Interferon-driven brain phenotype in a mouse model of RNaseT2 deficient leukoencephalopathy

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《Nature communications》

(IF=12.121)

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Interferon-driven brain phenotype in a mouse model of RNaseT2 deficient leukoencephalopathy

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Sketch

On November 11, 2021, Matthias Kettwig, Gogentine University Medical Center, Germany, and his team , published a paper titled "Interferon-driven brain phenotype in a mouse model of RNaseT2 deficient leukoencephalopathy" on Nature Communications, which suggested that RNaseT2-/- mice can be used to study central nervous system damage associated with RnaseT2 defects.

The antibody [Polyclonal Antibody to Ribonuclease T2 (RNASET2), PAA113Mu01] of Cloud-Clone brand was chosed in this article, we are so proud for supporting the reaserchers.

Next, primary antibodies were applied in 5 % non-fat milk in TBST overnight at 4 °C (anti-RNaseT2 (1:500), Cloud-Clone Corp., Katy, USA; anti-β-actin

Product

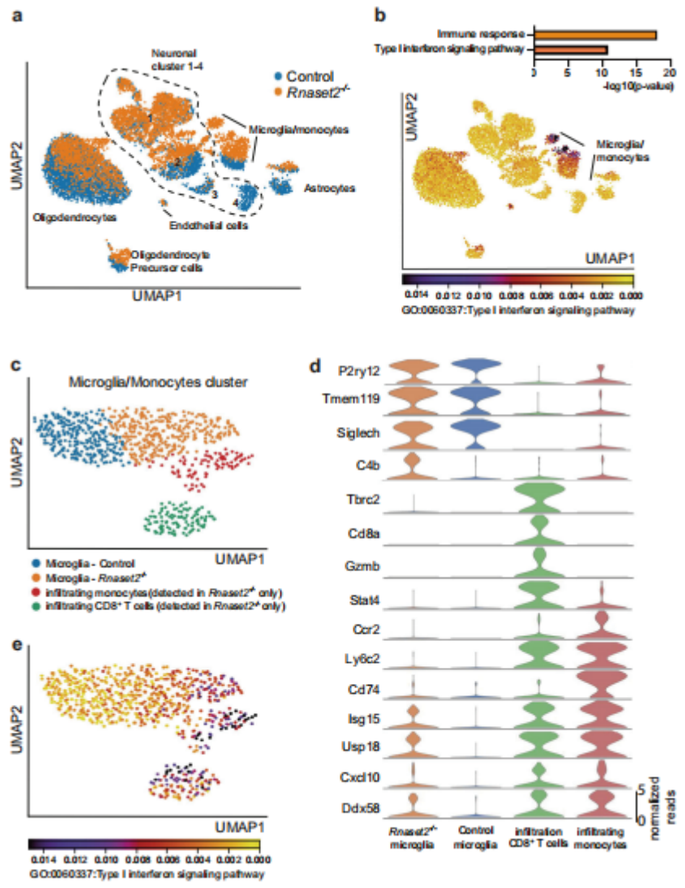
Product: Polyclonal Antibody to Ribonuclease T2 (RNASET2)

Product No.: PAA113Mu01

Concentration: 500ug/mL

Research

Infantile-onset RNaseT2 deficient leukoencephalopathy is characterised by cystic brain lesions, multifocal white matter alterations, cerebral atrophy, and severe psychomotor impairment. The phenotype is similar to congenital cytomegalovirus brain infection and overlaps with type I interferonopathies, suggesting a role for innate immunity in its pathophysiology. To date, pathophysiological studies have been hindered by the lack of mouse models recapitulating the neuroinflammatory encephalopathy found in patients. In this study, we generated Rnaset2−/− mice using CRISPR/Cas9-mediated genome editing. Rnaset2−/− mice demonstrate upregulation of interferon-stimulated genes and concurrent IFNAR1-dependent neuroinflammation, with infiltration of CD8+ effector memory T cells and inflammatory monocytes into the grey and white matter. Single nuclei RNA sequencing reveals homeostatic dysfunctions in glial cells and neurons and provide important insights into the mechanisms of hippocampal-accentuated brain atrophy and cognitive impairment. The Rnaset2−/− mice may allow the study of CNS damage associated with RNaseT2 deficiency and may be used for the investigation of potential therapies.



