



Borréliose de Lyme

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Borréliose de Lyme

Actualités

- Pas de conflit



PLAN : actualités/recherche

- Prévention
 - Faire plus ou faire moins ?
- Epidémiologie
 - Sommes nous face à une pandémie ?
 - *Borrelia*...et tout le reste
- Manifestations cliniques
 - Formes chroniques ?
- Diagnostic : LA polémique
- Traitement : jusqu'où aller ?



Quoi de neuf...



...pour la prévention ?

Faire plus ou faire moins ?

Prophylaxie post piqûre de tique



Topical azithromycin for the prevention of Lyme borreliosis: a randomised, placebo-controlled, phase 3 efficacy trial

Michael Schwameis, Thomas Kündig, Gustave Huber, Luzi von Bidder, Lorenz Meinel, Roland Weisser, Elisabeth Aberer, Georg Härter, Thomas Weinke, Tomas Jelínek, Gerd Fätkenheuer, Uwe Wollina, Gerd-Dieter Burchard, Roland Aschoff, Ruth Nischik, Gerhard Sattler, Georg Popp, Wolfgang Lotte, Dirk Wiechert, Gerald Eder, Olga Maus, Petra Staubach-Renz, Andrea Gräfe, Veronika Geigenberger, Ingomar Naudts, Michael Sebastian, Norbert Reider, Ridwan Weber, Marc Heckmann, Emil C Reisinger, Georg Klein, Johannes Wantzen, Bernd Jilma

- Application d'une crème à l'azithromycine 2 x par jour pendant 3 jours dans les 72 heures suivant une piqure de tique avérée
- Critère d'évaluation : survenue d'un EM ou séroconversion à S8

Lancet, 2017

	ITT population (n=995)		Per-protocol population (n=134)		Reanalysed ITT population (n=174)	
	Azithromycin (n=505)	Placebo (n=490)	Azithromycin (n=62)	Placebo (n=72)	Azithromycin (n=87)	Placebo (n=87)
Seroconversion, erythema migrans, or both at 8 weeks	11	11	3	5	3	9
Erythema migrans	6	8	1	5	2	8
Seroconversion	6	6	2	2	1	3
Seroconversion and erythema migrans	1	3	0	2	0	2
Erythema migrans at day 30	2	8	0	5	0	7
Negative tick bite and seroconversion as the failure event*	1	2	0	0	0	0
Negative tick bite and erythema migrans as the failure event	1†	0	0	0	0	0

ITT=intention-to-treat. *None of these seroconversion events could be confirmed with reanalysis by the German Reference Centre for Borreliosis. †Erythema migrans was poorly described with no details on size or progression.

Table 2: Numbers of patients with treatment failure events

Recommandations allemandes 2017

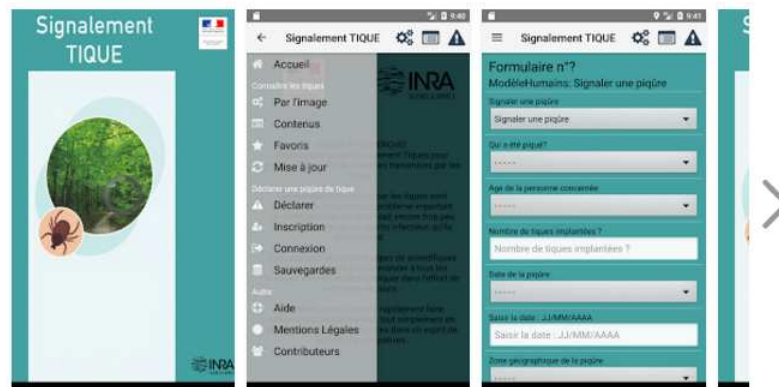
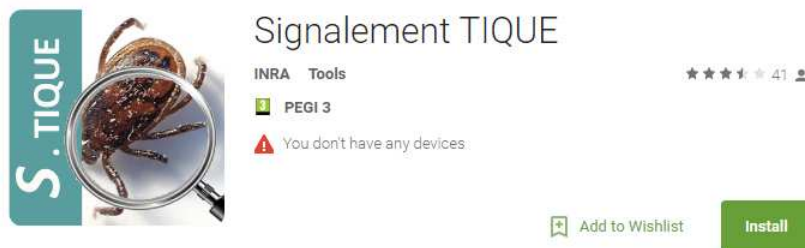
- Pas de prophylaxie en cas de piqûre de tique

...sans autres précisions

- En attendant le PNDS français

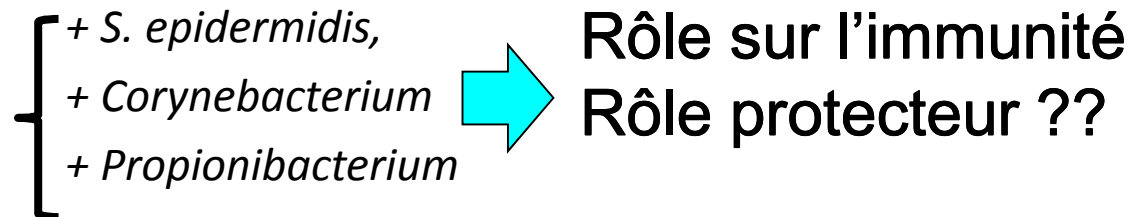
La prévention

- Médecine participative
 - Applications smartphone



...et la recherche ?

