



AINI EQAS 2026 FINAL REPORT

*Matteo Gastaldi
Diego Franciotta*

On behalf of the AINI Scientific Board
and NINA Scientific Board

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Introduction

As every year, the Italian Association of Neuroimmunology (AINI) and the Italian Network for the study of Autoimmune Neurology (NINA group) have organized an External Quality Assessment Scheme (EQAS) to promote quality and standardization in neuroimmunology laboratory diagnostics in Italy and in Europe.

In the evolving scenario of neuroimmunology diagnostics, these schemes are an essential tool to promote self-evaluation, highlight critical assays, and identify issues to be tackled for continuous improvement. Moreover, the recent rise of interest in many neuroimmunological disorders, mainly driven by the evolution of the therapeutic scenario, has made the standardization and optimization of laboratory diagnostics even more relevant to clinicians.

The results of the current EQAS are not intended as an exam for the participating laboratories, and the comparison with the reference result (the one codified as “sent as” in the present report) should always be interpreted cautiously, and not necessarily looked at as a “true value”.

The results of the current EQAS have been presented during the 2026 AINI conference in Rome, and are now available for consultation on the AINI website (www.nina.aini.it) not just for the participating laboratories, but also for everybody interested in this area.

We thank in advance all the people that contributed to support and organize the current EQAS, and all the participating laboratories.

General data of the 2026 AINI EQAS

The numbers of the 2026 AINI EQAS

	2022	2023	2024	2025	2026
Samples	43	44	39	39	37
Centres	31	41	47	41	45
Schemes	10	10	10	10	10

This year the number of schemes remained unchanged (10), while the number of samples decreased slightly from 39 to 37 (IEF included 3 serum/CSF pairs instead of 4). The number of participating centres increased from 41 to 45.

The schemes included in the 2026 AINI EQAS

Scheme	Description	Samples	Participants
IEF	Isoelectric focusing (IEF)	3 pairs	22
AQP4	AQP4 antibody	5	40
MOG	MOG antibody	5	39
ONCO	Intracellular neuronal antibody	3	29
ENC	Neuronal surface antibody	3	36
GANGLIO	Ganglioside antibody	3	27
MAG	MAG antibody	3	20
PN	Paranodal antibody	3	9
ACHR	Nicotinic acetylcholine receptor antibody	3	31
MUSK	MuSK antibody	3	28

All schemes included 3 samples, except for AQP4 and MOG, which included 5. A laboratory was considered a participant in a scheme when it reported at least one result for that scheme.

Participants to the AINI EQAS 2026

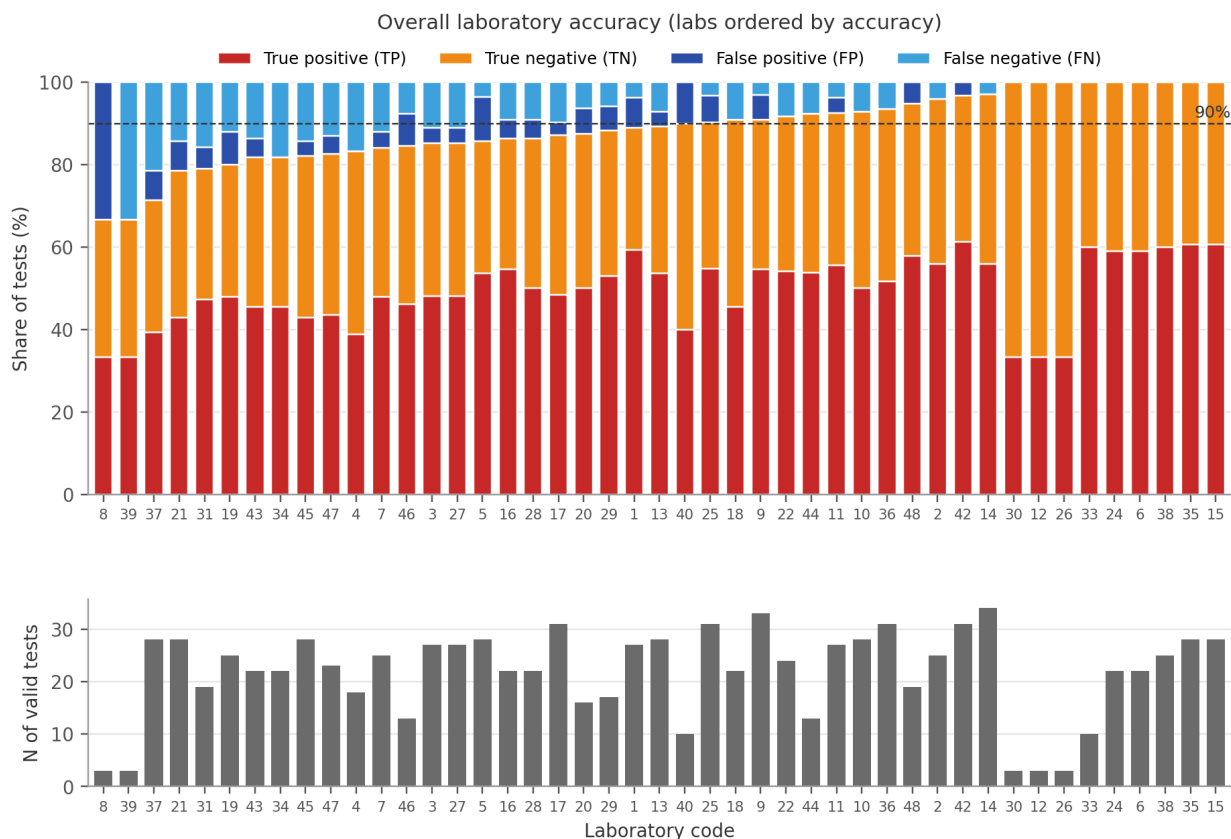
As in the previous editions, along with a long list of Italian collaborators that have participated to the EQAS for several years, we invited several labs from all around Europe. Here is a list of the participants:

Participating laboratory	City
AOU S. Giovanni di Dio e Ruggi d'Aragona	Salerno
ASST Papa Giovanni XXIII	Bergamo
Azienda Ospedaliera Universitaria integrata di Verona	Verona
Azienda ospedaliero-universitaria senese - UOC Laboratorio Patologia Clinica	Siena
Biobanca e Neurobiochimica clinica	Roma
CISMed-DMA (Università degli Studi di Trento, CISMed - Centro Interdipartimentale di Scienze Mediche CISMed)	Trento
Division of Neuropathology and Neurochemistry, Medical University of Vienna	Vienna (Austria)
DOMP - LABORATORIO DI NEUROBIOLOGIA - ASL CDT OMV	Torino

