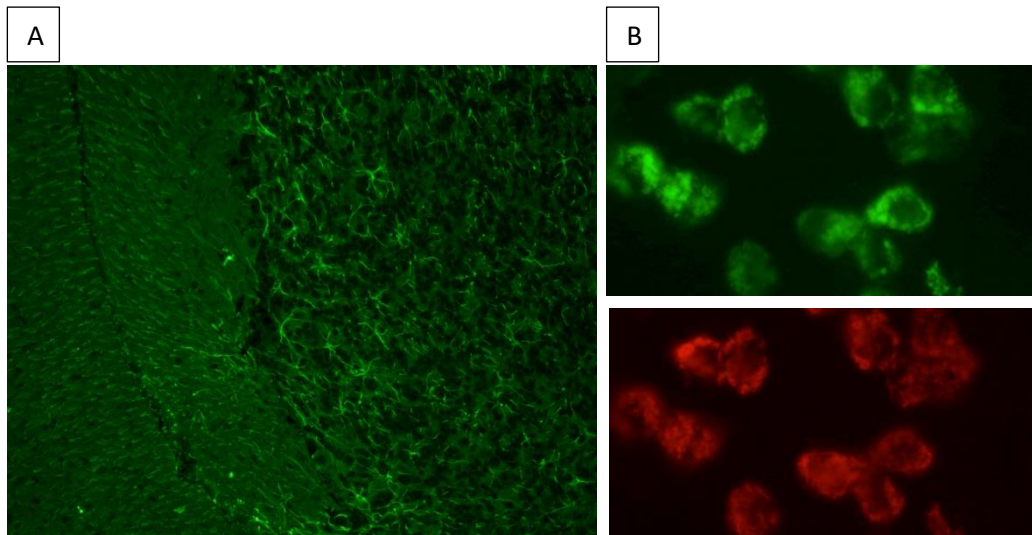


eMethods*Indirect immunofluorescence assays*

Briefly, the MIRCEM employed rat frozen brain sections fixed with 4% paraformaldehyde (PFA) for 10 minutes and permeabilised and blocked 1 hour with 0,3% Triton 100X, 1% bovine serum albumin, 4% normal goat serum. Sections were incubated with serum (1:100) or CSF (1:2) overnight at 4°C. Fluorescein isothiocyanate (FITC)-Goat IgG-Fcγ fragment-specific was used as a secondary antibody (1:200, 90 min). Sections were stained with 4,6-diamidino-2-phénylindole (DAPI) (1:50, 10 min) and then analysed by fluorescent microscopy. The IFA method of the French National Reference Center for Paraneoplastic Neurological Syndromes used freshly prepared adult rat brains fixed in 4% PFA for one hour, frozen, and sliced into 14-µm-thick sections. Immunolabeling was performed using patient CSF (1:10) or serum (1:100) and revealed with Alexa 488 fluorophore-conjugated secondary antibodies. Nuclei were stained using DAPI. Slides were analysed with a fluorescence microscope (Zeiss).



Supplementary Figure. IFA pattern and the confirmatory confocal CBA for GFAP-IgG. (A) Tissue-based immunofluorescence assay using frozen rat brain sections: immunoreactivity of patient's cerebrospinal fluid (CSF)-IgG was observed in the Bergmann glia of the cerebellum. (B) HEK293 cells stably expressing green fluorescent protein (GFP)-tagged GFAP α (green). Glial fibrillary acidic protein (GFAP) IgG was detected in the cerebrospinal fluid (CSF) of patient with autoimmune GFAP astrocytopathy (red), colocalising.

Supplementary Table. Allele carrier frequencies of GFAP patients compared to controls.

