SPIFE® Touch IgG IEF Procedure

Cat. No. 3389

INTENDED USE

The SPIFE Touch IgG IEF procedure is intended for the qualitative identification of IgG-specific oligoclonal banding in paired serum and cerebrospinal fluid (CSF) samples by using agarose gel isoelectric focusing and immunoblotting on the SPIFE Touch system. It is used as an aid in the diagnosis of inflammatory disease of the central nervous system (CNS), such as caused by multiple sclerosis.

For *In Vitro* Diagnostic Use.

RX Only

SUMMARY

Intrathecal IgG synthesis within the central nervous system in the proper clinical setting is well established as the diagnostic indicator for multiple sclerosis (MS). In 1994, the Committee of the European Concerted Action for Multiple Sclerosis recommended isoelectric focusing as the most sensitive method for the detection of oligoclonal bands in serum and CSF under certain circumstances.[1]

Isoelectric focusing is considered to be twice as sensitive as the use of the IgG Index.[2] The oligoclonal bands resolved are preferably visualized by IgG-specific antibody staining. It should be emphasized that the finding of oligoclonal bands by isoelectric focusing is not specific for MS. It reaches its maximal value in the differential diagnosis only when other known causes of CNS inflammation have been ruled out. The concentration of individual bands may be as low as 2% of the total CSF IgG,[2] but can be seen against the background of the polyclonal IgG present through filtration from the blood. Due to this filtration, it is important to rule out oligoclonal IgG from the blood by running parallel serum samples against CSF samples. The concentration of IgG in the CSF of a normal person is around 25 mg/L,[2] which needs to be doubled for the use of quantitative methods in order to give an abnormal IgG index. With IEF, oligoclonal banding may be detected while the total CSF IgG concentration is within the reference range.[2]

PRINCIPLE

The SPIFE IgG IEF Kit is based on the method originally described by Keir, G. et al.[3] The Helena method separates serum and CSF proteins according to their isoelectric points in an agarose IEF gel. The proteins are then transferred to nitrocellulose, and the nitrocellulose is then immunofixed to visualize IgG-specific bands. The patterns are interpreted qualitatively by comparing the presence or absence of oligoclonal bands in serum and CSF.

The significance of individual bands in the CSF can only be properly understood in the context of a parallel serum specimen as well as attention to the overall band pattern of all sample tracks on the isoelectric focusing plate. It is important to exclude artifactual bands that are caused by non-linearity of the isoelectric focusing pH gradient. A good practical indicator for these is to compare the serum patterns from several patients.

Bands that are at the same isoelectric point in all specimens of a given run are most likely to be artifacts produced by the ampholytes used in the separation. The higher the number of these artifactual bands, the more difficult it is to recognize not only legitimate abnormal serum bands, but even CSF bands, which can be obscured by interference from the common bands.[1]

REAGENTS

WARNING: FOR IN-VITRO DIAGNOSTIC USE

1. **SPIFE IgG IEF Gel**
   Ingredients: Each gel contains agarose (1.0%) and separators with a preservative.
   Preparation for Use: The gel is ready for use as packaged.
   Storage and Stability: The gels should be stored horizontally at room temperature (15 to 30°C), in the protective packaging, and are stable until the expiration date indicated on the package. **DO NOT REFRIGERATE OR FREEZE THE GELS.**
   Signs of Deterioration: Any of the following conditions may indicate deterioration of the gel: (1) crystalline appearance indicating the agarose has frozen, (2) cracking and peeling indicating drying of the agarose, (3) bacterial or fungal growth indicating contamination. Discard if any of these conditions are present.
2. **Anode Solution**
   Ingredients: Contains 0.3 M acetic acid.
   CAUTION: Irritant. Do not ingest.
   Preparation for Use: The solution is ready for use as packaged.
   Storage and Stability: The solution should be stored at room temperature (15 to 30°C), and is stable until the expiration date indicated on the label.
   Signs of Deterioration: Discard product if it appears cloudy or contains particulates.
3. **Cathode Solution**
   Ingredients: Contains 1 M NaOH.
   WARNING: CORROSIVE - Causes burns. **DO NOT PIPETTE BY MOUTH.** In case of contact with eyes, rinse immediately with plenty of water and seek medical attention immediately.
   Preparation for Use: The solution is ready for use as packaged.
   Storage and Stability: The solution should be stored at room temperature (15 to 30°C), and is stable until the expiration date indicated on the label.
   Signs of Deterioration: Discard product if it appears cloudy or contains particulates.
4. **Blocking Agent**
   Ingredients: Contains bovine milk protein solids.
   Preparation for Use: The Blocking Agent is used to prepare two working solutions as follows:
   - Blocking Solution A: Dissolve 1 g powder in 50 mL of 0.85% saline.
   - Blocking Solution B: Dilute 5 mL of Blocking Solution A to 50 mL with 0.85% saline.

