

**Dutchess County Legislative Tick Task
Force**

2019 Tick Exhibit

**The Henry A. Wallace Center
at the
FDR Presidential Library & Home
4079 Albany Post Road
Hyde Park, New York 12538**

Wednesday, May 15th 2019

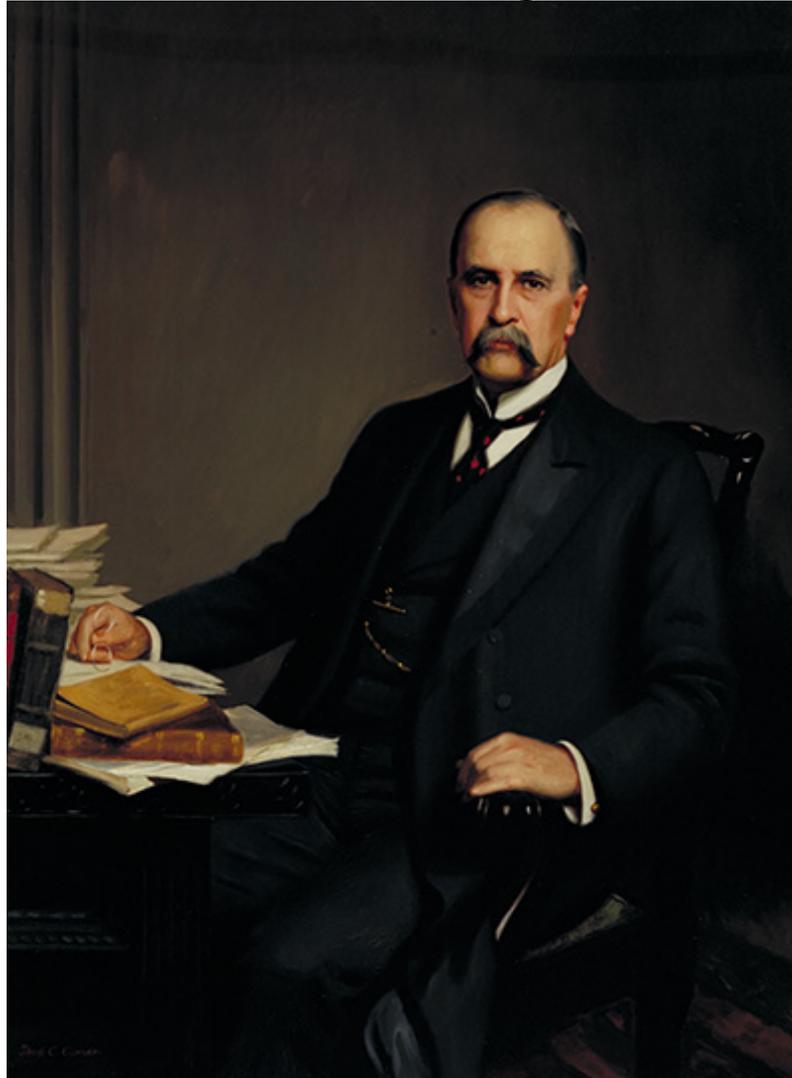
**The disease that does not
“exist”:
Chronic Lyme
disease**

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592 Route 22 – Suite 1B
Pawling, New York 12564
Ph: 845 493-0274
FAX: 845 493-0279**

Sir William Osler

b. 1849 Bond Head, Canada

d. 1919, Oxford, England



Aphorisms

He who studies medicine without books sails an uncharted sea but he who studies medicine without patients does not go to sea at all.

Listen to your patient. He will tell you his diagnosis.

Learn syphilis and all of medicine is added.

The greater the dogma, the greater the ignorance.