Allele	Controls, n=442 (%)	Patients, n=26 (%)	Uncorrected p value	Corrected p value
A*01:01	92 (20.8)	5 (19.2)	1	
A*01:02	0 (0.0)	1 (3.8)	0.06	1
A*01:23	1 (0.2)	0 (0.0)	1	
A*02:01	161 (36.4)	9 (34.6)	1	
A*02:02	11 (2.5)	0 (0.0)	1	
A*02:03	2 (0.5)	0 (0.0)	1	
A*02:05	12 (2.7)	0 (0.0)	1	
A*02:06	3 (0.7)	0 (0.0)	1	
A*02:07	0 (0.0)	1 (3.8)	0.06	1
A*02:17	2 (0.5)	0 (0.0)	1	
A*02:38	1 (0.2)	0 (0.0)	1	
A*03:01	88 (19.9)	7 (26.9)	0.45	1
A*03:02	3 (0.7)	0 (0.0)	1	
A*11:01	41 (9.3)	3 (11.5)	0.73	1
A*11:02	1 (0.2)	0 (0.0)	1	
A*23:01	33 (7.5)	2 (7.7)	1	
A*23:17	2 (0.5)	0 (0.0)	1	
A*24:02	78 (17.6)	5 (19.2)	0.79	1
A*24:03	6 (1.4)	0 (0.0)	1	
A*24:10	1 (0.2)	0 (0.0)	1	
A*25:01	12 (2.7)	1 (3.8)	0.52	1
A*26:01	37 (8.4)	1 (3.8)	0.71	1
A*26:08	1 (0.2)	0 (0.0)	1	
A*29:01	6 (1.4)	0 (0.0)	1	
A*29:02	41 (9.3)	3 (11.5)	0.73	1
A*30:01	16 (3.6)	1 (3.8)	1	
A*30:02	11 (2.5)	1 (3.8)	0.50	1
A*30:04	7 (1.6)	0 (0.0)	1	
A*31:01	24 (5.4)	1 (3.8)	1	
A*31:04	1 (0.2)	0 (0.0)	1	
A*32:01	57 (12.9)	2 (7.7)	0.75	1
A*32:26	1 (0.2)	0 (0.0)	1	
A*33:01	13 (2.9)	0 (0.0)	1	
A*33:03	10 (2.3)	0 (0.0)	1	

A*33:05	1 (0.2)	0 (0.0)	1	
A*34:02	5 (1.1)	1 (3.8)	0.29	1
A*36:01	4 (0.9)	1 (3.8)	0.25	1
A*66:01	4 (0.9)	0 (0.0)	1	
A*66:02	1 (0.2)	0 (0.0)	1	
A*66:03	1 (0.2)	0 (0.0)	1	
A*68:01	25 (5.7)	1 (3.8)	1	
A*68:02	18 (4.1)	2 (7.7)	0.31	1
A*74:01	3 (0.7)	0 (0.0)	1	
A*80:01	1 (0.2)	0 (0.0)	1	
B*07:02	74 (16.7)	4 (15.4)	1	
B*07:05	3 (0.7)	0 (0.0)	1	
B*07:06	3 (0.7)	0 (0.0)	1	
B*08:01	51 (11.5)	2 (7.7)	0.76	1
B*13:01	0 (0.0)	1 (3.8)	0.06	1
B*13:02	13 (2.9)	0 (0.0)	1	
B*14:01	21 (4.8)	0 (0.0)	0.62	1
B*14:02	36 (8.1)	1 (3.8)	0.72	1
B*15:01	29 (6.6)	4 (15.4)	0.10	1
B*15:02	0 (0.0)	1 (3.8)	0.06	1
B*15:03	13 (2.9)	2 (7.7)	0.2	1
B*15:09	1 (0.2)	0 (0.0)	1	1
B*15:10	2 (0.5)	2 (7.7)	0.02	1
B*15:16	1 (0.2)	0 (0.0)	1	
B*15:17	6 (1.4)	0 (0.0)	1	
B*15:18	5 (1.1)	0 (0.0)	1	
B*15:24	1 (0.2)	0 (0.0)	1	
B*15:25	1 (0.2)	0 (0.0)	1	
B*18:01	52 (11.8)	6 (23.1)	0.12	1
B*18:02	1 (0.2)	0 (0.0)	1	
B*18:26	1 (0.2)	0 (0.0)	1	
B*27:02	5 (1.1)	0 (0.0)	1	
B*27:03	1 (0.2)	0 (0.0)	1	
B*27:05	27 (6.1)	1 (3.8)	1	
B*27:06	1 (0.2)	0 (0.0)	1	
B*27:07	1 (0.2)	0 (0.0)	1	
B*35:01	48 (10.9)	3 (11.5)	0.76	1
B*35:02	6 (1.4)	0 (0.0)	1	