- Microbiome cutané et transmission de *Borrelia*
 - Bactéries commensales: rôle dans l'attraction des tiques
 - Peau à tique et identification (Collaboration ONF)
 - Rôle des bactéries commensales de la peau dans la transmission de *Borrelia* ?


+ *S. epidermidis*,
+ *Corynebacterium*
+ *Propionibacterium* → Rôle sur l'immunité
Rôle protecteur ??

- mise au point d'un vaccin en cours



Quoi de neuf...



...pour l'épidémiologie ?

Sommes nous face à une pandémie ?

Etude Alsacétique

- Nombre de cas estimés/ an: 2200
- Ti annuel: 117 cas/10⁵ [IC95%: 109-126]
 - 2014: 121 cas/10⁵ [IC95%:109-133]
 - 2015: 113 cas/10⁵ [IC95%:101-125]
- Ti cantonal annuel
 - Lieux d'exercice des médecins
 - Min: 9 cas/10⁵ [IC95%: 1-64]
 - Max: 264 cas/10⁵ [IC95%: 125-556]

Tableau 4 : Répartition des cas certains et possibles par tableau clinique.
Étude ALSA(CE)TIQUE. Janvier 2014 – décembre 2015 (n = 672)

Tableau clinique	Nombre	%
Erythème migrant unique	530	78,9
Formes disséminées	142	21,1
<i>Arthrite de Lyme</i>	68	10,3
<i>Neuroborréliose de Lyme</i>	54	8,0
<i>Erythème migrant multiple</i>	9	1,3
<i>Acrodermatite chronique atrophiante</i>	6	0,7
<i>Lymphocytome borrélien</i>	3	0,4
<i>Atteinte cardiaque</i>	1	0,1
<i>Atteinte oculaire</i>	1	0,1



Quoi de neuf...



...pour l'épidémiologie ?

Borrelia...et tout le reste

RESEARCH ARTICLE

Molecular Detection of Tick-Borne Pathogens in Humans with Tick Bites and Erythema Migrans, in the Netherlands

Setareh Jahfari*, Agnetha Hofhuis, Manoj Fonville, Joke van der Giessen, Wilfrid van Pelt, Hein Sprong

Centre for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, the Netherlands

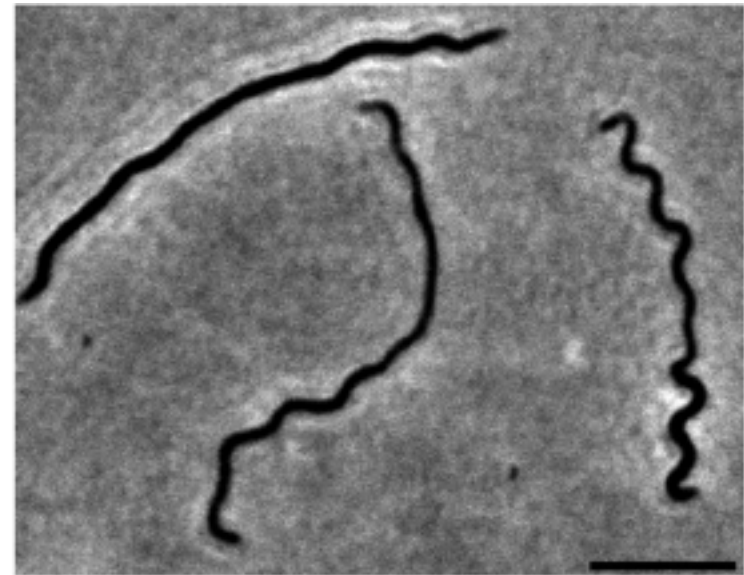
Table 1. Detected DNA sequences in 314 ticks obtained from 293 participants. The results on *B. burgdorferi* s. l. have been published by Hofhuis et al. 2013 [29].

Detected DNA sequences	n / N	% (95%CI)	Estimated human exposure with 1.1 million tick bites
<i>Borrelia burgdorferi</i> sensu lato [29]	92 / 314	29.3% (24.5%-34.5%)	322293
<i>B. afzelii</i> [29]	36 / 314	11.5% (8.3%-15.4%)	126115
<i>B. garinii</i> [29]	11 / 314	3.5% (1.9%-6.0%)	38535
<i>B. burgdorferi</i> sensu stricto [29]	7 / 314	2.2% (1.0%-4.4%)	24522
<i>B. valaisiana</i> [29]	4 / 314	1.3% (0.4%-3.0%)	14013
Untypeable* <i>Borrelia burgdorferi</i> [29]	36 / 314	11.5%	
<i>Borrelia miyamotoi</i>	7 / 302	2.3% (1.0%-4.5%)	25497
<i>Babesia</i> spp	11 / 314	3.5% (1.8%-6.0%)	
<i>B. microti</i>			21019
<i>B. veneta</i>			14013
<i>B. divisa</i>			3503
<i>Ehrlichia</i> spp			
<i>A. phagocytophilum</i>			10510
Untypeable*			
<i>Candidatus</i>			59936
Spotted fever rickettsia's	70 / 314	22.3% (18.0%-27.2%)	
<i>R. helvetica</i>	59 / 314	18.8% (14.8%-23.4%)	206688
<i>R. monacensis</i>	1 / 314	0.3% (0.0%-1.6%)	3503
Untypeable* <i>Rickettsia</i> spp	10 / 314	3.2%	
Co-infections with <i>B. burgdorferi</i> sensu lato**	30		105096
<i>Babesia</i> spp	3 / 314	1.0% (0.2%-2.6%)	
<i>Ehrlichia</i> / <i>Anaplasma</i> spp	10 / 314	3.2% (1.6%-5.6%)	
<i>Candidatus Neoehrlichia mikurensis</i>			
Spotted fever rickettsia's	21 / 314	6.7% (4.3%-9.9%)	
<i>Borrelia miyamotoi</i>	1 / 302	0.3% (0.0%-1.6%)	