Lyme Disease: A Zoonosis

(a disease in Nature, transmissible to man)

- Complex ecology: maintaining the spirochete, *Borrelia burgdorferi*:
mouse/chipmunk/squirrel/bird/deer/tick 2 year cycle
- Amplifying tick populations: deer/bear
- Infection of tick when feeding on mice (and other small mammals)
- Geographic dispersal – role of birds/flyways
- Tick densities/risk to human health
- Humans/domesticated animals as incidental hosts.



Photo: Durland Fish



PHOTO: Durland Fish



Photo: Durland Fish



Photo:
Herb Charles
Ohlmeyer

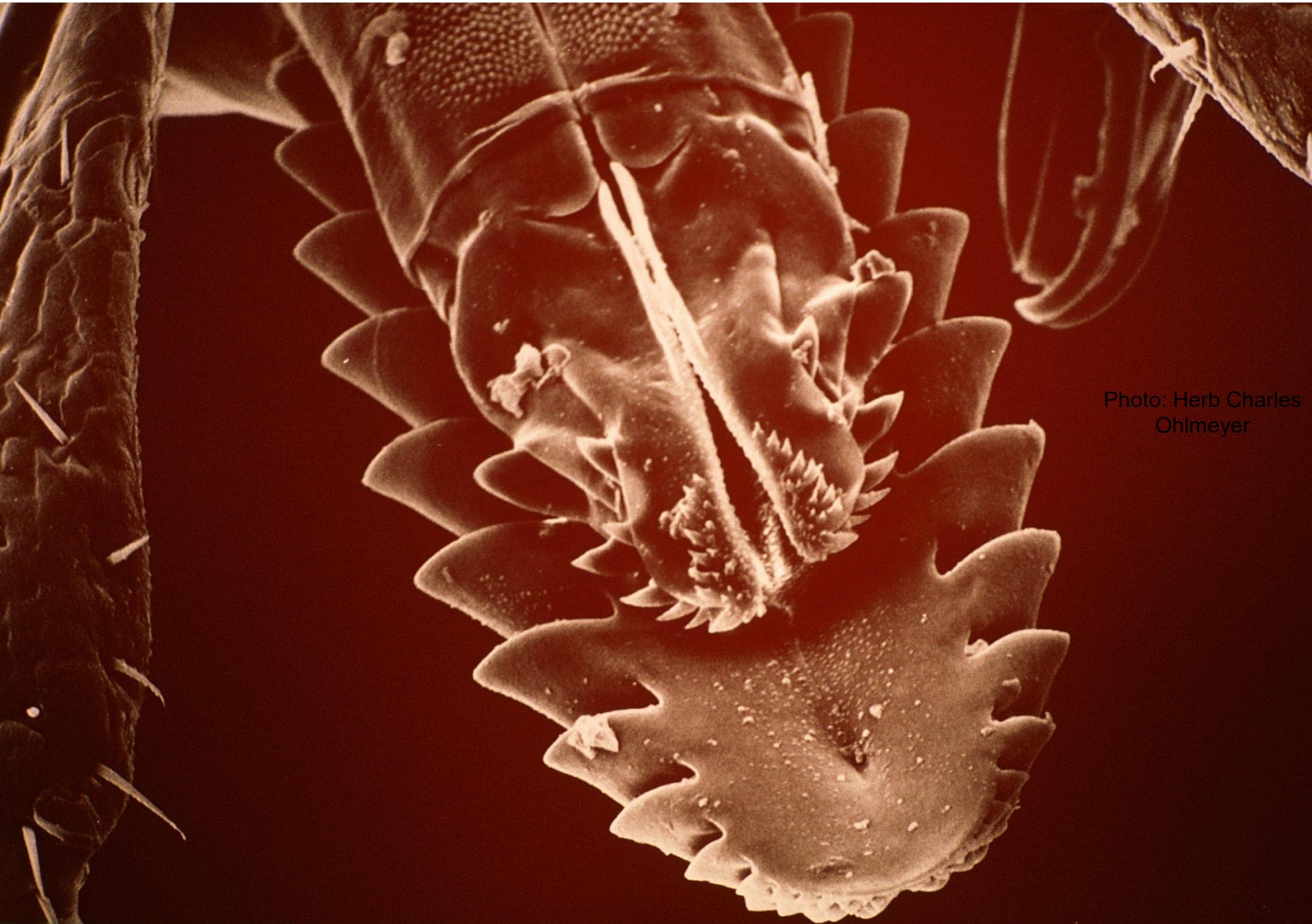