   Storage and Stability: The powder should be stored at room temperature (15 to 30°C), and is stable until the expiration date indicated on the label.
   Signs of Deterioration: The Blocking Agent should be free flowing off-white to pale yellow lumpy powder. Any changes to this appearance, or unusual coloration, may indicate deterioration.
5. **Acetate Buffer Concentrate**
   Ingredients: Contains 0.2 M Acetate Buffer, pH 5.1.
   Preparation for Use: Dilute 2.5 mL of Acetate Buffer Concentrate to 25 mL with deionized water and use immediately.
   Storage and Stability: The solution should be stored at room temperature (15 to 30°C), and is stable until the expiration date indicated on the label.
   Signs of Deterioration: Discard product if it becomes cloudy or contains particulates.
6. **Chromogen**
   Ingredients: Contains 3-amino-9-ethyl-carbazole powder.
   WARNING: TOXIC - May cause cancer or inheritable genetic damage. Harmful by inhalation and if swallowed. Wear suitable protective clothing, gloves and eye/face protection. In case of exposure, seek medical attention immediately.
   Preparation: Dissolve contents of the vial in 60 mL of methanol. Use glassware dedicated for this purpose to prevent protein contamination of the chromogen.
   Storage and Stability: The powder should be stored at 2 to 8°C and is stable until the expiration date indicated on the label. Store 5 mL aliquots of the reconstituted chromogen solution at -20°C in the dark. Frozen aliquots are stable for six (6) months.
   Signs of Deterioration: The reconstituted chromogen should be a yellow to red-brown color. Changes from this appearance or failure of the chromogen to perform in the test may indicate product deterioration. Discard if either of these conditions are present.
7. **Single Antibody**
   Ingredients: Contains goat anti-human IgG peroxidase conjugate with a preservative.
   WARNING: Harmful if swallowed.
   Preparation for Use: The antibody is ready for use as packaged.
   Storage and Stability: The antibody should be stored refrigerated at 2 to 8°C and is stable until expiration date indicated on the label.
   Signs of Deterioration: Discard the vial if it becomes cloudy or contains particulates.

INSTRUMENT

A SPIFE Touch Analyzer must be used to electrophorese the gel. Refer to the Operator's Manual for detailed instructions.

SPECIMEN COLLECTION AND HANDLING

Specimen: Freshly collected serum and CSF are the specimens of choice. Both serum and CSF should be collected at the same time using conventional collection methods for clinical laboratory testing.

Handling: CSF samples should be applied neat. Serum samples should be diluted 1:300 in 0.85% saline.

Storage and Stability: Samples can be stored refrigerated at 2 to 8°C for up to 3 days or 2 weeks at -20°C.

PROCEDURE

Materials Provided: The following materials needed for the procedure are contained in the SPIFE IgG IEF Kit (Cat. No. 3389):

SPIFE IgG IEF Gel (10)

SPIFE IgG IEF Anode Solution (1 vial)
SPIFE IgG IEF Cathode Solution (1 vial)
SPIFE IgG IEF Blocking Agent (1 vial)
SPIFE IgG IEF Acetate Buffer Concentrate (1 vial)
SPIFE IgG IEF Chromogen (1 vial)
SPIFE IgG IEF Antibody (1 vial)
Transfer Membranes (20)
Blotter C (20)
Blotter D (40)
Electrode Wicks (20)
Wick Blotters (40)
Soak-away Blotters (20)
Center Electrode Wicks (5)
Center Wick Blotters (10)