Aucune manifestation clinique corrélée à la présence d'un micro-organisme différent de *Borrelia*

B. myamotoi

- Agent de fièvre récurrentes
- Identifié en Amérique du nord, en Europe et en Asie
- En Alsace: 1 à 2 % des tiques infectées
- Qq cas de méningo encéphalites
- Diagnostic repose sur frottis sanguin ou PCR
- Risque de réaction de Jarish Herxheimer
- Traitement par doxy ou beta lactamines



Manifestation	% Patients		
	<i>B. miyamotoi</i> , n=46	<i>B. garinii</i> , n = 21	<i>B. burgdorferi</i> , n = 92
Individual			
EM	9	91	89
Multiple EM	0	14	7
Fever [†]	98	67	32
Fatigue	98	86	74
Headache	89	57	63
Chills	35	10	43
Myalgia	59	52	63
Arthralgia	28	29	62
Nausea	30	10	24
Vomiting	7	5	7
Neck stiffness	2	0	38

Clinical manifestations in patients with *Borrelia* spp. infection, Yekaterinburg City, Russia, 2009, and northeastern United States, 1991–2008. Adapted from Platonov AE, Karan LS, Kolyasnikova NM, Makhneva NA, Toporkova MG, Maleev VV, Fish D, Krause PJ. Humans infected with relapsing fever spirochete *Borrelia miyamotoi*, Russia. *Emerg Infect Dis* 2011;17:1816–23 [10].

Et la recherche ?

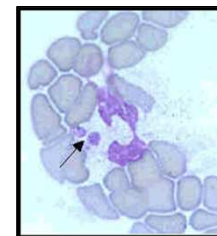
- Evolution de la population des tiques



Suivi mensuel des *Ixodes* en zones rurales et périurbaines en Alsace et en Bretagne

- Analyse moléculaire des microorganismes :
 - PCR
 - Génomique : OH ticks
 - Protéomique identifier les tiques et les pathogènes associés :
CNR

Iconographie : CNR Strasbourg



Anaplasma spp.



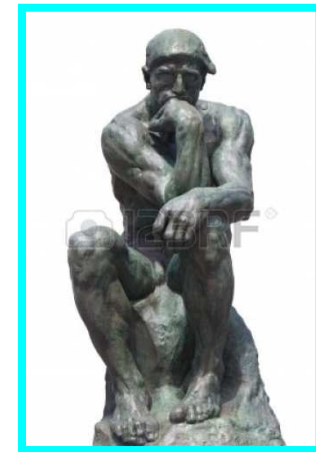
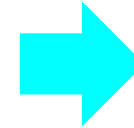
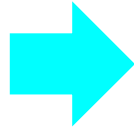
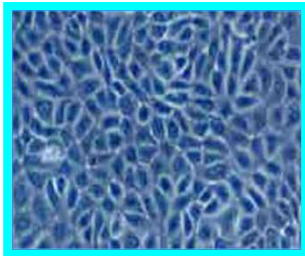
Quoi de neuf ?



...pour la physio-pathologie

Recherche: Approche translationnelle

Analyse du rôle de la peau dans la transmission et dans la persistance bactérienne



Modèles *In vitro* :
Cellules résidentes de la peau
Fibroblastes et kératinocytes
humaines primaires

Modèle *In vivo*
Souris C3H/HeN

Patients:
Validation

Techniques de protéomique à l'interface chimie-biologie

Source : Nathalie Boulanger, CNR, Strasbourg



Quoi de neuf...



...pour les manifestations ?

...et les formes chroniques ?

RESEARCH ARTICLE

Open Access



Common and uncommon neurological manifestations of neuroborreliosis leading to hospitalization