Participating laboratory	City
Fondazione Policlinico Universitario "A. Gemelli" IRCCS, Dipartimento di Neurologia, Laboratori di Neurologia Sperimentale	Roma
Lab neurobiologia AUO S. Luigi. CRESM- Orbassano (TO)	Orbassano (TO)
Lab neuroimmunologia-HUMANITAS	Milano
Laboratorio Autoimmunità - Ospedale San Raffaele	Milano
LABORATORIO CENTRALE - OSPEDALE DI MERANO	Merano
Laboratorio Centro Sclerosi MultiplaCagliari	Cagliari
Laboratorio Demenze e Neuropatie Autoimmuni-UOC Patologia Clinica e Microbiologia	Salerno
Laboratorio di Autoimmunità	Alessandria
LABORATORIO DI IMMUNOPATOLOGIA, AOR SAN CARLO POTENZA	Potenza
Laboratorio di Neurochimica di Ferrara	Ferrara
Laboratorio di Neuroimmunologia Dipartimento di Neuroscienze, Psicologia, Area del Farmaco e Salute del Bambino (NEUROFARBA) UNIVERSITÀ DEGLI STUDI DI FIRENZE Responsabile Prof.ssa Valentina Damato	Firenze
Laboratorio diagnostico di autoimmunologia	Genova
Laboratorio Euroimmun Italia	Padova
Laboratorio Generale AOU Careggi	Firenze
Laboratorio Logico Unico AOU Sassari	Sassari
Laboratorio Neuroimmunologia-Ist. Neurologico Besta	Milano
Laboratorio Neuromuscolare e Neuroimmunologia IRCCS Istituto Scienze Neurologiche Bologna	Bologna
Laboratorio Patologia Clinica, Azienda Ospedaliero Universitaria Pisana	Pisa
Laboratorio Spedali Civili Breescia	Brescia
LABORATORIO UNICO METROPOLITANO - IMMUNOLOGIA CLINICA	Bologna
Laboratory Autoimmunity University Hospital Udine	Udine
Medicina di Laboratorio Vicenza	Vicenza
Neuroimmunologia Modena	Modena
Neuropathology Laboratory, AOUI Verona	Verona
Ospedale Pediatrico Bambino Gesù	Roma
Oxford Autoimmune Neurology Diagnostic Laboratory	Oxford (Regno Unito)
Patologia Clinica "Santissima Annunziata" - Taranto	Taranto
S.C. Laboratorio Analisi San Giovanni Bosco - ASL Città di Torino	Torino
S.S.D. Laboratorio di Autoimmunità, Allergologia e Biotecnologie Innovative ASMN RE	Reggio Emilia
U.O.C Patologia Clinica, Ospedale San Filippo Neri, ASLROMA1	Roma
UKSH University Hospital Schleswig Holstein Kiel/Lübeck, Germany	Kiel/Lübeck (Germania)
University Hospital Basel, Laboratory Medicine, Medical Immunology	Basilea (Svizzera)
University Medical Center Göttingen, Institute of Neuropathology, Göttingen, Germany	Göttingen (Germania)
UOC Laboratorio Analisi Cliniche	Pescara
UOC Medicina di Laboratorio, Azienda Ospedale-Università Padova	Padova
UOC Patologia Clinica AOU Ferrara	Ferrara
UOS Diagnostica delle Patologie Autoimmuni - Dipartimento di Medicina di Laboratorio USL di Modena	Modena

Results' summary

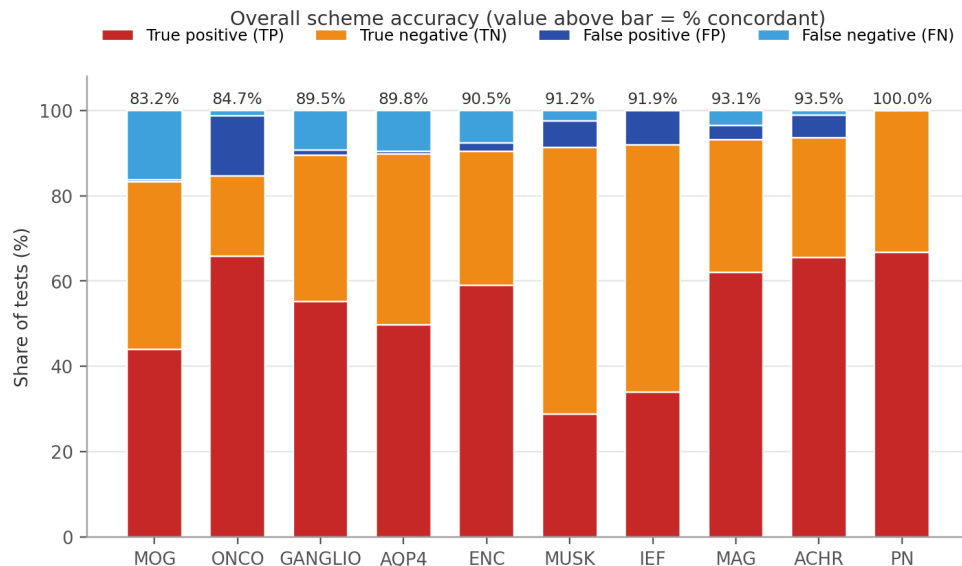
Overall accuracy of the laboratories



Overall accuracy was estimated as the percentage of valid tests concordant with the reference result ("sent as"), i.e. true positives (TP, red) and true negatives (TN, orange). Strong and weak positive results were both considered positive. Empty fields and "uncertain" results were excluded from all calculations. The performance is reported for each coded laboratory.

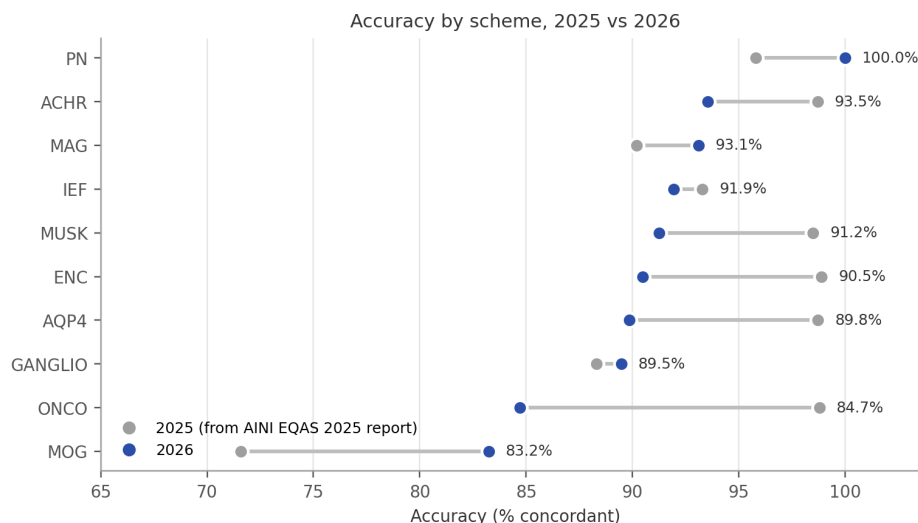
Overall, 22 of 45 laboratories (48.9%) showed an accuracy $\geq 90\%$, similar to the 41% reported in 2025. The performance of each laboratory should be weighted according to the number of samples processed, shown at the bottom of the figure: 5 laboratories (codes 8, 12, 26, 30, 39) contributed only 3 valid tests.

Overall accuracy of the schemes



The graph represents the performance in the 10 EQAS schemes. ENC = neuronal surface antibodies; PN = paranodal antibodies; GANGLIO = ganglioside antibodies; IEF = isoelectric focusing; ONCO = intracellular neuronal antibodies. Four schemes had an accuracy lower than 90%: MOG (83.2%), ONCO (84.7%), GANGLIO (89.5%), AQP4 (89.8%).

Comparison with the 2025 AINI EQAS



Compared with 2025, accuracy increased in 4 schemes (MOG, GANGLIO, MAG, PN) and decreased in 6 schemes (IEF, AQP4, ONCO, ENC, ACHR, MUSK). The largest change was observed in the MOG scheme (from 71.6% to 83.2%) and in the ONCO scheme (from 98.8% to 84.7%). However, this change is influenced by the type of analysis performed in the ONCO scheme- see dedicated results. Samples differ between editions, so year-to-year differences should be interpreted with caution.

Scheme judgment

AINI EQAS 2026 – judgment by scheme

 SATISFACTORY 3 schemes	 CRITICAL 5 schemes	 HIGHLY CRITICAL 2 schemes
Ganglioside antibodies Accuracy 89.5%	Isoelectric focusing (IEF) Accuracy 91.9%	AQP4 antibodies Accuracy 89.8%
MAG antibodies Accuracy 93.1%	Intracellular neuronal antibodies Accuracy 84.7%	MOG antibodies Accuracy 83.2%
Paranodal antibodies Accuracy 100.0%	Neuronal surface antibodies Accuracy 90.5%	
	AChR antibodies Accuracy 93.5%	
	MuSK antibodies Accuracy 91.2%	

Of the 10 schemes, 3 were judged satisfactory (ganglioside, MAG and paranodal antibodies), 5 critical (IEF, intracellular neuronal, neuronal surface, AChR and MuSK antibodies) and 2 highly critical (AQP4 and MOG antibodies). The accuracy shown for each scheme is the percentage of valid tests concordant with the reference result. As there is no objective criterion to define a critical scheme, the judgment takes into account both the proportion of discordant results and the potential impact of inaccurate results on patient management, so it does not follow accuracy alone.

