# DIAGNOSTICS OF LYME BORRELIOSIS



Global Technology. Local Solutions.

# **DIAGNOSTICS OF LYME BORRE**

### **BIOMEDICA – YOUR PARTNER IN LYME BORRELIOSIS DIAGNOSTICS**

**BIOMEDICA** has been on the forefront as a distributor of in vitro diagnostics for **more than 35 years**. BIOMEDICA has established **13 local offices**, distributed **across Central Eastern Europe (CEE)**, employing a **team of 250 professionals**. The reliability of BIOMEDICA's business performance and quality of products are evidenced in our daily work and our daily efforts with and for our customers.

We supply customers in the fields of health care and research with **flexible solutions**, **quality products**, **technical services and ongoing support**.

The **ISO 9001:2008 certification** throughout the entire group of companies ensures constant improvement in quality of products and services.





### **DIAGNOSTICS OF LYME DISEASE**

**Lyme Borreliosis** (LB, Lyme disease) is the most commonly reported tick-borne infection in Europe and North America. It is caused by a gram-negative spirochaete, named Borrelia (first isolation of Borrelia burgdorferi from Ixodes scapularis, deer tick). The pathogens are transmitted by the bite of various tick species, in Europe mostly by Ixodes ricinus (sheep tick). The incubation period varies from 3 to 30 days.

The disease is a multi-system disorder which can affect a complex range of tissues including the skin, heart, nervous system, and to a lesser extent the eyes, kidneys and liver.

Lyme disease has been known in Europe under a variety of names (including erythema migrans, neurobor-reliosis, acrodermatitis chronica atrophicans, Bannwarth's syndrome).

**Clinical presentations** can generally be divided into three stages but progress from an early to later stage is not inevitable, even if the infection is untreated:

**Stage 1:** early dermatitis – appearing days or weeks after the infection. Clinical: erythema migrans.

**Stage 2**: early disseminated infection – appearing weeks or months after infection. Clinical: lymphocytic meningoradiculitis (Bannwarth's syndrome), neuroborreliosis.

**Stage 3**: late disseminated infection – occuring up to years after infection. Clinical: chronic progressive encephalomyelitis, acrodermatitis chronica atrophicans, chronic arthritis.

Many features of later infection are not specific to Lyme Borreliosis and occur in other conditions.

The diagnosis of Lyme Borreliosis should be made only after careful evaluation of the patient's clinical history, physical findings, laboratory evidence and exposure risk evaluation.

### **TWO-STAGE DIAGNOSTICS FOR LYME DISEASE**

For the serological diagnosis of anti-borrelia antibodies, the German Association for Hygiene and Microbiology (DGHM), the Robert Koch Institute (RKI) and the Center for Disease Control (CDC) call for a two-stage strategy:

In the first step a preferably sensitive screening by ELISA is performed, e.g. by BIOMEDICA Borrelia recombinant IgG / IgM ELISA, which also detects antibodies against the Borrelia major antigen VIsE. During the early stage of borreliosis, the test result may still be negative. A second analysis should therefore be carried out after one to two weeks if borreliosis is indicated. In suspected cases of neuroborreliosis Borrelia-specific antibodies are investigated simultaneously in CSF and serum.

If the screening test result is positive or borderline, it should be followed up by immunoblot, e.g. MIKROGEN recomLine Borrelia IgG / IgM, which provide a secure and highly sensitive differentiation between Borrelia-specific and non-specific reactions.

# SCREENING

### Borrelia recombinant IgG ELISA ( Borrelia recombinant IgM ELISA (



12x8 breakable microtiter-well strips ELISA for the quantitative and qualitative determination of IgG- and IgM-antibodies in human serum, plasma, and CSF, for screening purposes.

Antibodies in the human sample bind to the antigens coated on the microtiter plate. Unbound immunoglobulins are removed by washing processes. The enzyme conjugate attaches to bound antibody. Unbound conjugate is removed by washing processes. After adding the substrate solution (TMB), a blue dye is produced by the bound enzyme (peroxidase). By adding stop solution the colour changes to yellow and can be detected with a normal colorimetric ELISA reader (filter 450nm).