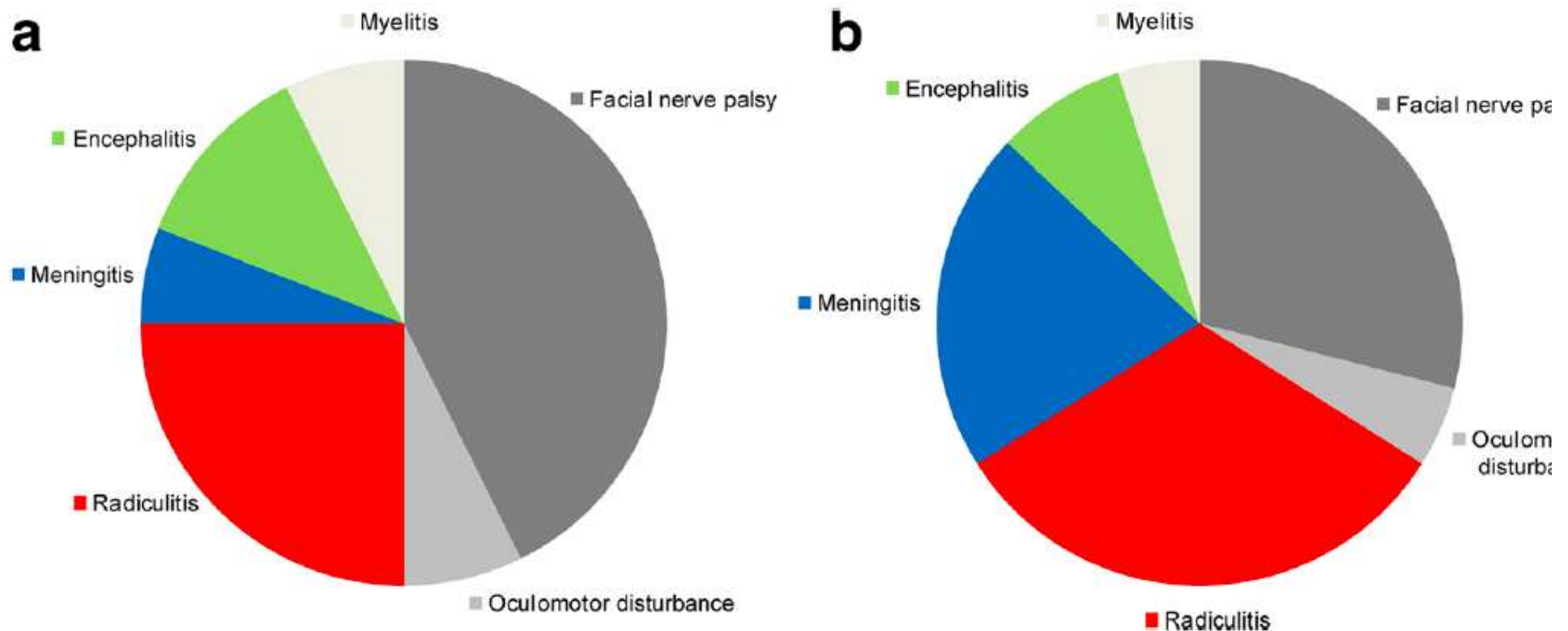
Philipp Schwenkenbecher^{1†}, Refik Pul^{1†}, Ulrich Wurster¹, Josef Conzen², Kaweh Pars¹, Hans Hartmann³, Kurt-Wolfram Sühs¹, Ludwig Sedlacek⁴, Martin Stangel¹, Corinna Trebst^{1†} and Thomas Skripuletz^{1*†}

- Service de neurologie
- Hôpital de Hanovre en Allemagne
- 68 patients entre 1999 et 2014

Description des manifestations neurologiques

Mode d'entrée vers le diagnostic

Nombre total de manifestations



Durée des symptômes au moment du diagnostic

Table 1 Patient's characteristics. Age and duration of symptoms to diagnosis are presented by median with lowest and highest values

Clinical features	Patients (number)	Age (years)	Males (number)	Tick bite and/or erythema migrans (number)	Duration of symptoms (days)
All patients	68	45 (5–93)	44/68	23/68	16 (1–733)
Cranial nerve palsy	34	40 (6–77)	23/34	10/34	7 (1–121)
Facial nerve palsy	29	34 (6–77)	16/29	9/29	7 (1–121)
Isolated facial nerve palsy	11	26 (6–73)	7/11	4/11	4 (1–15)
+ Radiculitis	8	57 (18–77)	6/8	2/8	18 (2–49)
+ Meningitis	6	67 (30–93)	4/6	2/6	7 (3–21)
+ Radiculitis + meningitis	4	(34, 43, 44, 57)	3/4	1/4	(2, 21, 28, 121)
Oculomotor nerve palsy	5	53 (38–76)	2/5	1/5	53 (38–76)
Isolated oculomotor nerve palsy	2	(76, 42)	1/2	0/2	(2, 7)
+ Meningitis/Radiculitis	3	(26, 38, 53)	1/3	1/3	(11, 25, 26)
Radiculitis	17	67 (5–93)	10/17	9/17	20 (3–379)
Isolated radiculitis	14	67 (5–93)	8/14	8/14	18 (3–379)
+ Meningitis	3	(13, 65, 75)	2/3	0/3	(3, 22, 30)
Encephalitis	8	70 (8–79)	7/8	2/8	183 (1–732)
Chronic course	5	74 (67–79)	4/5	0/5	186 (81–732)
Acute/Subacute onset	3	(8, 11, 45)	3/3	2/3	(1, 1, 38)
Myelitis	5	37 (7–64)	4/5	0/5	126 (23–733)
Meningitis	4	(22, 34, 45, 64)	0/4	2/4	(1, 4, 7, 120)

Suicide and Lyme and associated diseases

This article was published in the following Dove Press journal:
Neuropsychiatric Disease and Treatment
16 June 2017

- All of these patients met the clinical criteria for the diagnosis of LAD.
- Many patients fulfilled CDC Surveillance Case Definition, while in other patients, Surveillance Case Definition was not used as the sole criteria for establishing the clinical diagnosis
- Many had a history of erythema migrans rashes
- most had laboratory confirmation
- some had findings demonstrated by single photon emission tomography
- most tested positive for a number of coinfections which included *Babesia*, *Bartonella*, *Anaplasma*, *Ehrlichia chaffeensis*, *Rickettsia rickettsii*, Epstein–Barr virus, cytomegalovirus, human herpesvirus-2, *Mycoplasma pneumonia*, *Chlamydophila pneumoniae*, and hepatitis C virus

« The death formula »

...ou comment trouver une définition de « sophisme »

Lyme and associated diseases infection→
Persistent proinflammatory cytokines→
Dysregulation of tryptophan metabolism→
Quinolinic acid→NMDA receptor agonism→
Glutamate dysregulation→
Neural circuit dysfunction→
Psychiatric dysfunction→
Suicidal, sometimes also homicidal

Figure 2 The death formula.