Isoelectric focusing (IEF) scheme

Participants: 22

Samples: 3 serum/CSF pairs (S1L1 sent as pattern 2 or pattern 3; S2L2 sent as pattern 1, polyclonal; S3L3 sent as pattern 4, mirror)

Judgment: Critical

Methods

Assay	N of centres	Laboratory codes
Sebia	9/22 (40.9%)	2, 4, 5, 12, 14, 25, 29, 36, 46
Helena	4/22 (18.2%)	9, 26, 40, 48
Home made	1/22 (4.5%)	8
Unknown	8/22 (36.4%)	7, 10, 11, 17, 21, 22, 30, 45

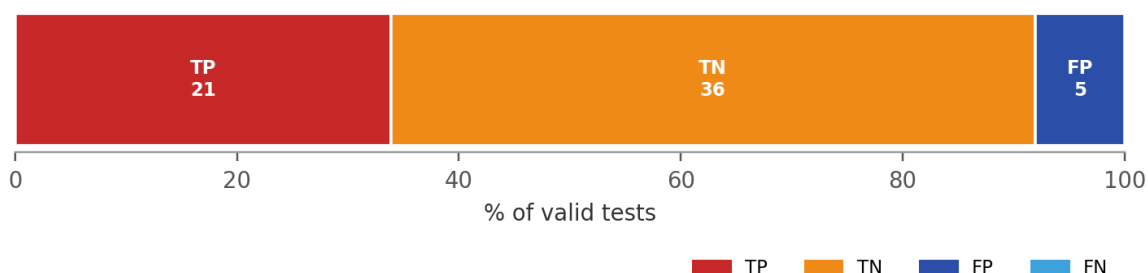
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

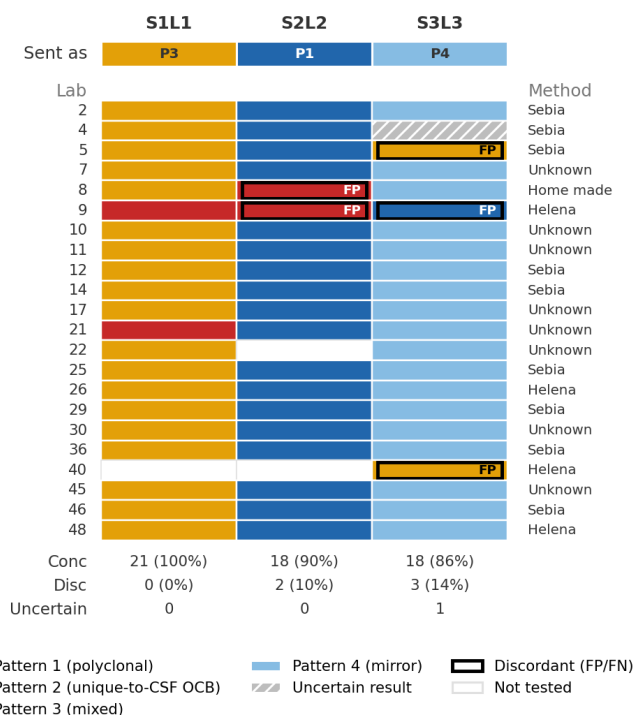
The graph represents all valid tests performed within the scheme.

All tests performed: N = 62 · concordant 57 (91.9%) · discordant 5 (8.1%) [FP 5, FN 0]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
Sebia	9	26	25	96.2%
Helena	4	10	7	70.0%
Home made	1	3	2	66.7%
Unknown	8	23	23	100.0%

Comments

The overall accuracy was 91.9% (57/62 valid tests). Discordant results were 5 false positive(s) and 0 false negative(s). Despite the overall performance of the scheme is acceptable, a certain degree of variability can still be found in pattern interpretation. Two labs reported a pattern 3 as pattern 2, and one a pattern 4 as 1. Even though such discrepancies have little clinical impact, they highlight intrinsic limitations in IEF interpretation. Moreover, this year's performance has greatly improved compared to previous years, likely also due to less critical samples selection. A new scheme for Kappa free light chains and K-Index will be implemented in the 2027 AINI EQAS. Each center will be participating by a) measuring serum and CSF Kappa free light chains and calculating the K-Index; b) performing IEF for OCB detection; c) a + b

AQP4 antibody scheme

Participants: 40

Samples: 5 (2 strong positive, 1 weak positive, 2 negative)

Judgment: Highly critical

Methods

Assay	N of centres	Laboratory codes
FCBA	30/40 (75.0%)	1, 2, 3, 4, 5, 9, 10, 13, 14, 16, 17, 18, 19, 21, 22, 25, 27, 31, 34, 35, 36, 37, 38, 40, 43, 44, 45, 46, 47, 48
LCBA	5/40 (12.5%)	6, 20, 28, 33, 42
FCBA + LCBA	3/40 (7.5%)	7, 15, 24
ELISA	1/40 (2.5%)	29
Unknown	1/40 (2.5%)	11

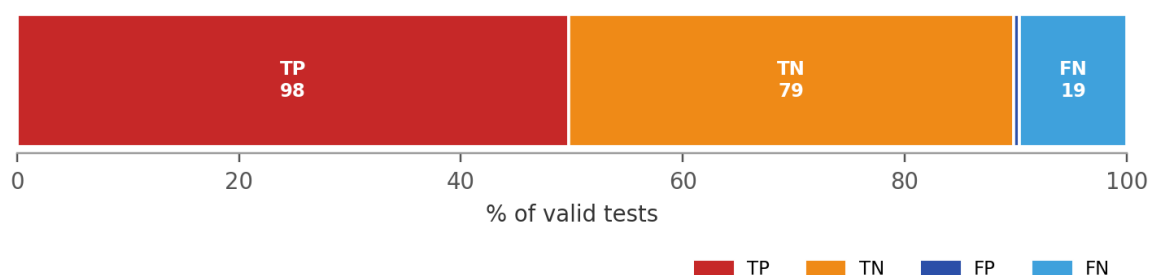
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

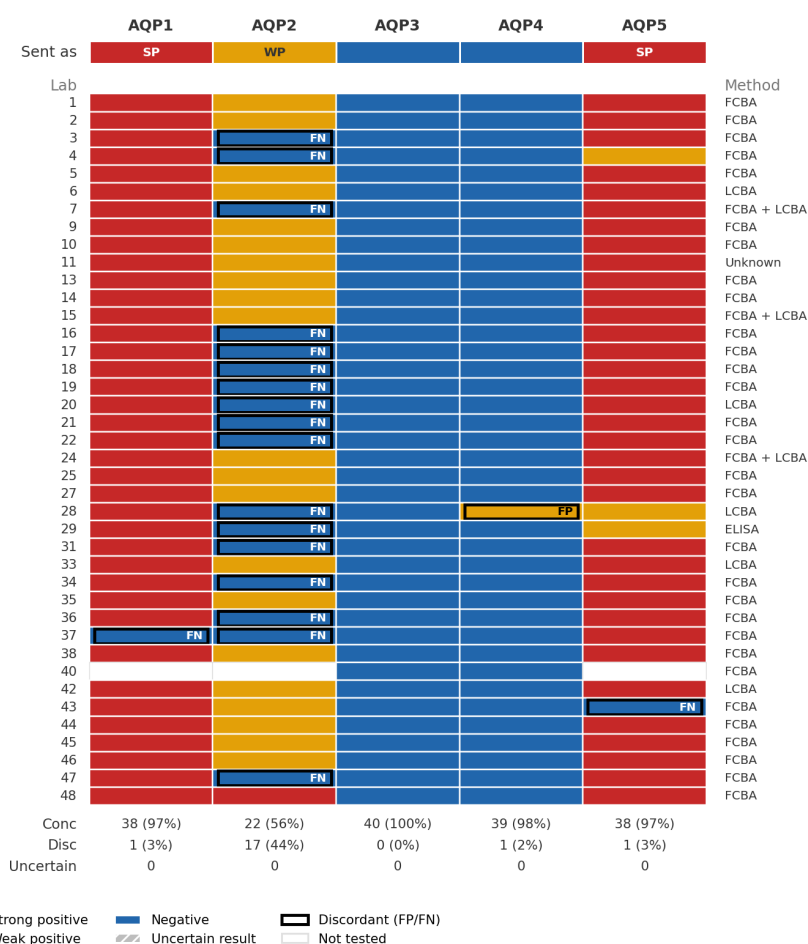
The graph represents all valid tests performed within the scheme.