Materials Provided but not contained in the kit:

Item	Cat. No.
SPIFE Touch	1068
REP Prep	3100
SPIFE IgG IEF Electrodes	3383
SPIFE IgG IEF Square Replacement Electrodes (2 gels)	3703
SPIFE IEF Electrodes and Adapter (2 gels)	3704
High Resolution Protein Marker	5141
Development Weight	5014
Staining Dish	4061

Materials required but not provided:

30% or 3% Hydrogen Peroxide
Methanol
0.85% Saline
Pipette to deliver 5 µL
Laboratory rotator

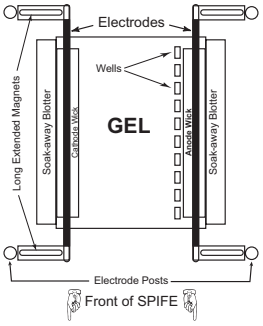
STEP-BY-STEP PROCEDURE

Two (2) gels may be run in the SPIFE Touch simultaneously, however the test parameters, technique, electrodes and some paper components are different from those used when electrophoresing one gel.

I. Procedure for One Gel

A. Gel Preparation

1. Remove two Electrode Wicks from the packaging. Soak one Electrode Wick in the Anode Solution and one wick in the Cathode Solution. Take care not to mix the anode and cathode solutions.
2. Remove the gel from the packaging and place on a paper towel. Carefully remove the transparent protective overlay. Using slight fingertip pressure, gently blot the gel surface with a Blotter C and discard blotter.



B. Electrophoresis

1. Using the instructions provided in the SPIFE Touch Operators Manual, set up the parameters as follows:

	Separator Unit
Electrophoresis	Prompt: None Time: 45:00 Temperature: 15°C Voltage: 700 V mA: 75 mA

End

2. Dispense 0.5 mL of REP Prep onto the chamber floor.
3. Position the gel in the center of the chamber floor with the sample wells toward the anode (right) electrode. Wipe excess REP Prep from around the edges of the gel. Take care to fully remove excess REP Prep.
4. Remove the wick from the Anode Solution and place it between two Wick Blotters and blot almost dry.
5. Position the anodal wick on the gel surface at the anode (right) end of the gel.
6. Repeat Step 4 for the wick in the Cathode Solution, and place the cathodal wick on the gel at the cathode (left) end of the gel.
7. Place an electrode (Cat. No. 3383) over each wick ensuring that the magnetic extenders contact the inside of the magnetic posts. The gel may need to be repositioned slightly so that the electrodes are directly over the wicks.
8. Position one Soak-away Blotter against the edge of the gel on the cathode end and one Soak-away Blotter against the gel on the anode end to act as excess fluid blotters. Ensure these Soak-aways are in contact with the gel.
9. Apply 5 µL of sample to each sample well. Close the chamber lid.
10. Use the arrows under **SEPARATOR UNIT** to select the appropriate test. Press **START** and choose an operation to proceed.
11. Continue to Step III.

II. Procedure for Two Gels

A. Gel Preparation

1. Remove two Electrode Wicks and one Center Electrode Wick from the packaging. Soak the Center Electrode Wick in the Anode Solution and the Electrode Wicks in the Cathode Solution. Take care not to mix the anode and cathode solutions.
2. Remove two gels from the packaging and place on a paper towel. Carefully remove the transparent protective overlay from each gel. Using slight fingertip pressure, gently blot each gel surface with a Blotter C and discard blotter.

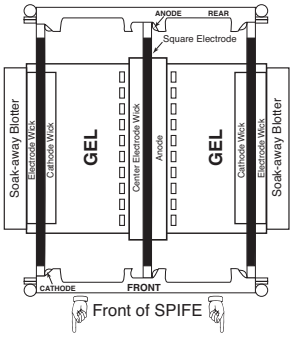
B. Electrophoresis

1. Using the instructions provided in the SPIFE Touch Operators Manual, set up the parameters as follows:

	Separator Unit
Electrophoresis	Prompt: None Time: 45:00 Temperature: 15°C Voltage: 700 V mA: 150 mA

End

2. Dispense 0.25 to 0.5 mL of REP Prep at each end of the chamber floor.
3. Place one gel on the left side and one gel on the right side of the chamber floor with the sample wells toward the center of the chamber. The edges of the gel backing should touch, but not overlap, at the center of the chamber floor. Wipe the excess REP Prep from around the edges of the gel backing. Take care to fully remove excess REP Prep.