B*35:03	14 (3.2)	1 (3.8)	0.58	1
B*35:08	3 (0.7)	0 (0.0)	1	
B*37:01	15 (3.4)	0 (0.0)	1	
B*38:01	22 (5.0)	0 (0.0)	0.63	1
B*38:02	2 (0.5)	0 (0.0)	1	
B*39:01	5 (1.1)	2 (7.7)	0.05	1
B*39:06	1 (0.2)	0 (0.0)	1	
B*39:10	3 (0.7)	0 (0.0)	1	
B*39:31	1 (0.2)	0 (0.0)	1	
B*40:01	27 (6.1)	3 (11.5)	0.23	1
B*40:02	13 (2.9)	0 (0.0)	1	
B*41:01	6 (1.4)	1 (3.8)	0.33	1
B*41:02	9 (2.0)	0 (0.0)	1	
B*42:01	6 (1.4)	1 (3.8)	0.33	1
B*44:02	40 (9.0)	5 (19.2)	0.09	1
B*44:03	62 (14.0)	3 (11.5)	1	
B*44:04	2 (0.5)	0 (0.0)	1	
B*44:05	2 (0.5)	0 (0.0)	1	
B*44:115	1 (0.2)	0 (0.0)	1	
B*45:01	13 (2.9)	0 (0.0)	1	
B*46:01	0 (0.0)	1 (3.8)	0.06	1
B*47:01	1 (0.2)	0 (0.0)	1	
B*48:01	2 (0.5)	0 (0.0)	1	
B*49:01	24 (5.4)	0 (0.0)	0.39	1
B*50:01	24 (5.4)	1 (3.8)	1	
B*50:02	3 (0.7)	0 (0.0)	0.76	1
B*51:01	55 (12.4)	2 (7.7)	1	
B*51:02	1 (0.2)	0 (0.0)	1	
B*51:07	1 (0.2)	0 (0.0)	1	
B*51:08	1 (0.2)	0 (0.0)	1	
B*51:165	1 (0.2)	0 (0.0)	1	
B*52:01	10 (2.3)	1 (3.8)	0.47	1
B*53:01	24 (5.4)	2 (7.7)	0.65	1
B*55:01	7 (1.6)	0 (0.0)	1	
B*56:01	9 (2.0)	0 (0.0)	1	
B*57:01	21 (4.8)	1 (3.8)	1	
B*58:01	16 (3.6)	0 (0.0)	1	
B*58:02	2 (0.5)	0 (0.0)	1	

B*73:01	3 (0.7)	0 (0.0)	1	
B*81:01	2 (0.5)	0 (0.0)	1	
B*82:01	1 (0.2)	0 (0.0)	1	
C*01:02	25 (5.7)	3 (11.5)	0.19	1
C*02:02	51 (11.5)	1 (3.8)	0.34	1
C*02:10	13 (2.9)	2 (7.7)	0.2	1
C*03:02	5 (1.1)	0 (0.0)	1	
C*03:03	26 (5.9)	3 (11.5)	0.21	1
C*03:04	33 (7.5)	4 (15.4)	0.14	1
C*04:01	108 (24.4)	6 (23.1)	1	
C*04:09	6 (1.4)	0 (0.0)	1	
C*05:01	48 (10.9)	3 (11.5)	0.76	1
C*06:02	83 (18.8)	3 (11.5)	0.44	1
C*07:01	86 (19.5)	7 (26.9)	0.32	1
C*07:02	83 (18.8)	3 (11.5)	0.44	1
C*07:04	16 (3.6)	1 (3.8)	1	
C*07:06	2 (0.5)	0 (0.0)	1	
C*07:18	13 (2.9)	0 (0.0)	1	
C*08:01	0 (0.0)	1 (3.8)	0.06	1
C*08:02	56 (12.7)	1 (3.8)	0.35	1
C*08:03	2 (0.5)	0 (0.0)	1	
C*12:02	10 (2.3)	1 (3.8)	0.47	1
C*12:03	52 (11.8)	2 (7.7)	0.76	1
C*14:02	7 (1.6)	0 (0.0)	1	
C*14:03	3 (0.7)	0 (0.0)	1	
C*15:02	24 (5.4)	1 (3.8)	1	
C*15:04	3 (0.7)	0 (0.0)	1	
C*15:05	8 (1.8)	0 (0.0)	1	
C*15:06	2 (0.5)	0 (0.0)	1	
C*15:13	2 (0.5)	0 (0.0)	1	
C*16:01	45 (10.2)	7 (26.9)	0.02	0.68
C*16:02	4 (0.9)	0 (0.0)	1	
C*16:04	1 (0.2)	0 (0.0)	1	
C*16:35	2 (0.5)	0 (0.0)	1	
C*17:01	10 (2.3)	2 (7.7)	0.14	1
C*17:03	9 (2.0)	0 (0.0)	1	
C*18:01	2 (0.5)	0 (0.0)	1	
DRB1*01:01	53 (12.0)	3 (11.5)	1	