All tests performed: N = 197 · concordant 177 (89.8%) · discordant 20 (10.2%) [FP 1, FN 19]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
FCBA	30	147	132	89.8%
LCBA	5	25	22	88.0%
FCBA + LCBA	3	15	14	93.3%
ELISA	1	5	4	80.0%
Unknown	1	5	5	100.0%

Comments

The overall accuracy was 89.8% (177/197 valid tests). Discordant results were 1 false positive(s) and 19 false negative(s). Sample AQP2 was by far the most critical one. It was sent out as a weak positive that could be identified both by FCBA and LCBA in the coordinating lab, and 17 labs failed to report it as positive (FN). This occurred more frequently by laboratories relying on FCBA but, notably, also occurred with 3 laboratories performing LCBAs. Overall, this suggests that samples at low titres always represent a challenge in interpretation. It is impossible to ascertain at this stage whether the FP were related to reduced sensitivity of the assays, mistakes in the interpretation or, possibly, pre-analytic factors. The report of a FN and of a FP in lab 28 would suggest a pre-analytic error (samples mix-up).

MOG antibody scheme

Participants: 39

Samples: 5 (2 strong positive, 1 weak positive, 2 negative)

Judgment: Highly critical

Methods

Assay	N of centres	Laboratory codes
FCBA	26/39 (66.7%)	1, 2, 3, 4, 5, 9, 10, 13, 14, 17, 18, 19, 21, 22, 25, 27, 31, 35, 36, 37, 38, 43, 44, 45, 47, 48
LCBA	8/39 (20.5%)	6, 7, 16, 20, 28, 33, 42, 46
FCBA + LCBA	1/39 (2.6%)	15
Unknown	4/39 (10.3%)	11, 24, 34, 40

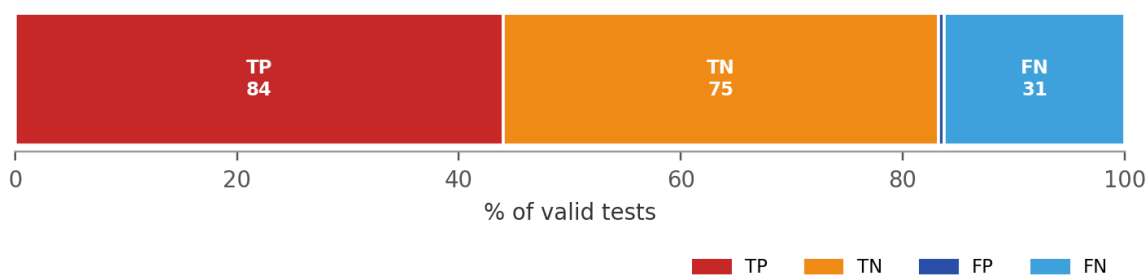
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

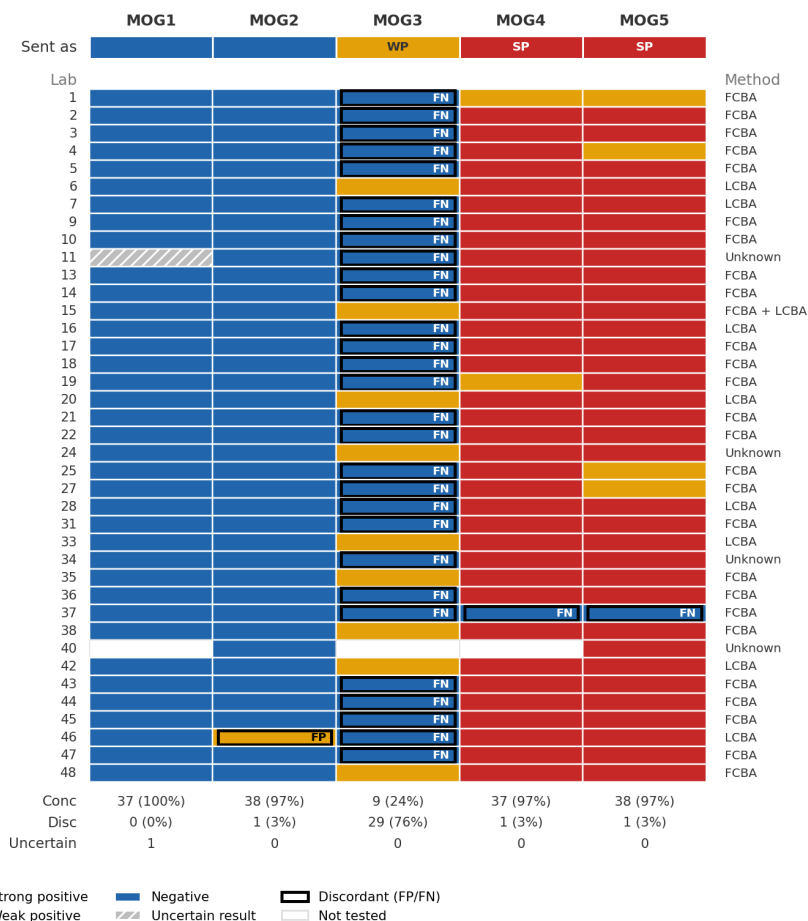
The graph represents all valid tests performed within the scheme.

All tests performed: N = 191 · concordant 159 (83.2%) · discordant 32 (16.8%) [FP 1, FN 31]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
FCBA	26	130	105	80.8%
LCBA	8	40	35	87.5%
FCBA + LCBA	1	5	5	100.0%
Unknown	4	16	14	87.5%

Comments

The overall accuracy was 83.2% (159/191 valid tests). Discordant results were 1 false positive(s) and 31 false negative(s). The most critical sample was MOG3, sent as weak positive (live CBA titre: 1:640) that could be detected by both LCBA and FCBA in the coordinating lab, and that 29 labs failed to report as positive. Similarly to the APQ4 scheme, samples harboring low titres antibodies always represent a challenge. In the MOG scheme, false negative results were rarer in centres using LCBA, confirming that this remains the gold standard for MOG antibody testing.

Intracellular neuronal antibody scheme

Participants: 29

Samples: 3 (1 strong positive for Yo, 1 strong positive for Hu, 1 negative)

Judgment: Critical

Methods

Assay	N of centres	Laboratory codes
TBA + line blot	18/29 (62.1%)	5, 7, 13, 14, 16, 18, 19, 22, 24, 25, 27, 34, 35, 36, 37, 38, 42, 47
Line blot only	6/29 (20.7%)	1, 3, 10, 17, 21, 29
TBA only	3/29 (10.3%)	2, 9, 45
FCBA	1/29 (3.4%)	40
Unknown	1/29 (3.4%)	11

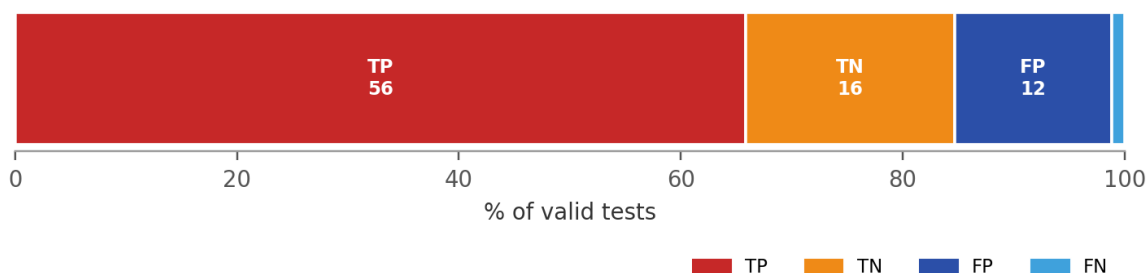
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