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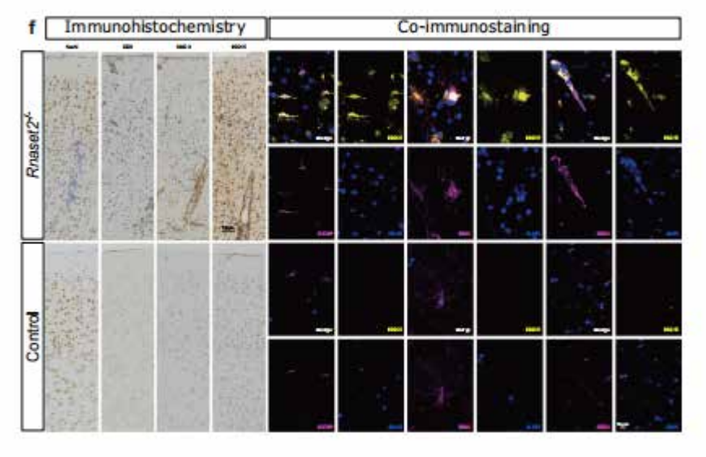

Fig. Single nuclei RNA sequencing analyses of the caudate putamen confirms type I interferon-driven neuroinflammation

Cloud-Clone Neurology Related Targets

Cloud-Clone Neurology Related Targets							
Targets	Core No.	Targets	Core No.	Targets	Core No.	Targets	Core No.
5-HT	A808	gABA	A900	NGF	A105	S100B	A567
ACH	A912	GAL	B084	NMB	A803	Slit2	A672
ADAM8	A620	GDH	A293	NMS	A828	SNCa	B222
AGER	A645	GDNF	A043	NOSTRIN	A628	SNCg	A939
Alk-Smase	A801	GFAP	A068	NOX1	A554	TRH	A839
AQP4	A582	GnRH	A843	NPS	A796		
bACE1	A718	GSTa4	A659	NPTX1	A298		
BDNF	A011	HEXb	A637	NPTX2	A299		
CDK5	A739	KLK6	A691	NRP1	A692		
CECR1	L307	KLK8	A690	NSE	A537		
CGRP	A876	MAG	A422	NT3	A106		
CNTF	A021	MAP1A	A338	NT4	A107		
CR	A687	MBP	A539	PER1	M012		
CRH	A835	MOG	A421	PGD2S	A724		
DA	A851	MT	A908	PK2	A115		
DNHD1	U491	NES	A500	PKBg	A382		
dSIP	A708	NGB	A606	PKCg	A419		

Citations of Neurology Related Products (Excerpts)

Brain Natriuretic Peptide (BNP)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Pig	51

Excerpt:

1. Lu D, Wang K, Wang S, et al. Beneficial effects of renal denervation on cardiac angiogenesis in rats with prolonged pressure overload[J]. Acta Physiologica, 2017, 220(1): 47-57.（IF=5.93）
2. Wei J, Guo F, Zhang M, et al. Signature-oriented investigation of the efficacy of multicomponent drugs against heart failure[J]. The FASEB Journal, 2018: fj. 201800673RR.（IF=5.595）
3. Li L, Ni J, Li M, et al. Ginsenoside Rg3 micelles mitigate doxorubicin-induced cardiotoxicity and enhance its anticancer efficacy[J]. Drug delivery, 2017, 24(1): 1617-1630.
4. Kovacevic L, Wolfe-Christensen C, Lu H, et al. Why does adenotonsillectomy not correct enuresis in all children with sleep disordered breathing?[J]. The Journal of urology, 2014, 191(5): 1592-1596.