4. Remove the Center Electrode Wick from the Anode Solution, and place it between two Center Wick Blotters and blot almost dry.
5. Position the Center Electrode Wick on the gel surface so that it overlaps both gels at the center of the chamber.
6. Remove the two Electrode Wicks from the Cathode Solution, and place them between two Wick Blotters and blot almost dry.
7. Place one Electrode Wick on the gel surface near the outer edge of each gel with approximately 1mm of gel exposure beyond the wick. Align the edge of the wick so that it is straight with the edge of the gel and the edge of the copper floor. The wicks should be placed so that the electrodes will be centered over the wicks.
8. Insert the SPIFE IEF Electrode Adapter (Cat. No. 3704) marked Front between the two magnetic posts located at the front of the chamber floor. Insert the IEF Electrode Adapter marked Rear between the two magnetic posts located at the back of the chamber floor.
9. Clean and wipe the three (3) IEF electrodes with a lint-free tissue.
10. Place a round electrode into the slots created by the adapter – one on each outside edge. Place the square electrode in the middle. Be sure all 3 electrodes are seated firmly against the electrode wicks.
11. Position one Soak-away Blotter against the edge of the gel on the left end of the chamber and one Soak-away Blotter against the gel on the right end of the chamber to act as excess fluid blotters. Ensure these Soak-aways are in contact with the gel.
12. Apply 5 µL of sample to each sample well. Close the chamber lid.
13. Use the arrows under **SEPARATOR UNIT** to select the appropriate test. Press **START** and choose an operation to proceed.

III. Immunoblotting

1. Following the focusing step, remove the gel from the chamber floor, and place it on a Blotter D with sample number one on the left. Remove and discard the electrode wicks and the blotters.
2. Pre-wet a sheet of Transfer Membrane in deionized water. Use gloves to handle the transfer membrane and take care not to touch the surface that will contact the gel. Remove excess water by gently blotting between two paper towels or tissues. Gently place the Transfer Membrane onto the gel surface, red dot down. Allow the membrane to take up moisture as it is placed on the gel surface to prevent the production of air pockets. Leave for 10 seconds and discard.
3. Pre-wet a second sheet of Transfer Membrane in 10% methanol in water. Allow excess fluid to drain from the membrane by holding the membrane vertical for 10 to 20 seconds. Allow the excess fluid to drip onto the gel. Carefully lay this Transfer Membrane onto the gel surface, red dot down in the lower left corner.

The dot will be by sample number one. Gently move your finger across the surface of the membrane moving from the center to outer edges to ensure good gel contact and to remove air pockets between the gel and the membrane (avoid excessive pressure which could damage the gel). Place one Blotter C, three Blotter D's and a Development Weight on top of the gel. Press for 30 minutes. (The weight should weigh between 2 and 2.5 kg.)

4. Remove the blotters and weight and discard the blotters. Place the Transfer Membrane, red dot up, into a staining dish containing 20 mL of Blocking Solution A. Ensure that the entire surface of the membrane is covered. Gently agitate for 30 minutes.
5. Wash the membrane in water three times.
6. Pour 15 mL of Blocking Solution B into a staining dish. Add 15 µL of Single Antibody and mix.
7. Place the membrane in this solution for 30 minutes and gently agitate.
8. Wash the membrane in water three times and, finally, in saline for 5 minutes. Rinse in deionized water.

IV. Visualization

1. Pour 25 mL of diluted Acetate Buffer into a dish. Add 5 mL Chromogen Solution and 25 µL of 30% hydrogen peroxide and mix quickly. 250 µL of 3% hydrogen peroxide may be used as an alternative to 25 µL of 30% hydrogen peroxide.
2. Place the membrane in this solution and gently agitate. Allow color to develop for 20 minutes. It is normal for precipitation of chromogen to occur during this step.
3. Rinse in water three times and allow the membrane to air dry.
4. Transfer membranes may be visually inspected for qualitative evaluation even after being kept an indefinite period of time after being processed. Transfer membranes that have darkened after long-term storage should not be used for evaluation.

