

# DREADD

Designer Receptors Exclusively Activated by Designer Drugs (DREADD) are G protein-coupled receptors (GPCRs) that are engineered to be specifically activated by otherwise physiologically inert, drug-like small molecules. They can be used remotely and non-invasively to control cellular signaling, enabling the investigation of relationships between particular cells and their corresponding behaviors. These receptors are generally unresponsive to endogenous ligands, which allows for discrete control of cellular activity with limited off-target effects.

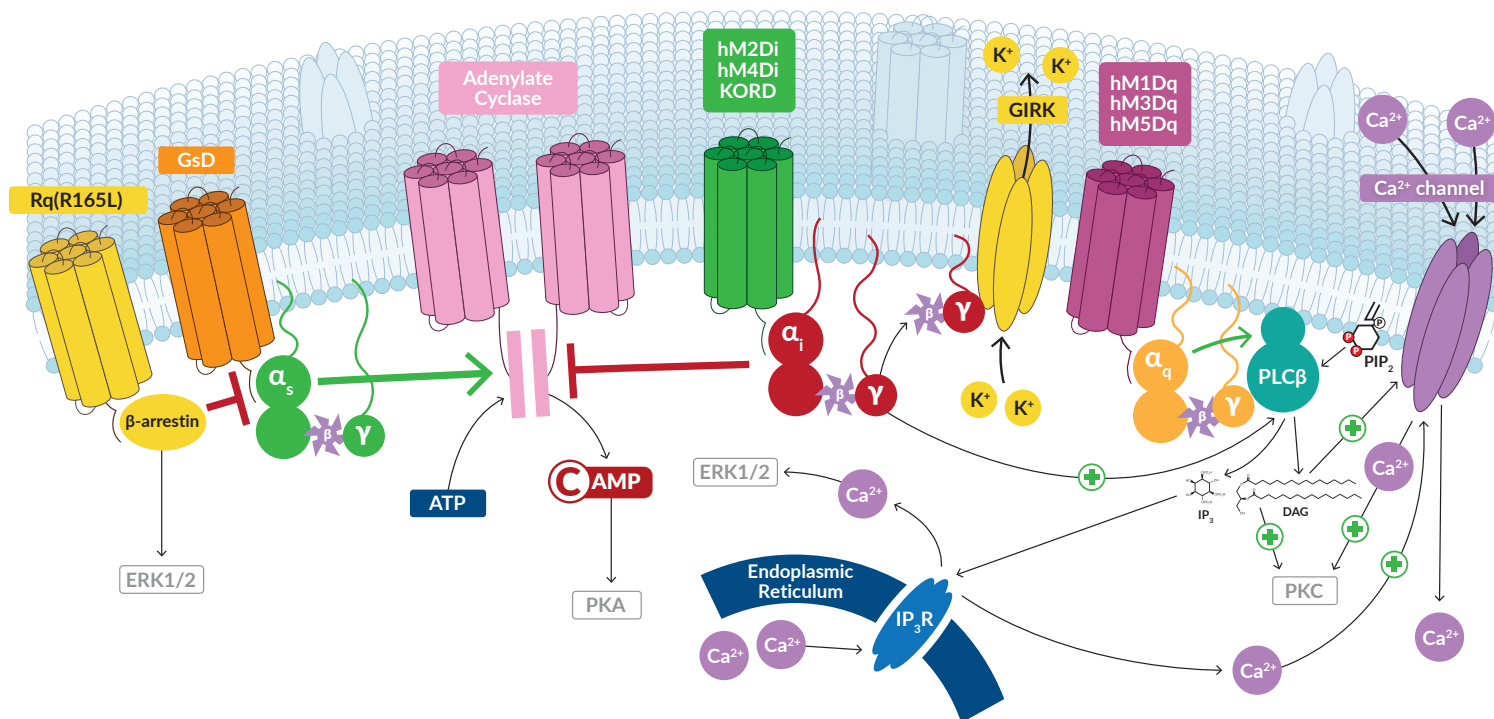


Figure 1. Activation of second-messenger cascades by G protein- and  $\beta$ -arrestin-linked DREADDs.

## hM1Dq

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
human M <sub>1</sub> muscarinic	Item No.	Product Name	G <sub>αq</sub>	increase Ca <sup>2+</sup>	neuronal burst firing; smooth muscle contraction
	16882	Clozapine N-oxide			

## hM3Dq

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
human M <sub>3</sub> muscarinic	Item No.	Product Name	G <sub>αq</sub>	increase Ca <sup>2+</sup>	neuronal burst firing; smooth muscle contraction
	16882	Clozapine N-oxide			
	18907	DREADD Agonist 21			
	17756	Perlapine			

## hM5Dq

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
human M <sub>5</sub> muscarinic	Item No.	Product Name	G <sub>αq</sub>	increase Ca <sup>2+</sup>	neuronal burst firing; smooth muscle contraction
	16882	Clozapine N-oxide			

## GsD

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
chimeric rat M <sub>3</sub> muscarinic – turkey β <sub>1</sub> -adrenergic	Item No.	Product Name	G <sub>αs</sub>	increase cAMP	modulates plasticity; smooth muscle relaxation
	16882	Clozapine N-oxide			

## hM2Di

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
human M <sub>2</sub> muscarinic	Item No.	Product Name	G <sub>αi</sub>	decrease cAMP; activate β/γ-GIRK	presynaptic inhibition; smooth muscle contraction
	16882	Clozapine N-oxide			
	18907	DREADD Agonist 21			
17756	Perlapine				

## hM4Di

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
human M <sub>4</sub> muscarinic	Item No.	Product Name	G <sub>αi</sub>	decrease cAMP; activate β/γ-GIRK	presynaptic inhibition; smooth muscle contraction
	16882	Clozapine N-oxide			
	18907	DREADD Agonist 21			
17756	Perlapine				

## KORD

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
human κ-opioid	Item No.	Product Name	G <sub>αi</sub>	decrease cAMP; activate β/γ-GIRK	presynaptic inhibition; smooth muscle contraction
	23582	Salvinorin B			
22244	Salvinorin B Mesylate				

## Rq(R165L) or rM3Darr

Originating Receptor	Ligand(s) Available from Cayman		Signal Transducer	Second Messenger Effect	Downstream Effect
rat M <sub>3</sub> muscarinic	Item No.	Product Name	β-arrestin	increase arrestin translocation	GPCR desensitization; non-canonical GPCR signaling
	16882	Clozapine N-oxide			

## Next Generation Designer Ligands for DREADD

Do you need a custom-designed ligand or special formulation for an existing ligand? We can make it for you! Cayman Contract Services has a highly qualified group of medicinal chemists capable of helping to develop the next generation of DREADD ligands.

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