potassium (K+), calcium (Ca2+), and/or chloride (Cl–) ions through a cellular membrane in response to the binding of a ligand. Examples of LGICs include, without limitation, Cys-loop receptors (*e.g.*, AChR such as a nAChR (*e.g.*, a muscle-type nAChR or a neuronal-type nAChR), gamma-aminobutyric acid (GABA; such as $GABA_A$ and $GABA_A$-ρ (also referred to as $GABA_C$) receptors, GlyR, GluCl receptors, and 5HT3 receptors), ionotropic glutamate receptors (iGluR; such as AMPA receptors, kainate receptors, NMDA receptors, and delta receptors), ATP-gated channels (*e.g.*, P2X), and phosphatidylinositol 4,5-bisphosphate (PIP2)-gated channels. In cases where a modified LGIC described herein is a chimeric LGIC, the chimeric LGIC can include a LBD selected from any appropriate LGIC and an IPD selected from any appropriate LGIC. In cases where a LGIC includes multiple different subunits (for example, a neuronal-type nAChR includes α4, β2, and α7 subunits), the LBD and/or IPD can be selected from any of the subunits. For example, a LBD from a nAChR can be a α7 LBD. A representative rat α7 nAChR amino acid sequence (including both a LBD and an IPD) is as follows.

SEQ ID NO:12

MGGGRGGIWLALAAALLHVSLQGEFQRRLYKELVKNYNPLERPVANDSQPLTVYFSLSLLQI
MDVDEKNQVLTTNIWLQMSWTDHYLQWNMSEYPGVKNVRFPDGQIWKPDILLYNSADERFDA
TFHTNVGVNASGHCQYLPPGIFKSSCYIDVRWFPFDVQQCKLKFGSWSYGGWSLDLQMQEAD
ISSYIPNGEWDLMGIPGKRNEKFYECCKEPYPDVTYTVTMRRRTLYYGLNLLIPCVLISALA
LLVFLLPADSGEKISLGITVLLSLTTFMLLVAEIMPATSDSVPLIAQYFASTMIIVGLSVVV
TVIVLRYHHHDPDGGKMPKWTRIILLNWCAWFLRMKRPGEDKVRPACQHKPRRCSLASVELS
AGAGPPTSNGNLLYIGFRGLEGMHCAPTPDSGVVCGRLACSPTHDEHLMHGAHPSDGDPDLA
KILEEVRYIANRNRCQDESEVICSEWKFAACVVDPLCLMAFSVFTIICTIGILMSAPNFVEA
VSKDFA

In some cases, a modified LGIC subunit described herein can include a LBD from a α7 nAChR. Examples of α7 nAChR LBDs include, without limitation, a human α7 nAChR LBD having the amino acid sequence set forth in SEQ ID NO:1, a human α7 nAChR LBD having the amino acid sequence set forth in SEQ ID NO:2, and a human α7 nAChR LBD having the amino acid sequence set forth in SEQ ID NO:11. In some cases, a α7 nAChR LBD can be a homolog, orthologue, or paralog of the human α7 nAChR LBD set forth in

SEQ ID NO:3

IIRRRPLFYAVSLLLPSIFLMVVDIVGFCLPPDSGERVSFKITLLLGYSVFLIIVSDTLPAT
IGTPLIGVYFVVCMALLVISLAETIFIVRLVHKQDLQRPVPDWLRHLVLDRIAWILCLGEQP
MAHRPPATEQANKTDDCSGSDLLPAMGNHCSHVGGPQDLEKTPRGRGSPLPPPREASLAVRG
LLQELSSIRHFLEKRDEMREVARDWLRVGYVLDRLLFRIYLLAVLAYSITLVTLWSIWHYS

SEQ ID NO:4

LFYVVSLLLPSIFLMVMDIVGFYLPPNSGERVSFKITLLLGYSVFLIIVSDTLPATAIGTPL
IGVYFVVCMALLVISLAETIFIVRLVHKQDLQQPVPAWLRHLVLERIAWLLCLREQSTSQRP
PATSQATKTDDCSAMGNHCSHMGGPQDFEKSPRDRCSPPPPPREASLAVCGLLQELSSIRQF
LEKRDEIREVARDWLRVGSVLDKLLFHIYLLAVLAYSITLVMLWSIWQYA

In some cases, a modified LGIC subunit described herein can include an IPD from a GlyR. Examples of GlyR IPDs include, without limitation, a murine GlyR IPD having the amino acid sequence set forth in SEQ ID NO:5. In some cases, a GlyR IPD can be a homolog, orthologue, or paralog of the human GlyR IPD set forth in SEQ ID NO:5. In some cases, a GlyR IPD can be have at least 75 percent sequence identity (*e.g.*, at least 80%, at least 82%, at least 85%, at least 88%, at least 90%, at least 93%, at least 95%, at least 97% or at least 99% sequence identity) to SEQ ID NO:5.

SEQ ID NO:5

MGYYLIQMYIPSLLIVILSWISFWINMDAAPARVGLGITTVLTMTTQSSGSRASLPKVSYVK
AIDIWMAVCLLFVFSALLEYAAVNFVSRQHKELLRFRRKRRHHKEDEAGEGRFNESAYGMGP
ACLQAKDGISVKGANNSNTTNPPPAPSKSPEEMRKLFIQRAKKIDKISRIGFPMAFLIFNMF
YWIIYKIVRREDVHNQ

In some cases, a modified LGIC subunit described herein can include an IPD from a GABA receptor (*e.g.*, $GABA_A$-ρ, also referred to as $GABA_C$). Examples of $GABA_A$-ρ IPDs include, without limitation, a human $GABA_A$-ρ IPD having the amino acid sequence set forth in SEQ ID NO:9. In some cases, a $GABA_A$-ρ IPD can be a homolog, orthologue, or paralog of the human $GABA_A$-ρ IPD set forth in SEQ ID NO:9. In some cases, a $GABA_A$-ρ IPD can be have at least 75 percent sequence identity (*e.g.*, at least 80%, at least 82%, at least 85%, at