QUALITY CONTROL

It is recommended that the High Resolution Protein Marker be used as a positive control for oligoclonal bands. It should be run on each gel as a control to ensure that all reagents and procedures perform properly. Dilute the marker 1:30 with saline before use. If no oligoclonal bands are detected, the test is considered invalid and should be repeated.

Additional controls may be included according to guidelines and requirements of local, state and/or federal regulations or accrediting organizations.

INTERPRETATION OF RESULTS[2, 3]

For a full review of the interpretation of IgG IEF patterns, see Andersson, M. et al.[1] The IgG bands become visible as a red/red brown color on the transfer membrane. Comparison of paired serum/CSF samples should always be the standard procedure. The interpretation of the patterns obtained should be performed in the context of the clinical history of the patient and appropriate biochemical and/or microbiological testing. Most of the clinical interest in CSF electrophoresis is focused on the gamma region. Oligoclonal bands are multiple distinct bands in the gamma zone of the CSF pattern, which are not present in serum.

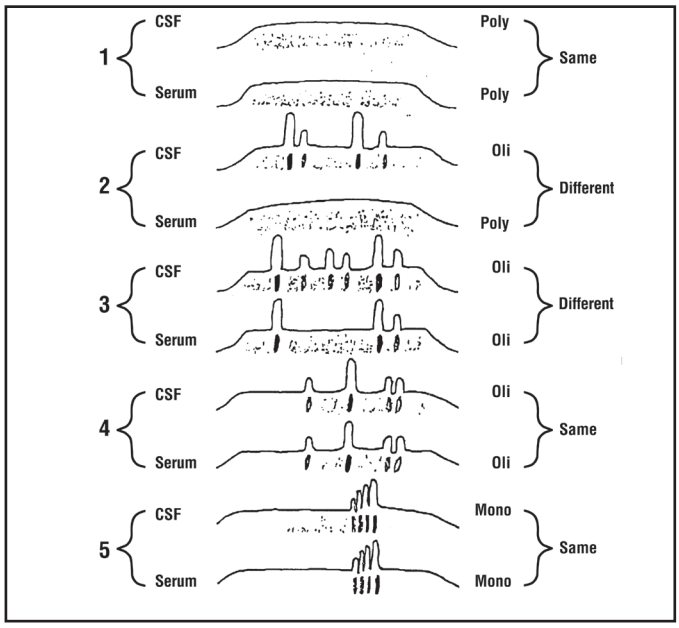


Figure 1: Diagram showing idealized CSF and serum isoelectric focusing patterns. Different CSF serum patterns denote local IgG synthesis. Densitometric scans of the patterns show the differences in optical density (relative amount of protein per band). Type 1 is normal. Type 2 is found in multiple sclerosis. Type 3 is found in multiple sclerosis and brain inflammation in systemic disease such as sarcoidosis. Type 4 is found in systemic inflammation such as Guillain-Barré. Type 5 is found in myeloma or monoclonal gammopathy of uncertain significance. The pH gradient is from 6-9, and the cathode is on the right. Poly = Polyclonal; Oli = Oligoclonal; Mono = Monoclonal.

There are five different IEF patterns that may be seen:

1. Normal CSF - no bands present in the CSF (see picture - Type 1).
2. CSF with restricted oligoclonal bands not seen in the serum (see picture - Type 2).
3. CSF with restricted oligoclonal bands with additional bands seen in both the CSF and serum (see picture - Type 3).
4. Identical oligoclonal bands in the CSF and serum (see picture - Type 4).
5. Monoclonal bands in both the CSF and serum (see picture - Type 5).

Of these five different patterns only pattern numbers 2 and 3 represent local synthesis of IgG within the central nervous system. If no oligoclonal bands are found in either CSF or serum, then no pathological process has been detected.

Oligoclonal bands that are present in the CSF only are associated with a variety of inflammatory brain diseases, the most common example of which is MS. Oligoclonal bands appear in 90% of MS patients sometime during the course of their disease.