Photo: Herb Charles
Ohlmeyer



Photo: Herb Charles Ohlmeyer

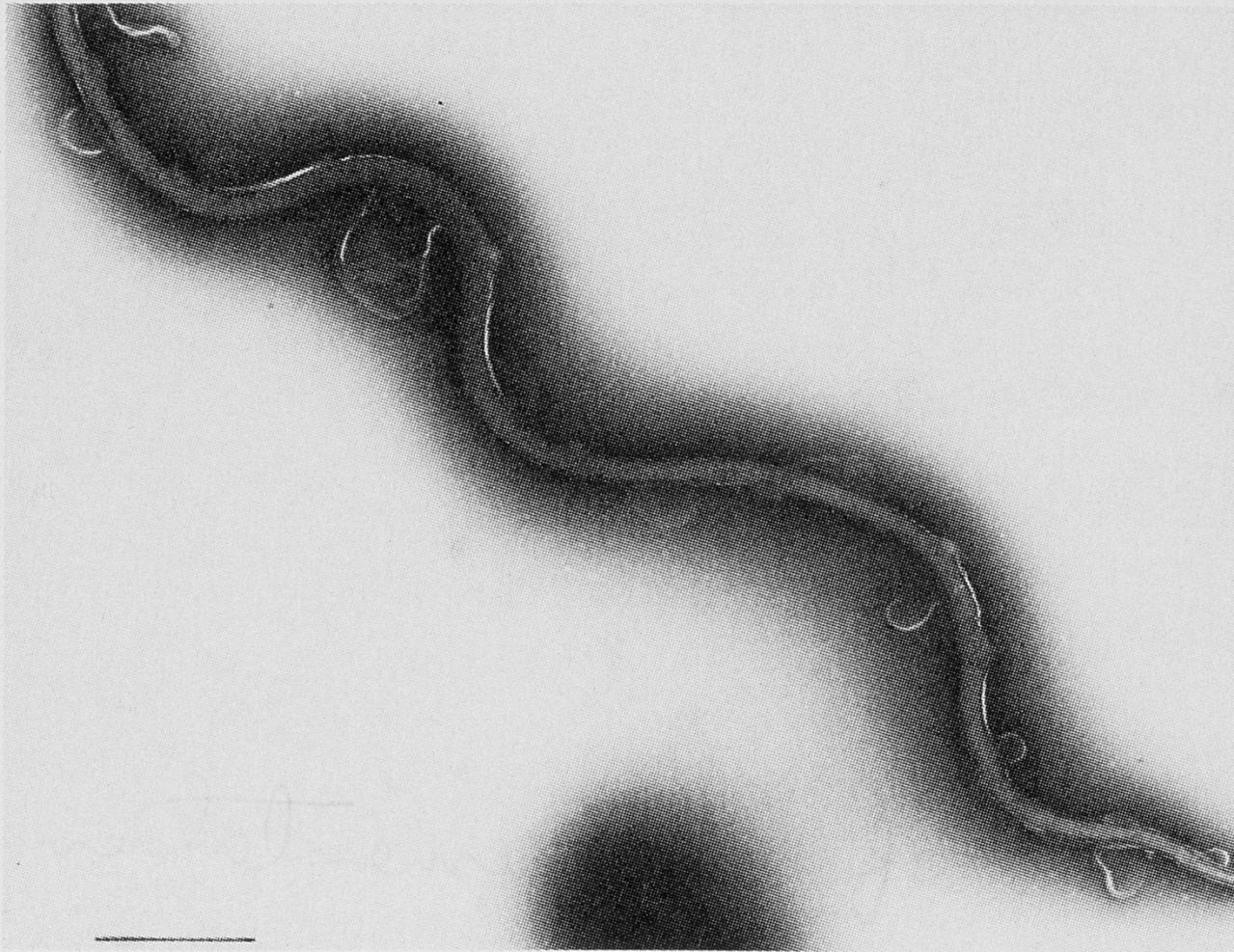


Figure 1. Electron photomicrograph of Borrelia burgdorferi cell negatively stained with 3% ammonium molybdate, pH 6.5. Numerous outer membrane blebs are shown along its length. Bar = 0.5 μm .