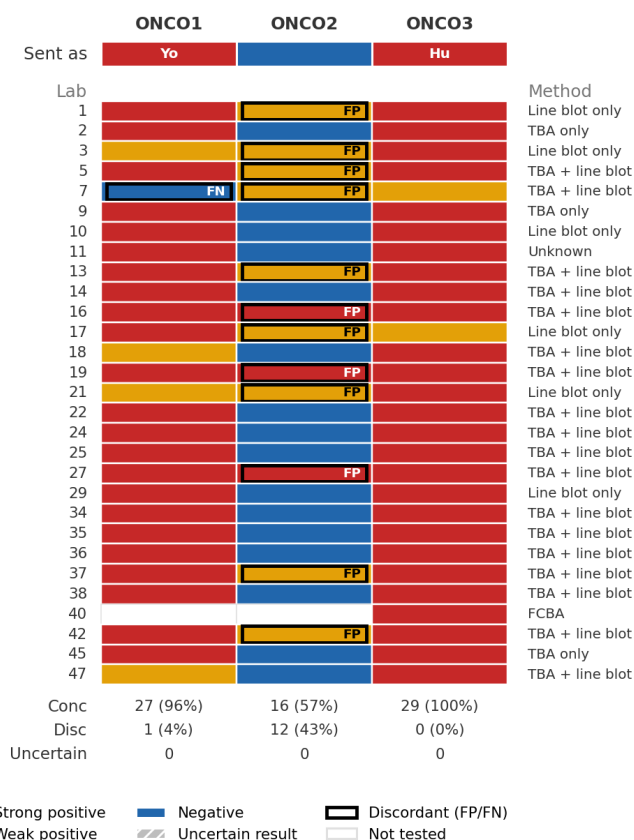
The graph represents all valid tests performed within the scheme.

All tests performed: N = 85 · concordant 72 (84.7%) · discordant 13 (15.3%) [FP 12, FN 1]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
TBA + line blot	18	54	45	83.3%
Line blot only	6	18	14	77.8%
TBA only	3	9	9	100.0%
FCBA	1	1	1	100.0%
Unknown	1	3	3	100.0%

Comments

The overall accuracy was 84.7% (72/85 valid tests). Discordant results were 12 false positive(s) and 1 false negative(s). The most critical sample was ONCO2, where many labs reported a positive result for Titin antibodies. In general, faint bands on immunoblots should raise the suspicion of false positive results, which, as such, should be reported in routine testing and in EQAS. In a routine setting, to test on cerebellar tissue adds crucial information. Therefore, we decided to consider all the reported positivity to Titin antibodies as FP, also to highlight the potential clinical risk of reporting this kind of antibody positivities. In the setting of most paraneoplastic syndrome (except for thymoma associated Myasthenia Gravis) Titin antibodies do not have any specific diagnostic or clinical relevance. Receiving a positive results could lead to misdiagnosis or requests of further clarifications to the lab. We recommend, if Titin positivity is reported, to recommend to clinicians caution in interpreting this result for diagnostic purposes.

Neuronal surface antibody scheme

Participants: 36

Samples: 3 (1 strong positive for CASPR2, 1 weak positive for LGI1, 1 negative)

Judgment: Critical

Methods

Assay	N of centres	Laboratory codes
FCBA	27/36 (75.0%)	1, 2, 3, 5, 9, 10, 13, 14, 17, 18, 19, 21, 22, 25, 27, 31, 34, 36, 37, 38, 39, 40, 43, 44, 45, 47, 48
FCBA + TBA	6/36 (16.7%)	7, 15, 16, 24, 35, 42
LCBA	2/36 (5.6%)	6, 28
Unknown	1/36 (2.8%)	11

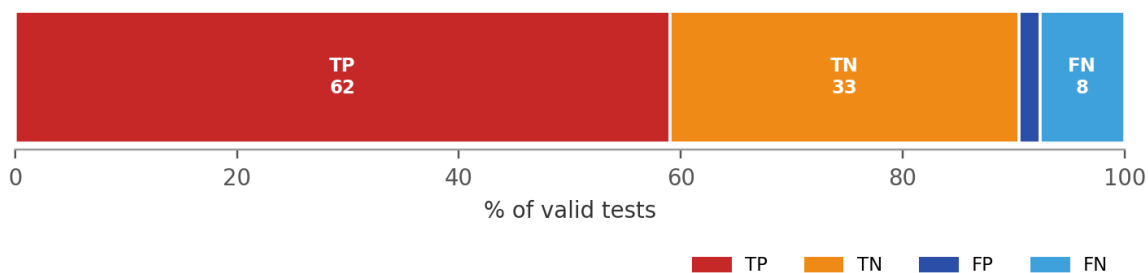
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

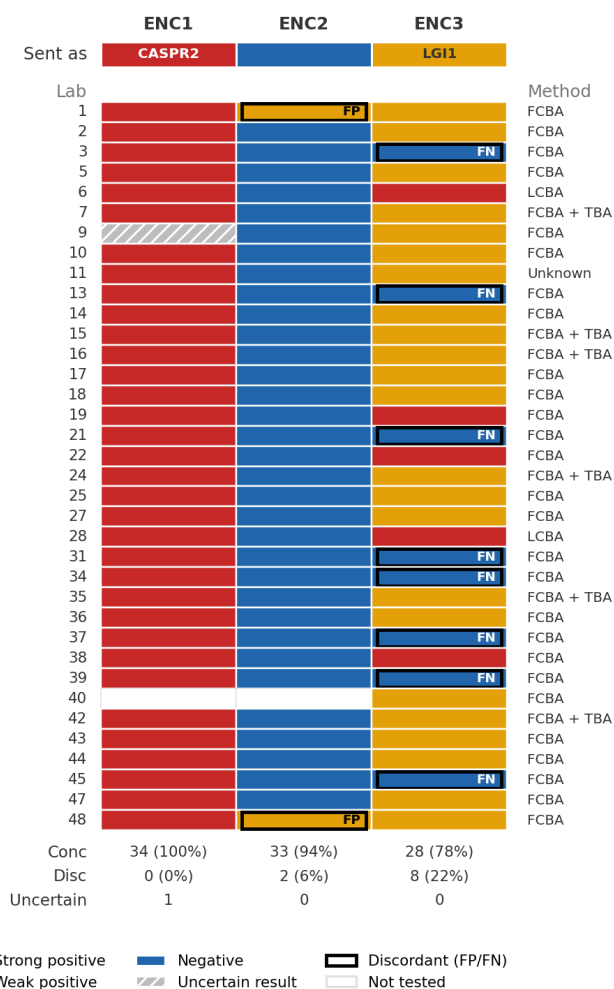
The graph represents all valid tests performed within the scheme.

All tests performed: N = 105 · concordant 95 (90.5%) · discordant 10 (9.5%) [FP 2, FN 8]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
FCBA	27	78	68	87.2%
FCBA + TBA	6	18	18	100.0%
LCBA	2	6	6	100.0%
Unknown	1	3	3	100.0%

Comments

The overall accuracy was 90.5% (95/105 valid tests). Discordant results were 2 false positive(s) and 8 false negative(s). Sample ENC3, a low titre LGI1, was the most critical one. Notably, all centres reporting a FN relied on a FCBA, highlighting a lower sensitivity of this method.