Abbreviation: NMDA, N-methyl-D-aspartate.

...et la recherche

- Centres spécialisés
 - évaluation clinique des patients
- Piq tiq : cohorte socio-microbio-clinique
 - Hypothèse : tiques poly infectées
 - Qu'est ce qui est transmis ?
 - Qu'est ce que risque l'homme ?
 - Méthodologie
 - Cohorte de sujets piqués par les tiques



Quoi de neuf...



...pour le diagnostic ?

LA polémique

Diagnostic Microbiology and Infectious Disease xxx (2017) xxx-xxx



Studies that
borrelia – a

Gary P. Worms

^a Division of Infectious Dis

^b Departments of Pediatric

^c Department of Infectious

Philipps, 1998 : patients traités au préalable
par antibiothérapie, sérologie négative

Sapi (2013) : 94 % des patients testés
sont positifs

Essai non reproductible :
contamination de laboratoire
probable

Rudenko, 2016 : probable
contamination de laboratoire



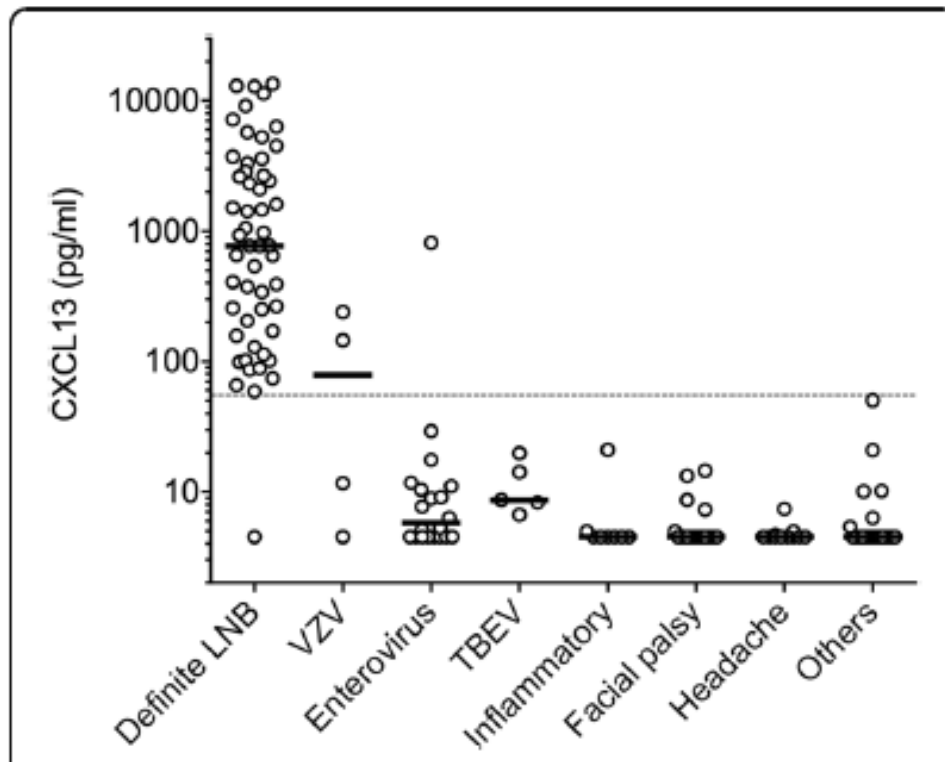
RESEARCH

Open Access



Cerebrospinal fluid CXCL13 as a diagnostic marker of neuroborreliosis in children: a retrospective case-control study

M. M. Remy^{1†}, N. Schöbi^{2†}, L. Kottanattu², S. Pfister¹, A. Duppenhaler² and F. Suter-Riniker¹



Groupe Lyme

- majorité de paralysie faciale
- Présence d'une réaction cellulaire
- Durée des symptômes : maximum 109 jours spécifiques

ESGBOR

Clinical suspicion of	Detection of antibodies to <i>B. burgdorferi</i>	^c Expected sensitivity	^d Incidence per 100,000 population
Tick bite	Not relevant	Not relevant	High
Erythema migrans	Not recommended	50%(40-61)	10-100
Lyme neuroborreliosis Clinical duration < 6 weeks	Specific CSF/serum antibody index	77%(67-85)	
Lyme neuroborreliosis Clinical duration >6 weeks	Specific CSF/serum antibody index	>99%	<10
Long-lasting Lyme neuroborreliosis > 6 months	Specific CSF/serum antibody index	>99%	<1
Lyme carditis	Serum IgG and/or IgM	>80%	<1
Borrelial lymphocytoma	Serum IgG and/or IgM	>80%	<1
Lyme arthritis	Serum IgG	96%(93-100)	<1
Acrodermatitis chronica atrophicans ^a	Serum IgG	98%(84-100)	1
Ocular manifestations ^b	Serum IgG	?	Rare

^aIncluding ACA-associated peripheral neuropathy, ^bSpecialist care only, also consider other diagnoses.