To improve the diagnostic specificity, the BIOMEDICA microtiter-well strips are coated with the following recombinant antigens for IgG and / or IgM detection:

- p21 = OspC (outer surface protein C B. sensu strictu, B. afzellii, B. garinii)
- p18 (B. afzelii)
- p100 (B. afzelii)
- VIsE (fusion protein of different genospecies)
- p41i (inner part of flagellin of B. garinii)

### Sample dilution for IgG detection:

- Serum or plasma: 1+100 with sample dilution, e.g. 10 µl sample + 1 ml sample diluent, mix well
- CSF: 1+2 with sample diluent, e.g. 100 µl sample + 200 µl sample diluent, mix well

#### Sample dilution for IgM detection:

- Serum or plasma: 1+100 with sample dilution, e.g. 10 µl sample + 1 ml sample diluent, mix well
- CSF: 1+1 with sample diluent, e.g. 100  $\mu$ l sample + 100  $\mu$ l sample diluent, mix well
- No additional RFS stripping necessary

### **Product advantages**

- Recombinant antigens lead to better standardization and lot-to-lot consistency
- High sensitivity and specificity confirmed by clinical samples
- Controls included: positive / cut-off / negative
- Colour-coded strips and reagents
- Easy test procedure for manual and instrument use
- Total incubation time <2 hours
- Standardised CSF-serum-analysis available
- Free SW (based on Reiber's formula) to calculate CSF levels
- CE label meet the high standard of the EC directive 98/79/EC on in vitro diagnostic medical devices
- Constant quality checks and confirmation by external INSTAND Ringversuch

### **Ordering Information:**

BI-21032 Borrelia recombinant IgG ELISA, 12x8 tests BI-21042 Borrelia recombinant IgM ELISA, 12x8 tests

#### **Related product:**

BI-3501 RFS Rheumatoid Factor Removal Stripper Solution, 40 tests

# CONFIRMATION

### recomLine Borrelia IgG ( recomLine Borrelia IgM (

# MIKROGEN

Strip-Immunoassay with antigens produced by recombinant techniques for the detection of IgG or IgM antibodies against Borrelia burgdorferi in human serum, plasma or CSF.

In comparison with the screening assays, recomLine Borrelia exhibits additional criteria with regard to sensitivity and specificity and is used to confirm the results of enzyme immunoassays. Highly specific, genetically engineered, immunodominant Borrelia proteins are used. Only the recomLine Borrelia detects antibodies against all five of the so far known as immunopathogenic genospecies (B. burgdorferi sensu stricto, B. garinii, B. afzelii, Borrelia spielmanii and B. bavariensis) on one single test strip:

VIsE from different genospecies			
OspC from all genospecies			П
<ul> <li>p18 (Decorin binding protein A = DbpA) from all genospecies</li> </ul>			н
	Re	act. Control	Н
Product advantages	Conjugate	Contr. IgG	Ħ
Recombinant antigens	0	utoff Control	ш
High sensitivity and specificity		ton control	
<ul> <li>Easy and clear interpretation due to easy to read bands</li> </ul>		p100	н
<ul> <li>Optimum presentation without cross-reacting Borrelia proteins</li> </ul>		VIsE	ы
<ul> <li>Immunodominant antigens of the five genospecies: B. burgdorferi sensu stricto,</li> </ul>		p58	ы
B. garinii, B. afzelii, B. spielmanii and B. bavariensis		p41	ы
<ul> <li>Easy test procedure; automation possible</li> </ul>		p39	ы
<ul> <li>Easy and objective evaluation and documentation by recomScan software</li> </ul>		OspA	ы
<ul> <li>Test procedure and reagents identical in all MIKROGEN strip tests - reagents exchangea</li> </ul>	ble		ы
<ul> <li>Separate detection of IgG and IgM antibodies</li> </ul>		B. s.s.	ш
<ul> <li>Safe evaluation due to strip specific controls (cut-off and conjugate control)</li> </ul>	0	B. afz.	В
Standardised CSF-serum-analysis available	UspC	B. gar.	ы
• CE label: The recomLine Borrelia tests meet the high standard of the EC		B. spiel.	ы
directive 98/79/EC on in vitro diagnostic medical devices			11
<ul> <li>Complement as confirmation tests ideally the BIOMEDICA Borrelia ELISA</li> </ul>		B. s.s.	н
• Conform with MiQ Lyme Borreliosis <sup>1</sup> and DIN 58969-44 <sup>2</sup>		B. afz.	ы
	p18	B. bav.	ы
Ordering information		B. gar.	ы
MG-4272/MG-4276 recommendation Borrelia InG 20/200 tests		B. spiel.	
MG-4273/MG-4277 recombine Borrelia IgA 20/200 tests			