Ganglioside antibody scheme

Participants: 27

Samples: 3 (2 strong positive for GM1 IgM, 1 negative)

Judgment: Satisfactory

Methods

Assay	N of centres	Laboratory codes
Blot	17/27 (63.0%)	2, 3, 5, 10, 13, 14, 17, 18, 19, 21, 27, 29, 31, 37, 40, 45, 47
ELISA	3/27 (11.1%)	1, 7, 22
Home made	2/27 (7.4%)	9, 15
Blot + ELISA	2/27 (7.4%)	25, 36
Blot + ELISA in-house	1/27 (3.7%)	42
Unknown	2/27 (7.4%)	11, 34

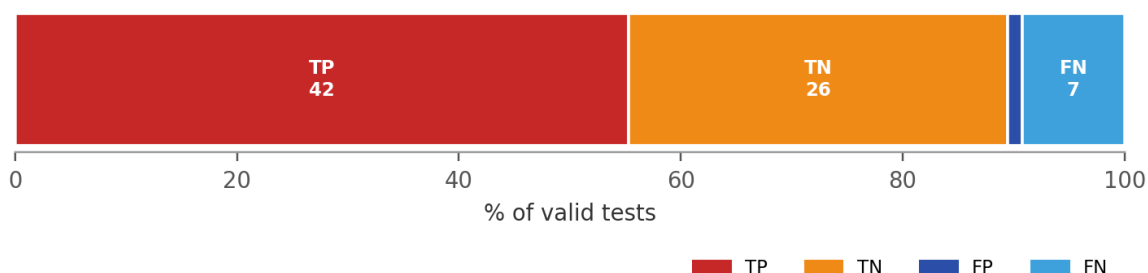
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

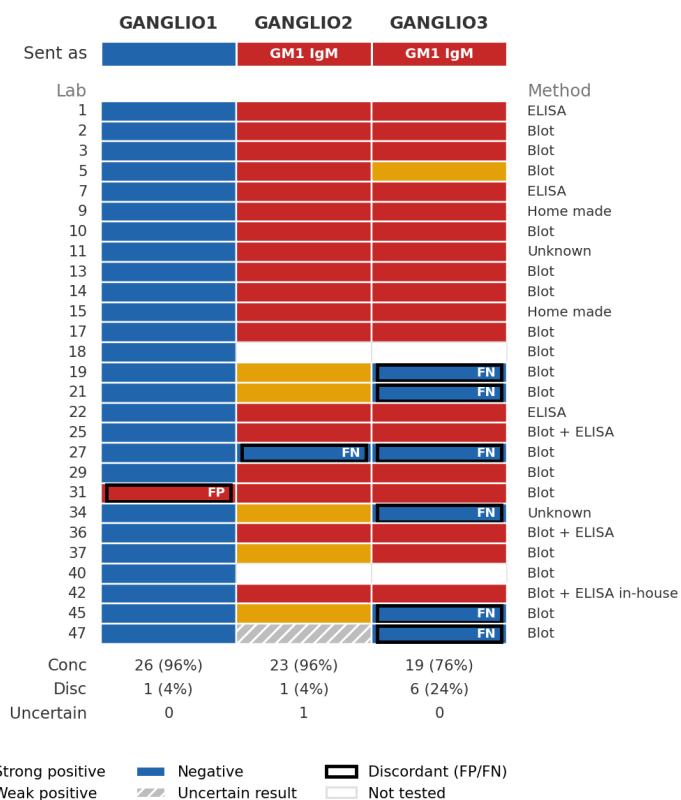
The graph represents all valid tests performed within the scheme.

All tests performed: N = 76 · concordant 68 (89.5%) · discordant 8 (10.5%) [FP 1, FN 7]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
Blot	17	46	39	84.8%
ELISA	3	9	9	100.0%
Home made	2	6	6	100.0%
Blot + ELISA	2	6	6	100.0%
Blot + ELISA in-house	1	3	3	100.0%
Unknown	2	6	5	83.3%

Ganglioside antibody scheme – additional reactivities

Reactivities other than GM1 IgM reported by the laboratories in the comment field.

Sample	Additional reactivity	N labs	Laboratory codes
GANGLIO1 (sent as negative)	GM3 IgM	1	31
GANGLIO2 (sent as GM1 IgM)	GD1a IgM	10	1, 13, 14, 18, 21, 25, 37, 11*, 17*, 29*
	Sulfatide IgM	7	2, 10, 18, 25, 37, 11*, 29*
	GM2 IgM	6	9, 15, 18, 25, 11*, 17*
	GM3 IgM	4	10, 18, 19, 11*
	GT1b IgM	4	2, 13, 19, 11*
	GD1b IgM	2	9, 19
	GM4 IgM	2	18, 11*
	Sulfatide IgG	1	10
	GM1 IgG	1	10

Sample	Additional reactivity	N labs	Laboratory codes
GANGLIO3 (sent as GM1 IgM)	GD1b IgM	19	1, 2, 3, 7, 9, 10, 13, 14, 15, 18, 22, 25, 31, 37, 42, 11*, 17*, 29*, 36*
	GM4 IgM	1	10
	Sulfatide IgG	1	10
	GM1 IgG	1	3

** Isotype not specified by the laboratory.*

Comments

The overall accuracy was 89.5% (68/76 valid tests). Discordant results were 1 false positive(s) and 7 false negative(s). Differently from previous years the overall performance was satisfactory, and the two relevant positives were reported by most labs. As in previous schemes, many labs provided additional reactivities in samples corresponding to other antibodies with little clinical impact. This highlights an intrinsic limitation of ganglioside antibody testing, and the recommendation of using ELISAs (which performed 100% accurate this year).

MAG antibody scheme

Participants: 20

Samples: 3 (2 strong positive, 1 negative)

Judgment: Satisfactory

Methods

Assay	N of centres	Laboratory codes
ELISA	12/20 (60.0%)	1, 2, 3, 7, 9, 13, 14, 15, 31, 36, 42, 48
TBA	4/20 (20.0%)	16, 17, 27, 43
ELISA + TBA	3/20 (15.0%)	25, 37, 40
ELISA + TBA + CBA	1/20 (5.0%)	35

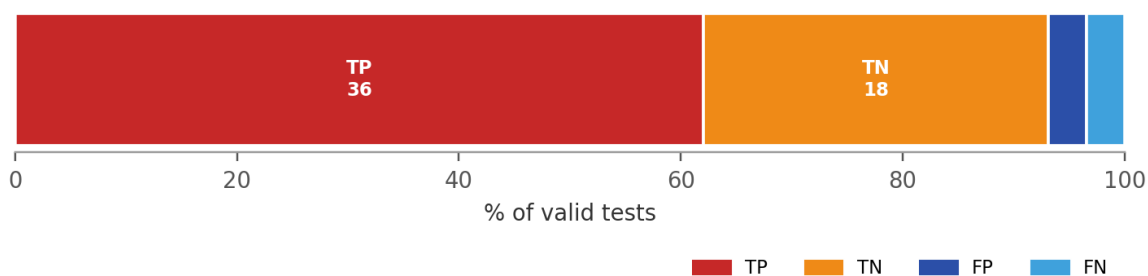
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

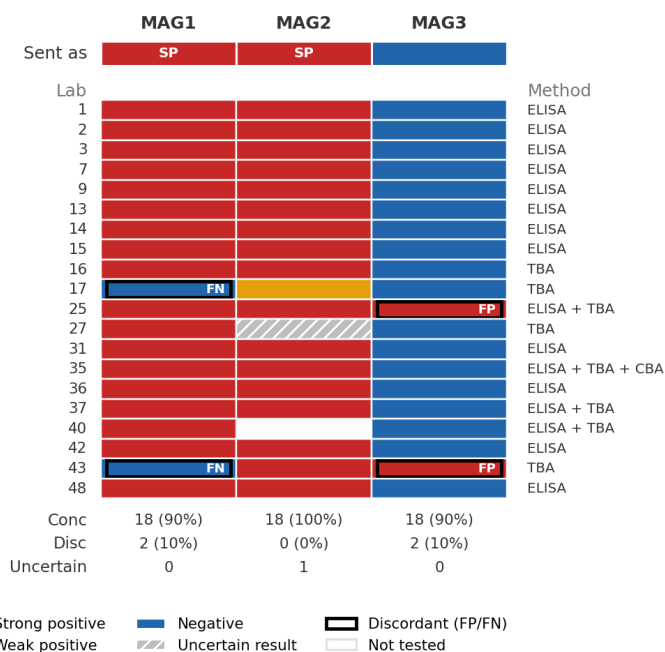
The graph represents all valid tests performed within the scheme.