^cSensitivities from the systematic review of European studies are indicated with 95% confidence intervals for erythema migrans and Lyme neuroborreliosis and with median and range for Lyme arthritis and acrodermatitis chronica atrophicans [65]. ^dIncidences are approximate magnitude and vary in different parts of Europe.

Quelle valeur diagnostique de la sérologie ?

Leeflang et al. *BMC Infectious Diseases* (2016) 16:140
DOI 10.1186/s12879-016-1468-4

BMC Infectious Diseases

RESEARCH ARTICLE

Open Access

The diagnostic accuracy of serological tests for Lyme borreliosis in Europe: a systematic review and meta-analysis



M. M. G. Leeflang^{12*}, C. W. Ang¹, J. Berkhout², H. A. Bijlmer³, W. Van Bortel⁴, A. H. Brandenburg⁵, N. D. Van Burgel⁶, A. P. Van Dam⁷, R. B. Dessau⁸, V. Fingerle⁹, J. W. R. Hovius¹⁰, B. Jaulhac¹¹, B. Meijer¹³, W. Van Pelt³, J. F. P. Schellekens¹³, R. Spijker¹⁴, F. F. Stelma¹⁵, G. Stanek¹⁶, F. Verduyn-Lunel¹⁷, H. Zeller⁴ and H. Sprong³

IgT

Estimate (95 % CI)

0.606 (0.503 to 0.700)

Table 4 Summary estimates of sensitivity

		IgG (IgT)	IgT
		Estimate (95 % CI)	Estimate (95 % CI)
Erythema migrans	S	0.293 (0.293 to 0.431)	0.606 (0.503 to 0.700)
	S	0.939 (0.939 to 0.975)	0.919 (0.885 to 0.944)
Neuroborreliosis	S	0.515 (0.515 to 0.659)	0.865 (0.812 to 0.906)
	S	0.935 (0.935 to 0.971)	0.913 (0.869 to 0.942)
Lyme arthritis	S	0.857 (0.857 to 0.977)	0.945 (0.842 to 0.982)
	S	0.942 (0.942 to 0.983)	0.921 (0.837 to 0.964)
Acrodermatitis Chronica Atrophicans	S	0.821 (0.821 to 0.999)	0.978 (0.874 to 0.996)
	S	0.952 (0.952 to 0.976)	0.932 (0.883 to 0.962)
Unspecified Lyme borreliosis*	S	0.448 (0.448 to 0.661)	0.792 (0.960 to 0.867)
	S	0.877 (0.877 to 0.998)	0.947 (0.725 to 0.992)
IgT refers to assays measuring IgM and IgG simultaneously; estimates for studies including cross-reacting controls are not possible for healthy controls; these are the		0.978 (0.874 to 0.996)	

0.932 (0.883 to 0.962)

0.792 (0.960 to 0.867)

0.947 (0.725 to 0.992)

Valeur des IgM ELISA



Contents lists available at SciVerse ScienceDirect

Diagnostic Microbiology and Infectious Disease

journal homepage: www.elsevier.com/locate/diagmicrobio



Evaluation of commercial screening tests and blot assays for the diagnosis of Lyme borreliosis[☆]

Laurent Busson ^{a,*}, Marijke Reynders ^b, Sigi Van den Wijngaert ^a, Hafid Dahma ^a, Marc Decolvenaer ^a, Liesbet Vasseur ^a, Olivier Vandenberg ^{a,c}

Table 3

Percentage of false-positive and equivocal results.

	Screening tests			
	DiaSorin liaison		Euroimmun anti-Borrelia	
	IgG	IgM	IgG	IgM
Equivocal	3/180	15/181	11/196	11/196
Equivocal (%)	1.66	8.28	5.61	5.61
False positive	13/180	50/181	4/196	14/196
False positive (%)	7.22	27.62	2.04	7.14

Table 2

Overall sensitivity, specificity, positive, and negative predictive value, and sp

	Screening tests			
	Diasorin liaison		Euroimmun anti-Borrelia	
	IgG	IgM	IgG	IgM
Overall sensitivity (%)	100	92.31	100	100
Overall specificity (%)	91.39	67.11	97.44	91.62
Specificity in control group (%)	95.83	85.11	100	97.96
Positive Predictive Value (%)	60.61	19.35	84	53.33
Negative Predictive Value (%)	100	98.03	100	100

Actualités diagnostiques

INFECTIOUS DISEASES, 2016
<http://dx.doi.org/10.3109/23744235.2016.1144931>

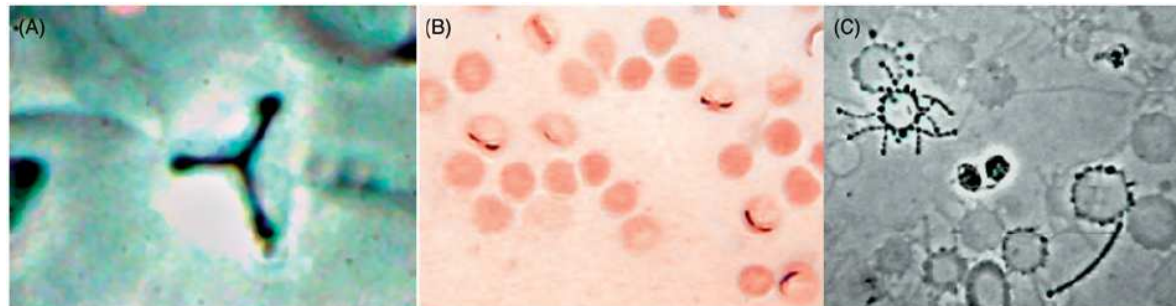


ORIGINAL ARTICLE

Validate or falsify: Lessons learned from a microscopy method claimed to be useful for detecting *Borrelia* and *Babesia* organisms in human blood