ease of the CNS (26). In depth evaluation of some patients previously thought to have multiple sclerosis has uncovered significant evidence of CNS and/or systemic borrelial in-

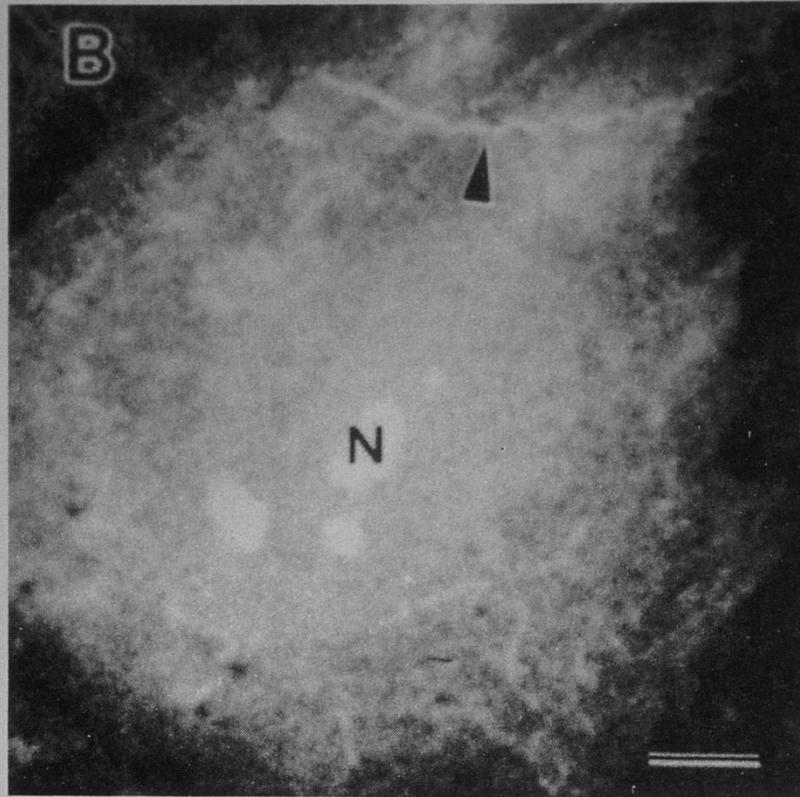
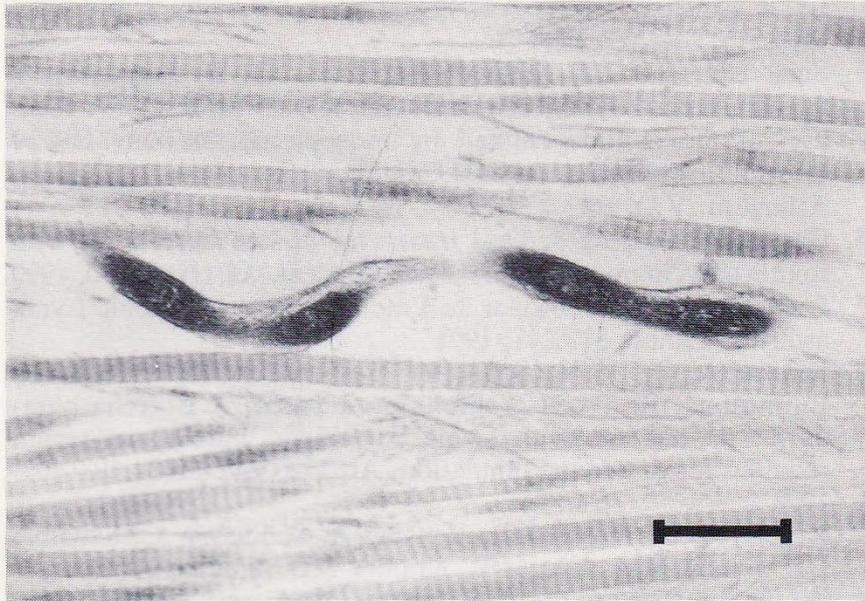
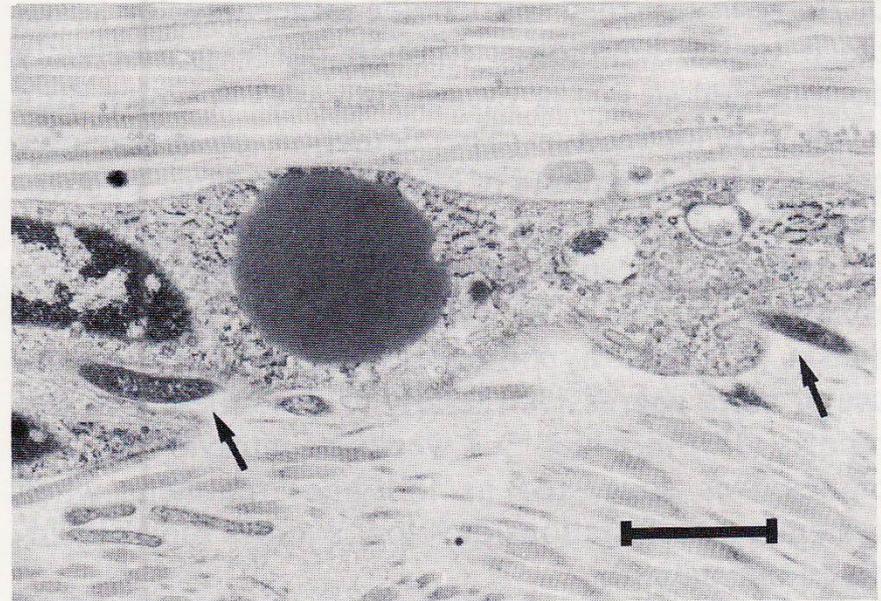