#### LITERATURE

<sup>1)</sup> Wilske B, Zöller L, Brade V, Eiffert H, Göbel UB, Stanek G, and Pfister HW: MIQ 12, Lyme-Borreliose. In Qualitätsstandards in der mikrobiologisch-infektiologischen Diagnostik. *H. Mauch and R. Lütticken, eds. Munich, Germany, Urban & Fischer Verlag,* 2000, pp. 1–59

 <sup>2)</sup> DIN 58969-44: Medizinische Mikrobiologie - Serologische und molekularbiologische Diagnostik von Infektionskrankheiten
 Teil 44: Immunoblot (IB); Spezielle Anforderungen für den Nachweis von Antikörpern gegen Borrelia burgdorferi

Antigen	Strain
p100	B.afzelii
VIsE	different Borrelia-genospecies
p58	<i>B.garinii</i>
p41	B. burgdorferi sensu stricto
p39	B.afzelii
OspA	B.afzelii
OspC	B. burgdorferi sensu stricto, B.afzelii, B.garinii, B. Spielmanii
p18	B. burgdorferi sensu stricto, B.afzelii, B.garinii, B. Spielmanii, B. bavariensis



With the tests kits, the instruments for ELISA and strip processing and the strip evaluation software recomScan, BIOMEDICA offers a suitable master plan for the automation of your diagnostic laboratory.

# **ELISA PROCESSOR**

# **GD-TBE100-00 THUNDERBOLT® AUTOMATED ELISA PROCESSING**

The ThunderBolt<sup>®</sup> offers automation features previously reserved for instruments many times the price and size. Streamline your workflow with easy loading, and fully automated processing, reading and reporting of results. Experience the difference ThunderBolt<sup>®</sup> walk-away automation will bring to your laboratory. The ThunderBolt<sup>®</sup> processes up to 2x96 tests.



# STRIP PROCESSORS, READERS AND SCANNERS



### ZZ-MAB3000-6 MEDTEC'S AUTOBLOT 3000

Benchtop Western Blot processor for accurate and highly reproducible results, processes up to 20 strips

#### MG-31050 MIKROGEN'S DYNABLOT PLUS

For the automatic processing of all MIKROGEN's strip assays, processes up to 40 strips

### TQ-16059028 TECAN'S PROFIBLOT 48

Fully automated Western Blot analysis, processes up to 48 strips

### **MG-31009 BLOTRIX READER**

Scan test strips directly from the black incubation trays.

## MG-31010 FLATBED SCANNER OPTICPRO S28

Scan test strips from black evaluation sheets.



# TRIP ASSAYS

# **STRIP EVALUATION SOFTWARE**

### MG-31006 RECOMSCAN SOFTWARE

Automatic detection and interpretation of MIKROGEN's recomBlot and recomLine assays. Easy to connect to the laboratory EDP (electronic data processing).

Plug-Ins for database, import/export, patient report separately available. recomScan calibration card separately available.

## **CREATE WORK LIST:**

<b>_</b>			Company: Minoper Test accounting	EBV		Worklist: Control:									
Table Bar	No	Typeofstrip	lates	¢W	Pid	Lastname	Fistname	Birthday	ProbeNumber	Datecftest	FatNo	tis-algA	tle-M2G	Elisa30M	PottentD
Bine	1	Patient	⊙Auto On.e. OlgA OlgS OlgH		0011	Plusternam	Susanno	01.02.1973	PL	11.11.2004	11		FostN	Pedity	
12 =1	2	Patient	Auto On.e. OtgA Otg6 OtgH		0012	Plufor	Klaus	10.11.1965	P2	11.11.2004	12		Fostiv	Podor	
	3	Fatient	⊙ fato On + OlgA Olg6 OlgH		0013	Schröder	Partn	05.12.1955	P3	11.11.2004	13		Fostin	Negotiv	
Cleartable	4	Patient	⊙Auto On.e. OlpA Olp6 OlpH		0014	Plater	Froni	21.06.1990	P4	11.11.2004	16		POSITIN	Negativ	
Frint table	5	Patient	Auto On.o. OlgA Olg6 OlgH	6	0015	Schuster	Bernhard	14.04.1982	P5	11.11.2004	15		Positiv	Negativ	
	6	Avidity	@Auto On & OlgA Olg6 OlgH		0015	Schuster	Bernhard	14.04.1982	P5	11.11.2004	15		Positiv	Negetiv	
Ins Flow	7	Patient	Auto On.o. OlpA OlpG OlpH		0011	Mustermann	Saame	01.02.1973	P1	11.11.2004	11		Posttix	Posts	
DelBaw	8	Patient	@ Auto On A. O IgA O IgS O IgH		0016	Huber	Schorsch	09.10.1980	P6	11.11.2004	16			Podity	
Constant	9	Patient	@Auto On & OlgA Olg6 OlgH		0013	Schröder	Martin	05.12.1955	P3	11.11.2004	13		Positiv	Negativ	
Could and	10	Patient	@ Auto On & OlpA Olp6 OlpH		0011	Musternam	Saame	01.02.1973	81	11.11.2004	11		Postly	Postin	
Charles	11	Patient	⊙Auto On to OlpA OlpS OlpH		0016	Huber	Schorech	09.10.1980	P6	11.11.2004	16			Podix	
C.68 100	12	Ratiect	CARD On & Otak Otas Otak		0013	Schröder	Partin	05.12.1955	P3	11.11.2004	13		Posth	Negativ	

