine-induced hyperlocomotion in rats and binge-like ethanol intake in mice
15999	Etifoxine	A positive allosteric modulator of $GABA_A$ receptors that has anxiolytic-like activity in mice
16355	Gaboxadol (hydrochloride)	A $GABA_A$ receptor agonist and $GABA_C$ receptor antagonist
13667	Muscimol	$GABA_A$ and $GABA_C$ receptor agonist that impairs memory formation and retrieval in mice
24302	TPMPA (hydrate)	A ρ1 $GABA_C$ receptor antagonist that increases waking and decreases slow-wave and paradoxical sleep in rats

See all tools for GABA receptor signaling at www.caymanchem.com

Glutamate Receptor Signaling

Glutamate is the most abundant excitatory neurotransmitter in the brain. It has important roles in neurodevelopment, learning and memory, cognition, and mood.

Metabotropic Glutamate Receptor (mGluR) Signaling Modulators

Item No.	Product Name	Summary
22104	LSN2463359	A brain-penetrant mGluR5 positive allosteric modulator (EC_{50} = 24 nM) that reverses learning deficits in a rat schizophrenia model and promotes wakefulness
24215	LY354740	An mGluR2 and mGluR3 agonist (K_is = 99 and 94 nM, respectively) that attenuates PCP effects on working memory, stereotypy, and locomotion in a rat schizophrenia model
14536	MPEP (hydrochloride)	A potent, highly selective mGluR5a receptor antagonist (IC_{50} = 36 nM) with no activity at the mGluR1b receptor
14961	MTEP (hydrochloride)	An mGluR5a receptor negative allosteric modulator (K_i = 42 nM, IC_{50} = 110 nM) that produces antidepressant and anxiolytic-like effects in rodent models

See all tools for mGluR signaling at www.caymanchem.com

View more than 1,100 products for Behavioral Neuroscience
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NMDA Receptor Signaling Modulators

Item No.	Product Name	Summary
33284	Arcaine (sulfate)	An NMDA receptor antagonist (IC_{50} = 9.13 µM) that impairs contextual and auditory fear conditioning in rats
14539	D-AP5	A selective NMDA antagonist (K_d = 1.4 µM) that is widely used to study the activity of NMDA receptors. *DL-AP5 (Item No. 14540) is also available*
30687	L-701,324	An NMDA receptor antagonist that inhibits NMDA-induced currents in rat cortical neurons (K_i = 5.4 nM)
14184	Memantine (hydrochloride)	An NMDA receptor antagonist that blocks NMDA-induced currents in rat retinal ganglion cells
30622	NVP-AAM077	An NMDA receptor antagonist (IC_{50} = 8 nM) that increases escape latency in the Morris water maze

See all tools for NMDA receptor signaling at www.caymanchem.com

AMPA/Kainate Receptor Signaling Modulators

Item No.	Product Name	Summary
33428	1-BCP	A positive allosteric modulator of AMPA receptors that enhances memory in the Morris water maze in rats
14618	CNQX	A non-NMDA glutamate receptor antagonist (IC_{50}s = 0.3 and 1.5 µM for AMPA and kainate receptors, respectively) that is widely used to differentiate AMPA/kainate receptor responses from NMDA receptors
38281	NBQX	An AMPA and kainate receptor antagonist (IC_{50}s = 0.15 and 4.8 µM, respectively) that suppresses relapse phase nicotine self-administration in rats
14937	S18986	A positive allosteric modulator of AMPA receptors that improves episodic memory in rats and is used to study AMPA receptor signaling
36571	UoS 12258	A positive allosteric modulator of AMPA receptors that reduces escape latency in the Morris water maze in aged rats

See all tools for AMPA/kainate receptor signaling at www.caymanchem.com

Nicotinic Acetylcholine Receptor (nAChR) Signaling

Acetylcholine (ACh) is the endogenous neurotransmitter for nAChRs. nAChRs regulate neurotransmitter release and have roles in learning and memory, cognitive function, sleep, and appetite.

nAChR Signaling Modulators

Item No.	Product Name	Summary
20119	Chlorisondamine (iodide)	An antagonist of nAChRs (IC_{50} = 1.8 µM in rat striatal synaptosomes) and ganglion blocker that blocks nicotine-induced stimulant activity
26437	Cytisine	An alkaloid and a partial agonist of nAChRs that decreases the dysphoric state induced by nicotine withdrawal in rats
13245	Donepezil	An inhibitor of acetylcholinesterase (AChE; IC_{50} = 6.7 nM) that has been used in formulations for the treatment of Alzheimer's disease
34529	Ipidacrine	An AChE inhibitor (IC_{50} = 270 nM) that prevents scopolamine-induced memory deficits in rats
29138	(−)-Nicotine	An alkaloid and neuronal nAChR agonist that has addictive properties
20505	(±)-Nornicotine	An active metabolite of nicotine and nAChR agonist that is self-administered in rats

See all tools for nAChR signaling at www.caymanchem.com

Melatonin (MT) Receptor Signaling

Melatonin receptors have roles in sleep, circadian rhythm, learning, and memory.

MT Receptor Signaling Modulators

Item No.	Product Name	Summary
13203	Agomelatine	A melatonin receptor agonist (EC_{50} = 0.1 nM for MT_2 receptors) and 5-HT_{2B} and 5-HT_{2C} antagonist (K_is = 0.26 and 0.71 nM for the human receptors)
15998	Luzindole	A melatonin receptor antagonist (K_is = 10-27 nM for MT_{1B} and 158-513 nM for MT_{1A}) that has been used to study circadian rhythms, animal behavior, and melanophore response
20389	Ramelteon	A melatonin receptor agonist (K_is = 14 and 112 pM for human MT_1 and MT_2, receptors, respectively) that shortens latency to sleep onset in macaques

See all tools for melatonin receptor signaling at www.caymanchem.com

Orexin Receptor (OXR) Signaling

OXRs have roles in several functions, including the promotion of wakefulness, appetite regulation, and reward.