All tests performed: N = 58 · concordant 54 (93.1%) · discordant 4 (6.9%) [FP 2, FN 2]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
ELISA	12	36	36	100.0%
TBA	4	11	8	72.7%
ELISA + TBA	3	8	7	87.5%
ELISA + TBA + CBA	1	3	3	100.0%

Comments

The overall accuracy was 93.1% (54/58 valid tests). Discordant results were 2 false positive(s) and 2 false negative(s). The scheme was considered satisfactory, but it is noteworthy the reiterative weakness of TBAs over years, warranting the transition ot other more robust assays (ELISA).

Paranodal antibody scheme

Participants: 9

Samples: 3 (2 strong positive for CNTN1, 1 negative)

Judgment: Satisfactory

Methods

Assay	N of centres	Laboratory codes
FCBA	4/9 (44.4%)	9, 15, 35, 38
LCBA	2/9 (22.2%)	6, 28
FCBA + ELISA + TBA	1/9 (11.1%)	14
LCBA + TBA	1/9 (11.1%)	16
FCBA + LCBA + ELISA	1/9 (11.1%)	42

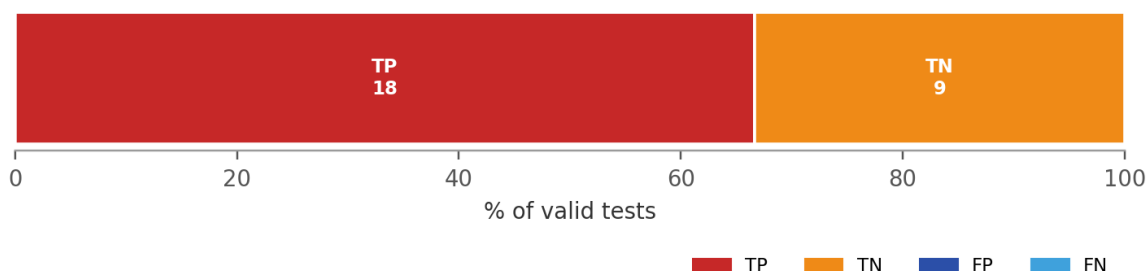
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

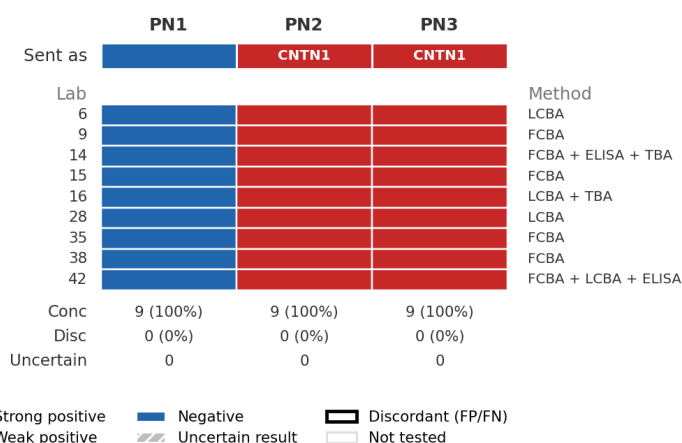
The graph represents all valid tests performed within the scheme.

All tests performed: N = 27 · concordant 27 (100.0%) · discordant 0 (0.0%) [FP 0, FN 0]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
FCBA	4	12	12	100.0%
LCBA	2	6	6	100.0%
FCBA + ELISA + TBA	1	3	3	100.0%
LCBA + TBA	1	3	3	100.0%
FCBA + LCBA + ELISA	1	3	3	100.0%

Comments

The overall accuracy was 100.0% (27/27 valid tests). No discordant results were observed.

Nicotinic acetylcholine receptor antibody scheme

Participants: 31

Samples: 3 (1 strong positive, 1 weak positive, 1 negative)

Judgment: Critical

Methods

Assay	N of centres	Laboratory codes
FCBA	17/31 (54.8%)	1, 4, 5, 9, 10, 13, 14, 17, 18, 19, 27, 35, 36, 37, 38, 42, 43
ELISA	5/31 (16.1%)	21, 22, 29, 45, 47
LCBA	3/31 (9.7%)	6, 20, 28
RIA	2/31 (6.5%)	3, 34
FCBA + LCBA + RIA	1/31 (3.2%)	15
FCBA + LCBA	1/31 (3.2%)	24
TBA	1/31 (3.2%)	25
Unknown	1/31 (3.2%)	11

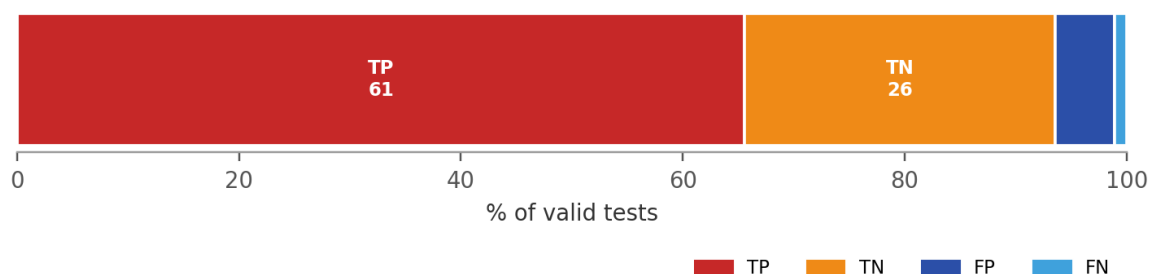
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

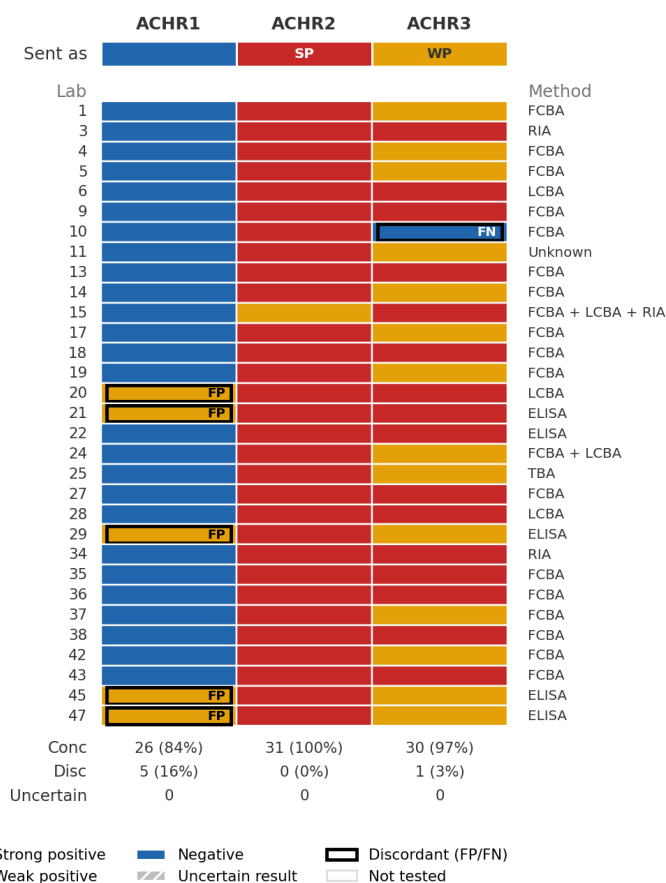
The graph represents all valid tests performed within the scheme.

All tests performed: N = 93 · concordant 87 (93.5%) · discordant 6 (6.5%) [FP 5, FN 1]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.



Accuracy according to method

Assay	N of centres	Valid tests	Concordant	Accuracy
FCBA	17	51	50	98.0%
ELISA	5	15	11	73.3%
LCBA	3	9	8	88.9%
RIA	2	6	6	100.0%
FCBA + LCBA + RIA	1	3	3	100.0%
FCBA + LCBA	1	3	3	100.0%
TBA	1	3	3	100.0%
Unknown	1	3	3	100.0%

Comments

The overall accuracy was 93.5% (87/93 valid tests). Discordant results were 5 false positive(s) and 1 false negative(s). Interestingly, 5 FP were reported for sample ACHR1, 4 from labs performing ELISAs and one performing LCBA. These results warrant caution, and highlight a known limitation in specificity of ELISAs for ACHR testing.