Increased IgG in the CSF is not specific for MS, but is an indication of chronic neural inflammation. Oligoclonal bands have been reported in cases of non-treated neurosyphilis, progressive rubella panencephalitis, trypanosomiasis, acute bacterial or viral meningitis, optic neuritis, subacute sclerosing panencephalitis, polyneuritis, Guillain-Barré Syndrome, meningeal carcinomatosis, headaches, systemic lupus erythematosis and other infectious autoimmune diseases.

If oligoclonal bands are found in both the CSF and serum, and the patterns are the same in both fluids, then the primary pathology is outside the central nervous system. The CSF is simply reflecting the abnormalities in the serum gamma-globulins. Examples of this include systemic infection by viruses such as HIV or measles, and post-infection polyneuropathy. Autoimmune diseases, such as Behcet's, SLE and sarcoidosis can also give this pattern, as can paraneoplastic syndromes and paraproteinemias.

Since 80% of CSF is derived from serum, patients with monoclonal proteins may have a corresponding band in their CSF. If the pattern of the bands in the CSF and serum is monoclonal, rather than oligoclonal, then the possibility of a B-cell tumor should be considered.

When the band patterns of the CSF and serum differ and there are more bands in the CSF than the serum, this suggests a specific involvement of the CNS in the pathology. The causes are the same as those listed above but the evidence of CNS involvement is superimposed upon the systemic response.

Oligoclonal bands may be present in the serum of patients with Hodgkin's disease and approximately 5% of MS patients will show faint bands in the serum. The reason for this is unclear but may be associated with underlying infection or release of CNS antigens into the peripheral blood system, where they induce antibody production. Approximately 2-3% of clinically confirmed MS patients show no evidence of oligoclonal bands in the CSF. For these patients the oligoclonal pattern is still evolving and a second test run at a later date may show they have developed oligoclonal bands.[2]

LIMITATIONS

1. It is imperative that serum and CSF samples be collected from the patient at the same time. Any treatment of the samples that might alter the concentration of the immunoglobulins (other than those required under the Sample Storage and Handling section of this procedure) must be avoided.
2. The use of antibody other than the one provided in the kit may affect the results.
3. It is important to exclude artifactual bands that are caused by non-linearity of the isoelectric focusing pH gradient. A good practical indicator for these is to compare the protein patterns from several patients. Bands that are at the same isoelectric point in all specimens of a given run are most likely to be artifacts produced by the ampholytes used in the separation.[1]

TROUBLESHOOTING

The following table details possible reasons and solutions to some of the most commonly encountered problems associated with isoelectric focusing followed by immunoblotting.

Problem Observed	Possible Reasons and Solutions
1. No staining of sample lanes a) Background unstained	a) No samples applied b) Antibody or chromogen omitted or degraded c) No hydrogen peroxide added d) Failure to use acetate buffer e) Failure to use chromogen
2. Background staining a) Background heavily and uniformly stained.	a) Blocking step omitted, or contaminated blocking solution. b) Inadequate washing of the transfer membrane during the immunofixation and coloration steps. c) Incorrect proportions of acetate buffer, chromogen solution, and/or H2O2
b) Background heavily but unevenly stained.	a) Omitted or inadequate pre-blot step. b) Inadequate mixing of blocking solution with antibody

3. Sample lanes stained but faint	a) Insufficient sample applied b) Insufficient staining time c) Old or contaminated hydrogen peroxide d) Decay of antibody due to incorrect storage e) Oxidized chromogen (will appear black) f) pH of acetate buffer incorrect (should be 5.0 to 5.2) g) Insufficient sample volume h) Inadequate blotter C and/or residual buffer on surface of gel
4. Sample lanes intensely stained losing resolution	a) Excessive sample applied b) Overdeveloped (rare)
5. Sample lanes distorted/smeared	a) No soak-aways used b) Condensation on gel surface due to excessive colling of the gel c) Excessive sample volume d) Inadequate cooling during IEF e) Improper alignment of gel to electrodes. Poor contact between electrodes and IEF gel f) Excess rep prep g) Cathode and anode solutions switched h) Failure to remove air pockets or achieve uniform contact between transfer membrane and IEF gel during initial and /or secondard blot i) Excess or uneven pressure during initial or secondary blot
6. All staining in the sample well	a) No power applied during electrophoresis b) Insufficient contact between electrode wick and electrode
7. White spots or lines in the stained sample	a) Air bubbles between gel and membrane at press stage. Ensure a pre-wet membrane is used. Allow the excess 10% methanol to drain from pre-wetted membrane onto the gel. Ensure bubbles are gently rubbed out from between the membrane and gel, moving fingers from the center of the gel outward.