Melatonin (MT)

Product	Species	Citations
Protein / Antibody / ELISA kit	General	64

Excerpt:

1. Szewczyk-Golec K, Rajewski P, Gackowski M, et al. Melatonin supplementation lowers oxidative stress and regulates adipokines in obese patients on a calorie-restricted diet[J]. Oxidative medicine and cellular longevity, 2017, 2017.（IF=4.936）
2. Özdem M, Kırzıoğlu F Y, Yılmaz H R, et al. Antioxidant effects of melatonin in heart tissue after induction of experimental periodontitis in rats[J]. Journal of oral science, 2017, 59(1): 23-29.
3. Budkowska M, Ostrycharz E, Wojtowicz A, et al. A Circadian Rhythm in both Complement Cascade (ComC) Activation and Sphingosine-1-Phosphate (S1P) Levels in Human Peripheral Blood Supports a Role for the ComC‐S1P Axis in Circadian Changes in the Number of Stem Cells Circulating in Peripheral Blood[J]. Stem Cell Reviews and Reports, 2018: 1-9.

Brain Derived Neurotrophic Factor (BDNF)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Rabbit, Porcine, Dog, Chicken	54

Excerpt:

1. Chen P C, Hsieh M H, Kuo W S, et al. Water-soluble chitosan inhibits nerve growth factor and attenuates allergic inflammation in mite allergen‐induced allergic rhinitis[J]. Journal of Allergy and Clinical Immunology, 2017, 140(4): 1146-1149. e8.（IF=13.258）
2. Qi F, Zuo Z, Hu S, et al. An enriched environment restores hepatitis B vaccination-mediated impairments in synaptic function through IFN-γ/Arginase1 signaling[J]. Brain, behavior, and immunity, 2018.（IF=6.306）
3. Li W, Li K, Gao J, et al. Autophagy is required for human umbilical cord mesenchymal stem cells to improve spatial working memory in APP/PS1 transgenic mouse model[J]. Stem cell research & therapy, 2018, 9(1): 9.（IF=4.963）

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Enolase, Neuron Specific (NSE)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Rabbit, Porcine, Dog, Chicken	39

Excerpt:

1. Erşahin M, Özdemir Z, Özsavcı D, et al. Melatonin treatment protects against spinal cord injury induced functional and biochemical changes in rat urinary bladder[J]. Journal of pineal research, 2012, 52(3): 340-348.（IF=11.613）
2. Chen K, Wang N, Diao Y, et al. Hydrogen-rich saline attenuates brain injury induced by cardiopulmonary bypass and inhibits microvascular endothelial cell apoptosis via the PI3K/Akt/GSK3 β signaling pathway in rats[J]. Cellular Physiology and Biochemistry, 2017, 43(4): 1634-1647.（IF=5.5）
3. Erşahin M, Toklu H Z, Erzik C, et al. The anti-inflammatory and neuroprotective effects of ghrelin in subarachnoid hemorrhage-induced oxidative brain damage in rats[J]. Journal of neurotrauma, 2010, 27(6): 1143-1155.

Growth Hormone (GH)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Rabbit, Porcine, Dog, Chicken, Goat	35

Excerpt:

1. Ii M, Li H, Adachi Y, et al. The efficacy of IGF-I receptor monoclonal antibody against human gastrointestinal carcinomas is independent of k-ras mutation status[J]. Clinical Cancer Research, 2011: clincanres. 3131.2010.（IF=10.199）
2. Lee S, Son B, Jeon J, et al. Decreased Hepatic Lactotransferrin Induces Hepatic Steatosis in Chronic Non-Alcoholic Fatty Liver Disease Model[J]. Cellular Physiology and Biochemistry, 2018, 47(6): 2233-2249.（IF=5.5）
3. Chen Y, Yang J, Nie X, et al. Effects of bariatric surgery on change of Brown adipocyte tissue and energy metabolism in obese mice[J]. Obesity surgery, 2018, 28(3): 820-830.