DRB1*01:02	40 (9.0)	1 (3.8)	0.72	1
DRB1*01:03	1 (0.2)	0 (0.0)	1	
DRB1*03:01	69 (15.6)	4 (15.4)	1	
DRB1*03:02	4 (0.9)	0 (0.0)	1	
DRB1*04:01	35 (7.9)	2 (7.7)	1	
DRB1*04:02	13 (2.9)	1 (3.8)	0.56	1
DRB1*04:03	17 (3.8)	0 (0.0)	0.61	1
DRB1*04:04	14 (3.2)	1 (3.8)	0.58	1
DRB1*04:05	13 (2.9)	1 (3.8)	0.56	1
DRB1*04:06	11 (2.5)	0 (0.0)	1	
DRB1*04:07	1 (0.2)	0 (0.0)	1	
DRB1*04:08	1 (0.2)	0 (0.0)	1	
DRB1*04:38	1 (0.2)	0 (0.0)	1	
DRB1*07:01	101 (22.9)	6 (23.1)	1	
DRB1*08:01	22 (5.0)	1 (3.8)	1	
DRB1*08:03	4 (0.9)	0 (0.0)	1	
DRB1*08:04	7 (1.6)	0 (0.0)	1	
DRB1*09:01	9 (2.0)	2 (7.7)	0.12	1
DRB1*10:01	9 (2.0)	3 (11.5)	0.02	0.82
DRB1*11:01	66 (14.9)	5 (19.2)	0.57	1
DRB1*11:02	14 (3.2)	0 (0.0)	1	
DRB1*11:03	4 (0.9)	0 (0.0)	1	
DRB1*11:04	41 (9.3)	2 (7.7)	1	
DRB1*12:01	14 (3.2)	1 (3.8)	0.58	1
DRB1*12:02	5 (1.1)	1 (3.8)	0.29	1
DRB1*13:01	62 (14.0)	3 (11.5)	1	
DRB1*13:02	40 (9.0)	2 (7.7)	1	
DRB1*13:03	13 (2.9)	2 (7.7)	0.2	1
DRB1*13:04	2 (0.5)	0 (0.0)	1	
DRB1*13:05	5 (1.1)	0 (0.0)	1	
DRB1*14:01	6 (1.4)	3 (11.5)	0.01	0.41
DRB1*14:04	1 (0.2)	0 (0.0)	1	
DRB1*14:17	2 (0.5)	0 (0.0)	1	
DRB1*14:54	28 (6.3)	0 (0.0)	0.39	1
DRB1*15:01	76 (17.2)	1 (3.8)	0.09	1
DRB1*15:02	11 (2.5)	1 (3.8)	0.50	1
DRB1*15:03	11 (2.5)	2 (7.7)	0.16	1
DRB1*15:04	1 (0.2)	0 (0.0)	1	