## LIST REPORT:

Info	NK.	Тур	NO.	PID	Proten Nr.	Streten Artigens	Uberafbeitete	Ergebrisse
						Munification (Munification) (Munific	- Constant	
Hustemann, Has	1	Patent	190		0039	0 1 3 4 3 8 3		positiv (sligelauten)
	2	Patient	1gG			VP2((.5: *P3(0.6)		positiv (abgelauten)
	3	Patient	1gG			UPA 18 VP2p(1.6; VPN(2.2; "VP15(0.9; VP2)(2.4; 0 3 4 5 8 7 8 7 7 PC(0.6)		positiv
	1	Patent	100			VP2p(1.5; VP15)0.5; VP2)2.0; 0 4 5 6 7 8 *********************************		popility
	3	Patient	1gG			VP2pt22: VPN(R.0; VP15(6,1); *VP2h(0.4; NS1(3,3)		positiv (skgelaufen)
	6	Patent	195			UPA 08 VP2p(27) VPN(11,8) VP1S(10,8) VP2p(3,9)		positiv (abgelaufen)
	7	Patent	19G			CONTRACT VP3(10.7); VP1S(10.3); VP2(10.7);     VPC(1.0)		positiv (V.a. 14. < 25%
Nutlefrau, Naria	8	Patient	1gG		0157	UPA 04 VP2q447; VP1q115;; VP1q10;;; VP2q17; 1; 0 VPC(1;2)		positiv (V.a. W. < 25%
	0	Patient	593			Link m		negativ
	10	Patient	1gG			0 I I I I I I I I I I I I I I I I I I I		regativ
	11	Patient	1gG			0 3 4 5 6 7 6 VP2p(4,1); VP1q(8,8); VP1S(5,4); VP2p(8,9); VPC(2,2)		positiv (V.a. VII. < 28W
	12	Patient	100			C LPACE		regativ
	13	Patent	1gG			ULPA.08 VP2(4.2); VPN(10.0); VP1(8.0); VP2(8.4); VPC(4.5); NS1(2,9)		positiv (V.a. Inf. 6 - 26)
	я	Padent	196			VP2p(33, VPN(7,0, VP15(57), VP2(7,3), VPC(3,5) NS1(2,2)		poblév (V.a. W. 6 - 26)
	18	Patient	1gG			0 1 5 4 5 6 7 6 VP2p(X,4) VPN(K,1) VP1S(1,9) VP2p(7,7) VPC(X,2)		poelliv (V.a. W. < 26%
	16	Patient	19G			UP20422 VPN(8.6) VP15(4,4) VP2(11,0) 0 3 4 5 6 7 VPC(4,0)		positiv (V.a. W. < 25%
	17	Patent	590					regativ
	10	Patient	1gG			I LPA 12		negativ