OXR Signaling Receptor Modulators & Assay Kits

Item No.	Product Name	Summary
13638	Almorexant (hydrochloride)	An OX1R and OX2R receptor antagonist (K_is = 4.7 and 0.9 nM, respectively, in a radioligand binding assay)
600240	Orexin 1 Receptor Reporter Assay Kit	A cell-based screening assay based on novel transfection technology
600250	Orexin 2 Receptor Reporter Assay Kit	A cell-based screening assay based on novel transfection technology
15073	Orexin A amide (bovine, human, mouse, rat) (trifluoroacetate salt)	A hypothalamic neuropeptide that activates OX1R and OX2R with equal affinity (EC_{50}s = 0.09 and 0.06 µM, respectively)
35128	Orexin B amide (mouse, rat) (trifluoroacetate salt)	A hypothalamic neuropeptide that increases intracellular calcium mobilization in HEK293 cells expressing OX1R or OX2R (EC_{50}s = 0.93 and 0.13 µM, respectively)
19145	SB-334867	An OX1R antagonist (K_B = 39.8 nM) that reduces food intake and increases resting duration as well as reduces acquisition and consolidation of spatial memory in rats

See all tools for orexin receptor signaling at www.caymanchem.com

Incretin Signaling

Originally developed to treat type 2 diabetes (T2D), glucagon-like peptide 1 (GLP-1), glucose-dependent insulinotropic polypeptide (GIP), and glucagon receptor (GCGR) agonists have found new therapeutic utility for obesity.

Item No.	Product Name	Summary
41269	Bamadutide	A GLP-1R and GCGR dual agonist; decreases blood levels of glucose and hemoglobin A1c (HbA1c) in female *db/db* mice when administered at a dose of 0.1 mg/kg per day
40714	Cotadutide (acetate)	A GLP-1R and GCGR dual agonist; enhances glucose-stimulated insulin secretion in INS-1 832/3 rat pancreatic β-cells; reduces food intake and fat mass, as well as improves glucose tolerance in diet-induced obese (DIO) mice at 10 nmol/kg
11096	Exendin-4 (48-86) amide (acetate)	A GLP-1R agonist (IC_{50} = 3.5 nM)
24727	Liraglutide	A GLP-1R agonist; decreases calorie intake, shifts food preference to a higher ratio of chow to candy, reverses weight and fat gains, and increases insulin sensitivity in a rat model of obesity induced by supplemental dietary candy
39739	Lixisenatide acetate	A GLP-1R agonist; lowers blood glucose levels in an oral glucose tolerance test (OGTT; ED_{50} = 0.021 nmol/kg) and decreases blood levels of hemoglobin A1c (HbA1c) in *db/db* mice
41245	LSN3318839	A GLP-1R positive allosteric modulator; reduces blood glucose levels in glucose-dependent insulinotropic polypeptide receptor (GIPR) knockout mice in an oral glucose tolerance test at 30 mg/kg
40971	Mazdutide	A GLP-1R and GCGR dual agonist; reduces body weight in both *Gcgr*$^{-/-}$ and *Glp1r*$^{-/-}$ mice
39741	Orforglipron	A nonpeptide GLP-1R agonist (EC_{50} = 3.05 nM); decreases blood glucose and serum insulin levels in glucose-injected cynomolgus monkeys (5.4 mg/kg)
39747	Retatrutide (sodium salt)	A GCGR, GLP-1R, and GIP receptor agonist (EC_{50}s = 5.79, 0.775, and 0.0643 nM, respectively); decreases plasma glucose levels in an intraperitoneal glucose tolerance test in mice at 0.1-30 nmol/kg
41175	SAR441255 (sodium salt)	A peptide agonist of GLP-1R, GIPR, and GCGR (EC_{50}s = 1.03, 0.73, and 1.01 pM, respectively); reduces body weight in a mouse model of high-fat diet-induced obesity at 1-30 µg/kg
40231	Semaglutide	A GLP-1R agonist (EC_{50} = 6.2 pM); decreases blood glucose levels in the *db/db* mouse model of type 2 diabetes (ED_{50} = <2 nmol/kg)
40972	Survodutide	A GLP-1R and GCGR dual agonist (EC_{50}s = 0.33 and 0.52 nM, respectively); potentiates glucose-induced insulin secretion in isolated mouse, rat, and perifused human pancreatic islets
41258	Taspoglutide (acetate)	A GLP-1R agonist (K_i = 1.1 nM for the human receptor); decreases blood levels of glucose and increases blood levels of insulin in an oral glucose tolerance test in Zucker diabetic obese rats at 1 mg/animal per week
39748	Tirzepatide (sodium salt)	A GLP-1R and GIPR dual agonist; decreases body weight, food intake, plasma levels of leptin, triglycerides, and free fatty acids (FFAs), hepatic levels of triglycerides, and blood glucose levels in a mouse model of high-fat diet-induced obesity at 10 nmol/kg per day
39740	V-0219 (hydrochloride)	A GLP-1R positive allosteric modulator; enhances reductions in food intake induced by the GLP-1R agonist exendin-4 in rats at 0.001 mg/kg

See all tools for incretin signaling at www.caymanchem.com