DRB1*16:01	14 (3.2)	2 (7.7)	0.22	1
DRB1*16:02	4 (0.9)	0 (0.0)	1	
DQB1*02:01	73 (16.5)	4 (15.4)	1	
DQB1*02:02	88 (19.9)	5 (19.2)	1	
DQB1*03:01	162 (36.7)	10 (38.5)	0.84	1
DQB1*03:02	70 (15.8)	3 (11.5)	0.78	1
DQB1*03:03	22 (5.0)	3 (11.5)	0.16	1
DQB1*03:05	3 (0.7)	0 (0.0)	1	
DQB1*03:19	12 (2.7)	1 (3.8)	0.53	1
DQB1*04:02	39 (8.8)	1 (3.8)	0.72	1
DQB1*05:01	108 (24.4)	6 (23.1)	1	
DQB1*05:02	27 (6.1)	3 (11.5)	0.23	1
DQB1*05:03	33 (7.5)	3 (11.5)	0.44	1
DQB1*06:01	10 (2.3)	0 (0.0)	1	
DQB1*06:02	81 (18.3)	3 (11.5)	0.59	1
DQB1*06:03	59 (13.3)	3 (11.5)	1	
DQB1*06:04	30 (6.8)	2 (7.7)	0.69	1
DQB1*06:09	9 (2.0)	0 (0.0)	1	
DQA1*01:01	91 (20.6)	4 (15.4)	0.62	1
DQA1*01:02	140 (31.7)	7 (26.9)	0.67	1
DQA1*01:03	69 (15.6)	3 (11.5)	0.78	1
DQA1*01:04	35 (7.9)	3 (11.5)	0.46	1
DQA1*01:05	11 (2.5)	3 (11.5)	0.04	0.68
DQA1*02:01	100 (22.6)	6 (23.1)	1	
DQA1*03:01	59 (13.3)	2 (7.7)	0.56	1
DQA1*03:02	8 (1.8)	2 (7.7)	0.10	1
DQA1*03:03	51 (11.5)	3 (11.5)	1	
DQA1*04:01	26 (5.9)	2 (7.7)	1	
DQA1*04:02	3 (0.7)	0 (0.0)	1	
DQA1*04:04	1 (0.2)	0 (0.0)	1	
DQA1*05:01	69 (15.6)	4 (15.4)	1	
DQA1*05:05	143 (32.4)	8 (30.8)	1	
DQA1*05:09	5 (1.1)	0 (0.0)	1	
DQA1*05:11	1 (0.2)	0 (0.0)	1	
DQA1*06:01	5 (1.1)	1 (3.8)	0.29	1
DPB1*01:01	62 (14.0)	5 (19.2)	0.39	1
DPB1*02:01	133 (30.1)	7 (26.9)	0.83	1
DPB1*02:02	3 (0.7)	0 (0.0)	1	

DPB1*03:01	62 (14.0)	4 (15.4)	0.78	1
DPB1*04:01	239 (54.1)	9 (34.6)	0.07	1
DPB1*04:02	92 (20.8)	8 (30.8)	0.23	1
DPB1*05:01	27 (6.1)	1 (3.8)	1	
DPB1*06:01	8 (1.8)	0 (0.0)	1	
DPB1*06:02	0 (0.0)	1 (3.8)	0.06	1
DPB1*09:01	5 (1.1)	0 (0.0)	1	
DPB1*10:01	14 (3.2)	1 (3.8)	0.58	1
DPB1*11:01	20 (4.5)	2 (7.7)	0.35	1
DPB1*13:01	34 (7.7)	3 (11.5)	0.45	1
DPB1*14:01	11 (2.5)	0 (0.0)	1	
DPB1*15:01	4 (0.9)	0 (0.0)	1	
DPB1*16:01	3 (0.7)	1 (3.8)	0.21	1
DPB1*17:01	22 (5.0)	4 (15.4)	0.05	1
DPB1*18:01	5 (1.1)	0 (0.0)	1	
DPB1*19:01	4 (0.9)	1 (3.8)	0.25	1
DPB1*20:01	5 (1.1)	0 (0.0)	1	
DPB1*21:01	1 (0.2)	0 (0.0)	1	
DPB1*23:01	9 (2.0)	0 (0.0)	1	
DPB1*29:01	1 (0.2)	0 (0.0)	1	
DPB1*34:01	4 (0.9)	0 (0.0)	1	
DPB1*39:01	1 (0.2)	0 (0.0)	1	
DPB1*40:01	1 (0.2)	0 (0.0)	1	
DPB1*50:01	1 (0.2)	0 (0.0)	1	
DPB1*63:01	3 (0.7)	0 (0.0)	1	
DPB1*104:01	23 (5.2)	0 (0.0)	0.63	1
DPB1*105:01	5 (1.1)	0 (0.0)	1	
DPB1*131:01	5 (1.1)	0 (0.0)	1	
DPB1*351:01	1 (0.2)	0 (0.0)	1	
DPB1*370:01	1 (0.2)	0 (0.0)	1	