### **EVALUATION:**



### EXPORT RESULTS TO LIS (LABORATORY INFORMATION SYSTEM):

Type of best recordine EBV	No 1	CW	PID	LestNarse	Enstrance	Einthday	Sec	Probenuarber	Strip-Type	lg-Type	Date	GutOff+E	Gut Diff+A	E		
		1	1	1	1		0011	Nustemenn	m Susanne	01.02.1973		P1	Petient	195	11.11.2004	90
recordine EBV	2		0012	Nüller	Klaus	10.11.1905		P2	Polient	1g5	11.11.2004	67	328			
recordine EBV	3		0013	Schröder	Martin	05.12.1955		P3	Petient	195	11.11.2004	63	301			
recordine IBV	4		0014	Neier	Froni	21.06.1990		P4	Polient	395	11.11.2004	77	300			
recordine EBV	s	6	0015	Schuster	Bernhard	14.04.1982		PS .	Patient	195	11.11.2004	81	412	4		
reconLine EBV	6		0015	Schuster	Bernhard	14.04.1982		PS	Avidity	105	11.11.2004	70	350	2		
recombine EBV	7		0011	Nustermenn	Susanno	01.02.1973		P1	Potient	3011	11-11-2004	57	282			
reconLine EBV	8		0012	Nüler	Klaus	10.11.1985		P2	Patient	3011	11.11.2004	104	613	6		
reconLine EBV	9		0013	Schröder	Martin	15.12.1955		P3	Potient	3011	11-11-2004	51	254			
record ine EBV	10		0011	Nustemann	Susanne	01.02.1973		P1	Potient	394	11.11.2004	53	259			
recombine EBV	11		0012	Nüler	Klaus	10.11.1985		P2	Patient	104	11.11.2004	74	390			
reconLine EBV	12		0013	Schröder	Martin	05.12.1955		P3	Potient	304	11.11.2004	53	291			

# **BIOMEDICA OFFICES**

# Albania

Biomedica Sh.p.k Zona 4, Godina 1, Kati 1, Ap. 6, Selite 1001 Tirana, Albania T +355 4 481 8759 F +355 4 481 8759 office@bmgrp.al www.bmgrp.al

# Bulgaria

Biomedica Bulgaria Ltd. 2E "Akad. Ivan E. Geshov" blvd. Business center "Serdika" build. 2, floor 2, office 203 Sofia 1330, Bulgaria T +359 2 447 2833 F +359 2 447 2831 office@bmgrp.bg www.bmgrp.bg

# Hungary

Biomedica Hungària Kft. Ganz utca 16 1027 Budapest, Hungary T +36 1 225 38 50 F +36 1 201 26 84 office@bmgrp.hu www.bmgrp.hu

# Romania

Biomedica Medizinprodukte Romania SRL Strada Siriului nr. 42 – 46, Et. 2, Sector 1 014354 Bucharest, Romania T +40 37 276 68 44 F +40 21 232 22 04 office@bmgrp.ro www.bmgrp.ro

# Slovenia

Biomedis M.B. d.o.o. Jurančičeva ulica 11 2000 Maribor, Slovenia T +386 2 471 63 01 F +386 2 471 63 04 office@bmgrp.si www.bmgrp.si

# Austria

Biomedica Medizinprodukte GmbH Divischgasse 4 1210 Wien, Österreich T +43 1 291 07 0 F +43 1 290 14 29 office@bmgrp.at www.bmgrp.at

# Croatia

Biomedica dijagnostika d.o.o. Strojarska 20/X 10000 Zagreb, Croatia T +385 1 888 5727 F +385 1 888 5728 office@bmgrp.hr www.bmgrp.hr

## Macedonia

Biomedica dijagnostika Ltd Ilindenska 103, local 2 and 3 1000 Skopje, Macedonia T +389 2 3222 404 F +389 2 3222 404 office@bmgrp.mk www.bmgrp.mk

# Serbia

Biomedica MP d.o.o. Lazara Mamuzića 26a 11186 Zemun, Serbia T +381 11 630 1882 F +381 11 630 1883 office@bmgrp.rs www.bmgrp.rs

# Bosnia & Herzegovina

Biomedica d.o.o. Tvornička 3 71210 Ilidža, Sarajevo, Bosnia and Herzegovina T +387 33 262 725 F +387 33 262 726 office@bmgrp.ba www.bmgrp.ba

# Czech Republic

Biomedica ČS, s.r.o. Radlická 740/113d 158 00 Praha 5 - Jinonice, Czech Republic T +420 2 839 33 605 F +420 2 839 32 507 office@bmgrp.cz www.bmgrp.cz

# Poland

Biomedica Poland Sp. z o.o. Raszyńska 13 05-500 Piaseczno, Poland T +48 22 737 5996 F +48 22 737 5994 office@bmgrp.pl www.bmgrp.pl

# Slovakia

Biomedica Slovakia s.r.o. Drobného 27 841 01 Bratislava, Slovakia T +421 2 693 099 01 F +421 2 693 099 08 office@bmgrp.sk www.bmgrp.sk

