Anti-Glutamate receptor autoantibodies

Glutamate receptors are subdivided into two main types: ionotropic receptors, which function as ligand gated ion channels and metabotropic receptors, which ligated to G-proteins mediate the intrcellular production of second messengers. The ionotropic receptors are classified according to their preferred agonists into AMPA (α-amino-3-hydroxy-5-methyl-4-isoxazolpropionate), kainite and NMDA (N-methyl-D-aspartate) receptors. The majority of the hitherto known autoantibodies against glutamate receptors react with the AMPA- and NMDA subunits (see table 1).

Table 1 Families of ionotropic an metabotropic glutamate receptors in mammals. The nomenclature of receptor subunits follows that of the International Union of Basic and Clinical Pharmacology (Collingridge et al. 2009). Former terms are given in brackets. The denomination of the autoantibodies, in virtue of comprehension, follows the former nomenclature (more frequently encountered antibodies are marked red, infrequent ones in green).

Class	Agonists	Subunits	Autoantibodies	Clinic
ionotropic (Class I)	**AMPA** α-**a**mino-3-hydroxy-5-**m**ethyl-4-isoxazole-**p**ropionic **a**cid	GluA1 ($GluR_1$) GluA2 ($GluR_2$) GluA3 ($GluR_3$) GluA4 ($GluR_4$)	anti-$AMPAR_1$, anti-$iGluR_1$ anti-$AMPAR_2$, anti-$iGluR_2$ anti-$AMPAR_3$, anti-$iGluR_3$ anti-$AMPAR_4$, anti-$iGluR_4$	LE LE E PN
	Kainat	GuK1 ($GluR_5$) GluK2 ($GluR_6$) GluK3 ($GluR_7$) GluK4 (Ka1) GluK5 (Ka2)	anti-$iGluR_5$ anti-$iGluR_6$	PN PN
	NMDA N-methyl-aspartate	GluN1 (NR1, ζ) GluN2A (NR2A, ε_1) GluN2B (NR2B, ε_2) GluN2C (NR2A, ε_3) GluN2D (NR2A ε_4) GluN3A (NR2A) GluN3B (NR2A)	anti-$NMDA_{(NR1)}$-R	
	Delta receptors	GuD1 (GluRδ1) GluD2 (GluRδ2)		
metabo-tropic (Class II)	**Group I** (Phospholipase C)	$mGluR_1$ $mGluR_5$	anti-$mGluR_1$ anti-$mGluR_5$	CA, LE OS
	Group II (Adenylatcyclase)	$mGluR_2$ $mGluR_3$		
	Grouppe III (Adenylatcyclase)	$mGluR_4$ $mGluR_6$ $mGluR_7$ $mGluR_8$		

CA Cerebellar ataxia; LE Limbic encephalitis; PN Paraneoplastic syndromes; E Epilepsy; OS Ophelia syndrome

Literature

Collingridge GL, Olsen RW, Peters J, Spedding M: A nomenclature for cligand-gated ion channels. Neuropharmacology (2009); 56(1): 2 - 5 (PMID: 18655795).