Audun Aase^a, Ondrej Hajdusek^b, Øivind Øines^c, Hanne Quarsten^d, Peter Wilhelmsson^e, Tove K. Herstad^a, Vivian Kjelland^{f,g}, Radek Sima^b, Marie Jalovecka^b, Per-Eric Lindgren^{e,h} and Ingeborg S. Aaberge^a

Groupe témoin : 88 % de positifs
Groupe infectés : 66 % de positifs



...et la recherche ?

- Recherches génomiques systématiques chez patients piqués par des tiques : piq tiq
- Protéomique ciblée : Diabolyc
 - Diagnostic précoce : idex, PHRC interrégional
 - Diagnostic tardif
 - Recherche de marqueurs protéiques d'infection active
- Vésicules lipidiques

Bioaster

Agence Nationale de la Recherche
ANR

Projet générique 2016-2019



Quoi de neuf...



...pour le traitement ?

Jusqu'où aller ?

Identification of novel activity against *Borrelia burgdorferi* persists using an FDA approved drug library

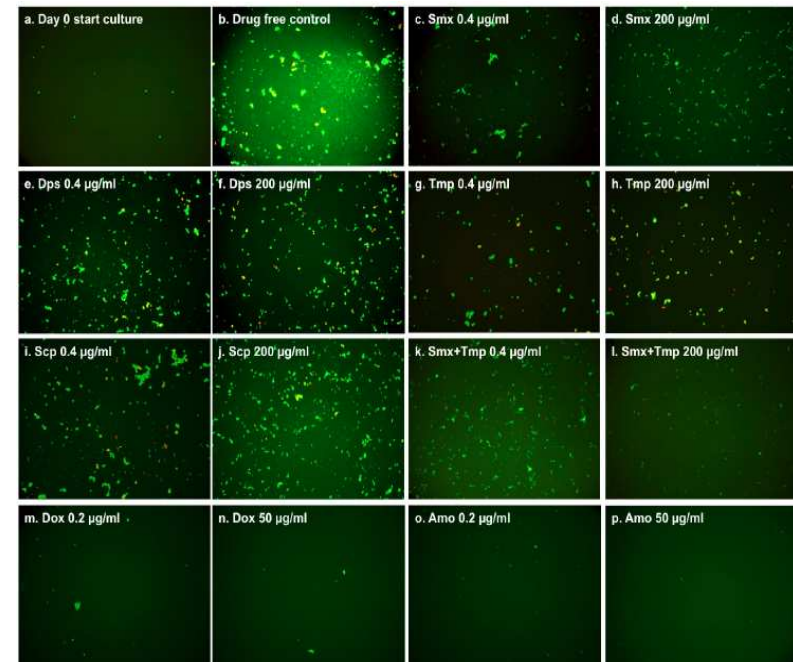
Jie Feng¹, Ting Wang¹, Wanliang Shi¹, Shuo Zhang¹, David Sullivan¹, Paul G Auwaerter² and Ying Zhang¹

- *Borrelia* en phase de croissance stationnaire vs formes métaboliquement actives

Table 2 Comparison of the MIC values and anti-persister activity of selected antibiotics against *B. burgdorferi*

Antibiotics	MIC ($\mu\text{g/mL}$)	C_{max} ($\mu\text{g/mL}$) ^a	Activity against persisters
Doxycycline	≤ 0.25	3.6–4.6	–
Amoxicillin	≤ 0.25	1.5–13.8	–
Metronidazole	25	12.5–19.4	–
Daptomycin	12.5–25	57.8–93.9	++++
Clofazimine	6.25	0.47–0.7	+++
Carbomycin	≤ 0.25	0.625	+++
Cefoperazone	≤ 0.25	111–375	+++
Cefotiam	≤ 0.25	30–170	++
Vancomycin	0.2–0.4	19–23	+
Tazobactam	12.5	14.8–33.8	–
Sulfamethoxazole	≤ 0.25	46.3	–

^a C_{max} values are derived from the literature.



The **NEW ENGLAND**
JOURNAL *of* **MEDICINE**

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Randomized Trial of Longer-Term Therapy for Symptoms
Attributed to Lyme Disease

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- Etude randomisée, double aveugle contre placebo
- Patients avec manifestations chroniques, en échec d'un traitement par ceftriaxone
- Traitement par doxycycline vs clarithromycine + hydroxy chloroquine vs placebo pendant 12 semaines

0.69

0.94

0.85

0.44

0.84

0.42

0.41

1.00

0.11

0.32

0.85

Placebo
Group
(N=98)

P Value†

Doxycycline Group
vs. Placebo GroupClarithromycin-
Hydroxychloroquine Group
vs. Placebo Group

