Anti-AMPA receptor autoantibodies

AMPA-receptors (AMPAR, α-**a**mino-3-hydroxy-5-**m**ethyl-4-isoxazole**p**ropionic **a**cid-Rezeptor) appertain to the family of ionotropic glutamate receptors, which mediate very speedy synaptic transmissions within the CNS. The tetramer receptors are composed of four4 subunits ($GluR_1$, $GluR_2$, $GluR_3$, $GluR_4$, also termed as $AMPAR_1$, $AMPAR_2$, $AMPAR_3$, $AMPAR_4$), which distinguish themself by their terminal extracellular domains.

Specificities

The autoantibodies, up to now identified, identified in humans recognized the receptor subunits $GluR_1$, $GluR_2$, $GluR_3$ and $GluR_4$, herein defined **i**$GluR_1$, **i**$GluR_2$, **i**$GluR_3$ and **i**$GluR_4$, in order to distinguish them from the metabotropic glutamate receptors (**m**$GluR_{1-8}$), which also may constitute the target of human autoantibodies (vide infra, table 1)

Screenings

- anti-$AMPA_1$-receptor autoantibodies (anti-i$GluR_1$, anti-$AMPAR_1$)
- anti-$AMPA_2$-receptor autoantibodies (anti-i$GluR_2$, anti-$AMPAR_2$)
- anti-$AMPA_3$-receptor autoantibodies (anti-i$GluR_3$, anti-$AMPAR_3$)
- anti-$AMPA_4$-receptor autoantibodies (anti-i$GluR_4$, anti-$AMPAR_4$)

Indications

- **Limbic encephalitis** (anti-$AMPAR_{1/2}$)

The targets of anti-AMPA receptor antibodies, which can be found in patients with limbic encephalitis, often occur in context with paraneoplastic neurological syndromes (e. g. small cell lung carcinoma, (SCLC), thyroid or mamma carcinoma), are mainly the subunits i$GluR_1$ and i$GluR_2$. Often patients harbor antibodies reacting with both the subunits. Antibodies directes against the receptor subunit $AMPA_4$ were referred once in a patient suffering from paraneoplastic neuropathy.

- **Epileptiform complaints**

Antibodies reacting with the i$GluR_3$ receptor subunit were first described as potentially marker antibody in children suffering from Rasmussen encephalitis. However, later on they were more regarded as non-specific for this disease. Anti-i$GluR_3$ antibodies were repeatedly reported in the context with epileptiform symptoms, also once in a status of myoclonus after bone marrow transplantation. The diagnostic significance of anti-$GluR_3$ remains uncertain.

See also

- Autoantibodies in paraneoplastic neuropathy

Anti-AMPA receptor autoantibodies

Tabelle 1 Families of ionotropic and metabotropic glutamate receptors in mammals.

Klasse	Agonist	Untereinheiten	Autoantikörper	Klinik
ionotrop (Klasse I)	**AMPA** (tetramer) 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 (pentamer)	GuK1 ($GluR_5$) GluK2 ($GluR_6$) GluK3 ($GluR_7$) GluK4 (Ka1) GluK5 (Ka2)	anti-$iGluR_5$ anti-$iGluR_6$	PN PN
	NMDA (tetramer) N-Methyl-Aspartat	GluN1 (NR1, ζ) GluN2A (NR2A, ε_1) GluN2B (NR2B, ε_2) GluN2C (NR2A, ε_3) GluN2D (NR2A ε_4) GluN3A (NR2A) GluN3B (NR2A)		
	Deltarezeptoren	GuD1 (GluRδ1) GluD2 (GluRδ2)		
metabotrop (Klasse II)	**Gruppe I** (Phospholipase C)	$mGluR_1$ $mGluR_5$	anti-$mGluR_1$ anti-$mGluR_5$	CA, LE OS
	Gruppe II (Adenylatcyclase)	$mGluR_2$ $mGluR_3$		
	Gruppe III (Adenylatcyclase)	$mGluR_4$ $mGluR_6$ $mGluR_7$ $mGluR_8$		

CA Cerebellare Ataxie
E Epilepsie
LE Limbische Enzephalitis
OS Ophelia Syndrom
PN Paraneoplastisches Syndrom

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