MuSK antibody scheme

Participants: 28

Samples: 3 (1 weak positive, 2 negative)

Judgment: Critical

Methods

Assay	N of centres	Laboratory codes
FCBA	20/28 (71.4%)	1, 3, 4, 5, 9, 10, 13, 14, 17, 18, 19, 21, 25, 27, 35, 36, 37, 38, 43, 47
LCBA	3/28 (10.7%)	6, 20, 28
FCBA + LCBA	2/28 (7.1%)	24, 42
FCBA + LCBA + RIA	1/28 (3.6%)	15
ELISA	1/28 (3.6%)	45
Unknown	1/28 (3.6%)	11

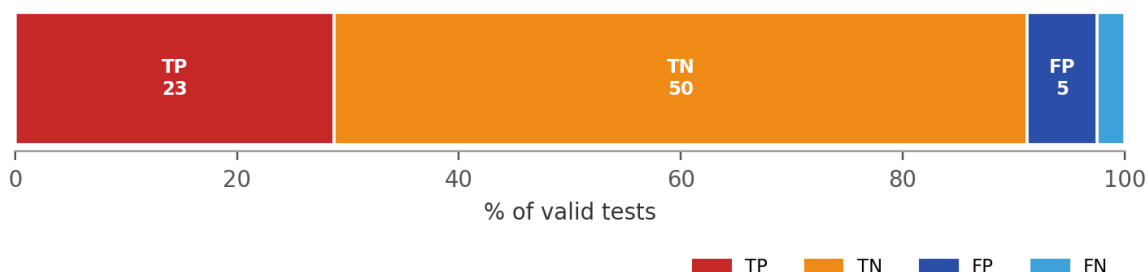
Methods were grouped from the free-text description provided by each laboratory. "Unknown" = method not specified.

Results

Overall concordance of all tests performed

The graph represents all valid tests performed within the scheme.

All tests performed: N = 80 · concordant 73 (91.2%) · discordant 7 (8.8%) [FP 5, FN 2]



Heatmap

The graph represents the detailed results for each sample. Discordant results are outlined in black; the method reported by each laboratory is shown on the right.

Conclusions

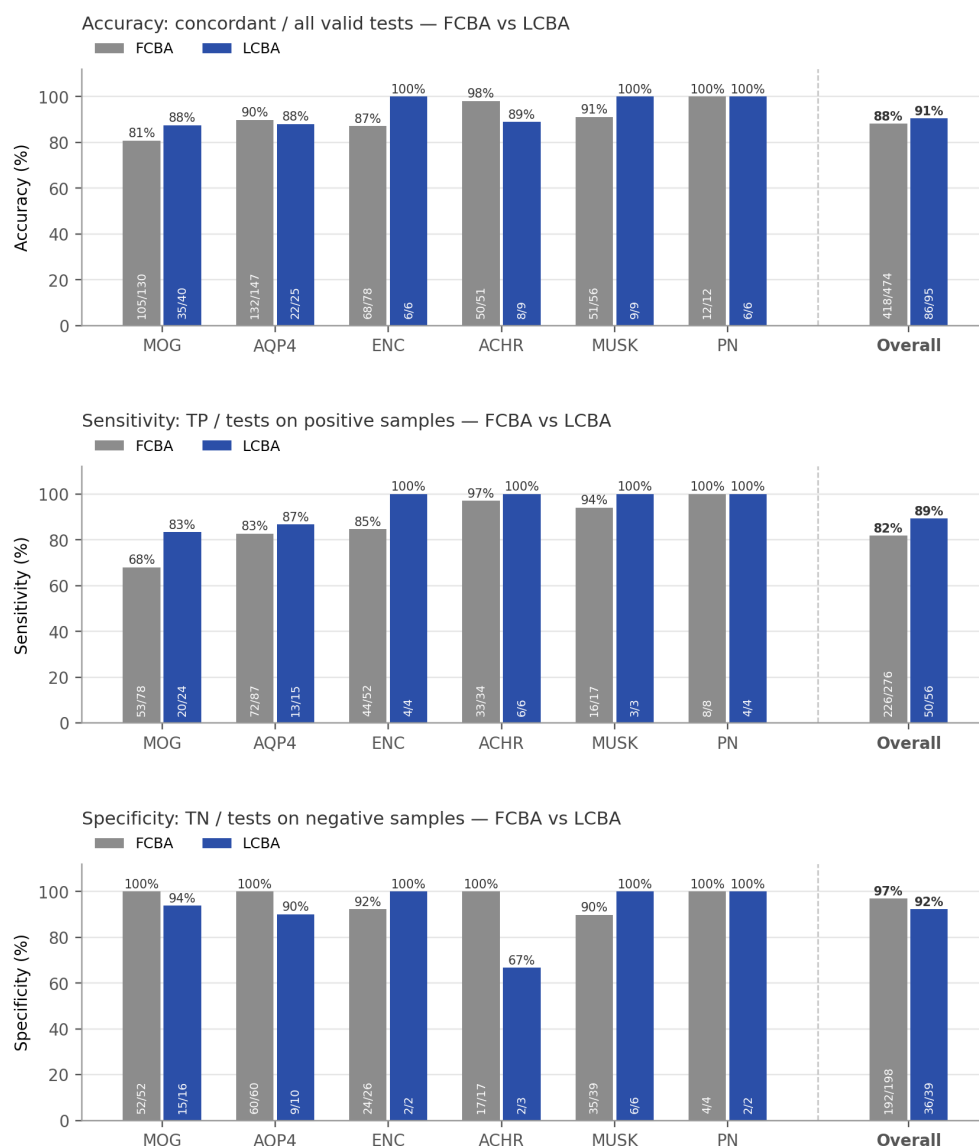
In the 2026 AINI EQAS, 45 centres participated in 10 schemes, and a total of 974 valid tests were evaluated. Overall accuracy ranged from 83.2% (MOG) to 100.0% (PN); 4 schemes were below 90% (MOG (83.2%), ONCO (84.7%), GANGLIO (89.5%), AQP4 (89.8%)).

Compared to previous years, we have observed more critical schemes, mainly due to inaccurate results from CBAs. Notwithstanding that AINI EQAS is not set, and does not allow to provide a final judgment on the best assay for a specific scheme, some clear indications, also supported by literature data, should be taken into account for shifting to better performing and more accurate methods.

Overall, the data suggest that a) LCBAs, performed in specialized, second level centres, might be more sensitive, while a higher specificity was observed with FCBAs, and b) CBAs remain challenging tests, where difficulties in interpretation apply to both 1st and 2nd level laboratories, performing whether LCBAs, or FCBAs. In 2026-2027, AINI will keep promoting initiatives to promote quality and accuracy in neuroimmunology testing throughout Italy and Europe.

To this end, AINI-NINA Winter School will be held in Pavia next year, on 15-17th of January, a new round of EQAS will be performed, and the NINA Flow project will remain active for 2027. Information on all these initiatives can be found at the AINI website www.aini.it

Overall performance of FCBA vs LCBA in the 2026 EQAS



Numbers inside bars: numerator/denominator (tests). FCBA-only and LCBA-only laboratories; combined or other methods excluded.

We would like to thank all the Italian and European participants to this EQAS for their valuable contributions. Please feel free to contact us for any queries regarding the results addressed in this document, or to exchange samples for double-checking. We are also extremely happy to receive your complaints and suggestions to improve our EQAS, including potential additional assays that you would like to be evaluated.

See you next year!

Matteo Gastaldi

Diego Franciotta

A grateful thanks to



for its unconditional contribution

Appendix: abbreviations

AINI: Associazione Italiana di Neuroimmunologia

CBA: cell-based assay

CSF: cerebrospinal fluid

ELISA: enzyme-linked immunosorbent assay

FCBA: fixed cell-based assay

FN: false negative

FP: false positive

IEF: isoelectric focusing

IIF: indirect immunofluorescence

LCBA: live cell-based assay

NINA: Network Italiano Neurologia Autoimmune

OCB: oligoclonal bands

RIA: radioimmunoassay

SP: strong positive

TBA: tissue-based assay

TN: true negative

TP: true positive

WP: weak positive