Glial Fibrillary Acidic Protein (GFAP)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Bovine	36

Excerpt:

1. Johansson P I, Sørensen A M, Perner A, et al. High sCD40L levels early after trauma are associated with enhanced shock, sympathoadrenal activation, tissue and endothelial damage, coagulopathy and mortality[J]. Journal of Thrombosis and Haemostasis, 2012, 10(2): 207-216.（IF=4.899）
2. Tskitishvili E, Pequeux C, Munaut C, et al. Estrogen receptors and estetrol-dependent neuroprotective actions: a pilot study[J]. Journal of Endocrinology, 2017, 232(1): 85-95.
3. Rodriguez Cruz Y, Strehaiano M, Rodriguez Obaya T, et al. An Intranasal Formulation of Erythropoietin (Neuro-EPO) Prevents Memory Deficits and Amyloid Toxicity in the APP Swe Transgenic Mouse Model of Alzheimer's Disease[J]. Journal of Alzheimer's Disease, 2017, 55(1): 231-248.

Dopamine (DA)

Product	Species	Citations
Protein / Antibody / ELISA kit	General	31

Excerpt:

1. Abdelkader N F, Safar M M, Salem H A. Ursodeoxycholic acid ameliorates apoptotic cascade in the rotenone model of Parkinson's disease: modulation of mitochondrial perturbations[J]. Molecular neurobiology, 2016, 53(2): 810-817.（IF=5.076）
2. Safar M M, Arab H H, Rizk S M, et al. Bone marrow-derived endothelial progenitor cells protect against scopolamine-induced Alzheimer-like pathological aberrations[J]. Molecular neurobiology, 2016, 53(3): 1403-1418.（IF=5.076）

Noradrenaline (NE)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Bovine	26

Excerpt:

1. Yoon Y S, Tsai W W, Van de Velde S, et al. cAMP-inducible coactivator CRTC3 attenuates brown adipose tissue thermogenesis[J]. Proceedings of the National Academy of Sciences, 2018, 115(23): E5289-E5297.（IF=9.504）
2. Wang K, Lu D, Zhang B, et al. Renal denervation attenuates multi-organ fibrosis and improves vascular remodeling in rats with transverse aortic constriction induced cardiomyopathy[J]. Cellular Physiology and Biochemistry, 2016, 40(3-4): 465-476.（IF=5.5）
3. Sun H J, Chen D, Han Y, et al. Relaxin in paraventricular nucleus contributes to sympathetic overdrive and hypertension via PI3K-Akt pathway[J]. Neuropharmacology, 2016, 103: 247-256.

S100 Calcium Binding Protein B (S100B)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Rabbit	25

Excerpt:

1. Erşahin M, Özdemir Z, Özsavcı D, et al. Melatonin treatment protects against spinal cord injury induced functional and biochemical changes in rat urinary bladder[J]. Journal of pineal research, 2012, 52(3): 340-348.（IF=11.613）
2. Chen K, Sun Y J, Dong W, et al. Activated Α7nachr Improves Postoperative Cognitive Dysfunction and Intestinal Injury Induced by Cardiopulmonary Bypass in Rats: Inhibition of the Proinflammatory Response Through the Th17 Immune Response[J]. Cellular Physiology and Biochemistry, 2018, 46(3): 1175-1188.（IF=5.5）
3. Jeremias I C, Victorino V J, Machado J L, et al. The severity of cecal ligature and puncture-induced sepsis correlates with the degree of encephalopathy, but the sepsis does not lead to acute activation of spleen lymphocytes in mice[J]. Molecular neurobiology, 2016, 53(5): 3389-3399.（IF=5.076）