Difference in score (95% CI)‡

4.8
to 36.00.1
to 41.76.0
to 37.51.0
to 42.33.9
to 35.89.4
to 40.97.5
to 38.95.1
to 46.42.6
to 44.87.5
to 39.51.9
to 43.48.4
to 92.48.3
to 40.2**P = 0,69**0.1
to 2.80.1
to 2.90.1
to 2.90.9
to 3.2-0.3
to 3.1-0.3
to 2.4-0.4
to 2.00.0
to 2.22.1
to 6.0-1.2
to 2.30.5
to 3.10.3
to 7.41.1
to 4.60.9
to 3.30.4
to 3.10.6
to 3.21.1
to 3.40.5
to 3.81.1
to 3.60.9
to 3.30.0
to 2.2-1.2
to 2.61.0
to 4.40.5
to 3.0-1.3
to 5.60.3
to 3.7**Table 2. Treatment Effect at the End of the Treatment Period in the Modified Inter**

Outcome	Doxycycline Group (N=86)	Clarithromycin-Hydroxychloroquine Group (N=86)	Placebo Group (N=98)	P Value†	Doxycycline Group vs. Placebo Group	Clarithromycin-Hydroxychloroquine Group vs. Placebo Group
Primary outcome: SF-36 physical-component summary§	35.0 (33.5 to 36.5)	33.0 (34.2 to 36.0)	4.8 to 36.0	0.69	0.1 to 2.8	0.9 to 3.3
Secondary outcomes						
RAND SF-36§						
Mental-component summary	40.2 (38.6 to 41.9)	40.0 (38.9 to 41.1)	0.1 to 41.7	0.94	0.1 to 2.9	0.4 to 3.1
Global-health composite	36.1 (34.5 to 37.8)	33.0 (35.1 to 36.0)	6.0 to 37.5	0.85	0.1 to 2.9	0.6 to 3.2
Physical-functioning scale	41.9 (40.5 to 43.3)	40.0 (40.8 to 41.1)	1.0 to 42.3	0.44	0.9 to 3.2	1.1 to 3.4
Role-physical scale	33.6 (31.6 to 35.6)	33.0 (32.5 to 33.5)	3.9 to 35.8	0.84	-0.3 to 3.1	0.5 to 3.8
Bodily pain scale	39.1 (37.5 to 40.7)	40.0 (39.0 to 41.0)	9.4 to 40.9	0.42	-0.3 to 2.4	1.1 to 3.6
General-health scale	37.1 (35.6 to 38.6)	33.0 (37.0 to 39.0)	7.5 to 38.9	0.41	-0.4 to 2.0	0.9 to 3.3
Mental-health scale	45.1 (43.8 to 46.4)	40.0 (43.9 to 46.1)	5.1 to 46.4	1.00	0.0 to 2.2	0.0 to 2.2
Role-emotional scale	44.7 (42.4 to 47.0)	40.0 (39.2 to 40.8)	2.6 to 44.8	0.11	2.1 to 6.0	-1.2 to 2.6
Social-functioning scale	36.3 (34.2 to 38.4)	33.0 (36.6 to 39.4)	7.5 to 39.5	0.32	-1.2 to 2.3	1.0 to 4.4
Vitality scale	42.5 (40.9 to 44.0)	40.0 (41.0 to 42.0)	1.9 to 43.4	0.85	0.5 to 3.1	0.5 to 3.0
Checklist Individual Strength¶						
Total score	88.7 (84.4 to 92.9)	83.0 (83.0 to 83.0)	8.4 to 92.4	0.84	0.3 to 7.4	-1.3 to 5.6
Fatigue-severity scale	39.4 (37.3 to 41.5)	33.0 (36.6 to 39.4)	8.3 to 40.2	0.73	1.1 to 4.6	0.3 to 3.7

Que disent les dernières recommandations ?

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Update of the Swiss guidelines on post-treatment Lyme disease syndrome

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« Finally, there is no evidence for specific treatment for PTLDS. »

Atteinte articulaire

Molécules	Posologie adulte	Posologie pédiatrique	Durée du traitement
Doxycycline¹	100 mg 2x/j	4 mg/kg/j en 2 prises (max. 100 mg/prise)	28 jours
Amoxicilline	500 mg 3x/j	50 mg/kg/j en 3 prises (max. 500 mg/prise)	28 jours
Ceftriaxone	2g 1x/j	100 mg/kg/j en 1prise (max.2g)	14 à 28 jours

Neuroborréliose aiguë

Molécules	Posologie adulte	Posologie pédiatrique	Durée du traitement
Doxycycline¹	100 mg 2x/j	4-8 mg/kg/j en 2 prises (max 100 mg/prise)	14 jours
Ceftriaxone	2g 1x/j	100 mg/kg/j en 1 prise (max.2 g)	14 jours

...et la recherche ?

- Ce qu'il manque
 - Les pathologies chroniques
 - quelles relations avec la borréliose de Lyme ?
 - Les traitements prolongés
 - Quelle efficacité : absence d'évaluation

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Table 3 Accuracy of CSF CXCL13 test to diagnose definite LNB in children using a 55 pg/ml cut-off

Sensitivity %	96.7 (90.7–99.3)
Specificity %	98.1 (89.9–100.0)
Positive LR	29.8 (9.8–90.6)
Negative LR	0.02 (0.0–0.14)
Diagnostic odds ratio	1525.3 (154.6–15047.4)

Definite LNB cases ($n = 53$) were compared to control non-LNB cases ($n = 96$)
LR likelihood ratio. 95% confidence interval is indicated in parentheses