PERFORMANCE CHARACTERISTICS

Accuracy

Sixty paired CSF and serum samples with known clinical diagnoses were tested using the SPIFE 3000 and the SPIFE IgG IEF procedure. The samples could be subdivided into 34 MS, 12 possible MS and 14 other inflammatory brain conditions. Results were considered positive if oligoclonal bands were observed in the CSF and not in the serum. Of the 34 patients diagnosed with MS, 29 were positive as compared to 7 in the possible MS patients. For patients with other inflammatory brain conditions, 2 of 14 were positive. Excluding the possible MS patients, the assay sensitivity and specificity are 85% and 80% respectively.

Method Comparison

Sixty paired CSF and serum patient samples were tested using the SPIFE IgG IEF kit and a commercially available electrophoresis and immunofixation kit. Both the serum and CSF samples were pretreated according to the manufacturer's specifications.
These samples included 34 MS, 12 possible MS and 14 other inflammatory brain conditions (headache, fibromyalgia, optic neuropathy, visual blurring, trigeminal neuralgia, dementia and vertigo). Eighteen paired samples (17 MS and 1 possible MS) and 3 serum samples were excluded due to prozone effect when analyzed with the commercially available kit. Results were tabulated below.

		Electrophoresis/Immunofixation	
		Positive	Negative
SPIFE IgG Kit	Positive	18	4[a]
	Negative	2[b]	18
	Total	20	22

[a]two MS and 2 possible MS
[b]1 MS and 1 possible MS

Overall agreement 85.7% (36/42)
Positive agreement 90.0% (18/20)
Negative agreement 81.8% (18/22)

Analytical Sensitivity

The SPIFE IgG IEF method will detect IgG type monoclonal bands at concentrations greater than 0.28 mg/L. An IgG lambda serum sample was assayed using Radial ImmunoDiffusion (RID) to determine its IgG concentration. The sample was then serially diluted and run on the IEF method. The patterns were visually inspected to see when the patterns were no longer visible. That sample's dilution was back calculated to determine its concentration.

Reproducibility

Within Gel Reproducibility

A CSF and serum sample from two different patients (one with oligoclonal bands, one without) were run in replicate on a single gel. The patterns were visually inspected and found to be qualitatively identical. In each lane the oligoclonal bands were correctly identified. No false negatives or positives were observed.

Within Lot (Gel to Gel) Reproducibility

A CSF and serum sample from two different patients (one with oligoclonal bands, one without) were run in replicate on 5 separate gels. The patterns were visually inspected and found to be qualitatively identical. In each lane the oligoclonal bands were correctly identified. No false negatives or positives were observed.
Comparison studies between SPIFE 3000 and SPIFE Touch, using the SPIFE IgG IEF procedure, produced equivalent results.

BIBLIOGRAPHY

1. Andersson, M. et al. Cerebrospinal fluid in the diagnosis of multiple sclerosis: a consensus report. J Neurol, Neurosurg. Psychiatry, 1994; 57:897-902.
2. Keir, G. Report on the Evaluation of Helena Laboratories' Method for Agarose Isoelectric Focusing of Immunoglobulin G. Private communication.
3. Keir, G. et al. Isoelectric focusing of cerebrospinal fluid immunoglobulin G: An annotated update. Ann. Clin. Biochem., 1990; 27:436-443.

For Sales, Technical and Order Information and Service Assistance, call 800-231-5663 toll free.

Shaded areas indicate that the text has been modified, added or deleted.

HELENA LABORATORIES
1530 Lindbergh Dr.
Beaumont, Texas 77707 U.S.A.

Pro 237
2/24(3)