FIG. 2B. Representative confocal microscopic image of optically sectioned fibroblast cocultured with *B. burgdorferi* for 24 hours. Serial section 2.4 μ m below cell surface shows clear intact spirochete adjacent to perinuclear region of fibroblast. Typical periodicity of spiral shape of *B. burgdorferi* is apparent. Nucleus, nucleoli (N), and mitochondria are visible. (Reprinted with permission from *Journal of Infectious Diseases*.)

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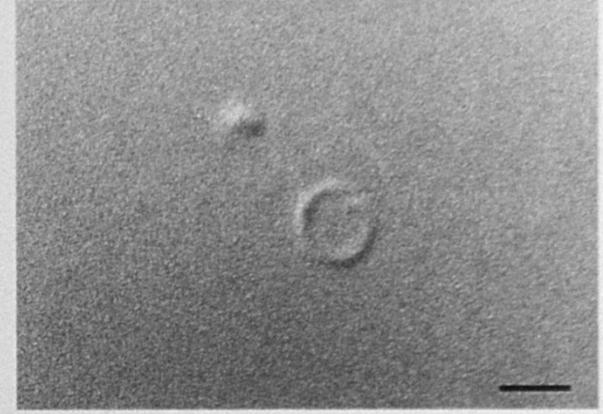
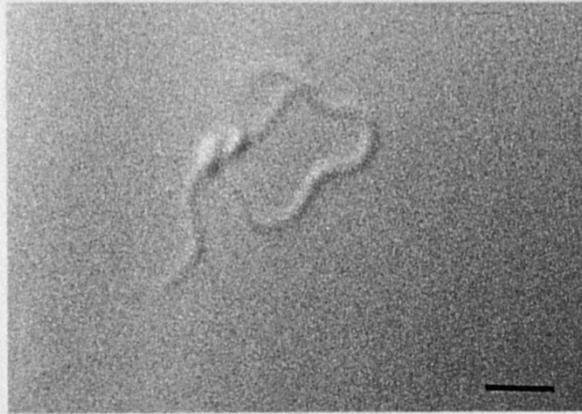


B

Figure 2. Electron micrographs of the cultured ligament section, showing **A**, a spirochete between unaltered collagen fibers, and **B**, invagination of a fibroblast by spirochetes (**arrows**). Bar = 10 μ m.

centration of protein (0.51 g/l); 10% of the spirochetes were converted after 1 h and after 4 h the rate of conversion was 20%. After 24 h no normal, mobile spirochetes were observed in either of the spinal fluids, but some spirochetal structures were protruding from the cysts in the most protein-rich spinal fluid (Figure 2). The spherical cysts tended to accumulate into aggregates of various sizes (Figures 3 and 4), and this tendency was clearest when transferred to BSK-H medium. Figures 5–7 show the development from a normal, mobile spirochete to a cystic form within an interval of 15 min. At first an excrescence developed on the spirochete, and soon the bacterium

was more frequent in the cysts from the spinal fluid with the highest concentration of protein (Figure 11). When cysts had been in BSK-H medium for 24 h, the TEM examination demonstrated the beginning of biological activity as formation of blebs from half-born spirochetes, which were not yet detached from the mother cyst, and the increase of the amount of electron-dense material inside the cysts (Figure 12). TEM examination after 4 weeks in BSK-H medium showed many normal, mobile spirochetes with trilaminar membrane, but some cysts were also present (Figure 13). Development of blebs was seen. The blebs contain both circular and linear DNA [20].



Figures 5, 6, 7: The development from a normal, mobile spirochete to a cystic form within an interval of 15 min is illustrated by interference contrast microscopy. At first an excrescence develops on the spirochete (Figures 5 and 6), and soon the bacterium whirls into its own membrane-encapsulated space, and a cyst is developed (Figure 7) (TEM-micrograph of corresponding cysts are shown in Figure 10). Original magnification 2,000x, Bar 2 μ m.

“Classic” (pathognomonic) Manifestations

- Erythema migrans
- Bell’s palsy
- Arthritis/synovitis
- Carditis
- Meningitis/encephalitis
- Desirably, occurring after a known tick bite in a “Lyme-endemic” area

Non-specific “Constitutional Symptoms”

- fatigue/malaise/flu-like symptoms/low grade fever/ +/- night sweats/headache/muscle & joint aching/neck pain/body aches
- Neuropsychiatric symptoms: mood disturbance/irritability/sleep disturbance (insomnia or it's opposite, hypersomnia)
- Sensory hyperacuties: photophobia/phonophobia/smell hypersensitivities

Wide & *expanding* range of multi-system manifestations

- Central nervous system including any cranial nerve
- Peripheral nervous system
- Autonomic nervous system
- Auditory & vestibular apparatus
- Ocular
- Musculoskeletal
- Genitourinary
- Cardiac
- Gastrointestinal & visceral
- Hormonal: Hypothalamo-pituitary-adrenal axis
- Skin – late manifestations
- Infectious-triggered immune/autoimmune disorders

Atypical Presentations

- No known rash
- No known tick attachment
- Occurring in a “non-Lyme endemic” region
- Seronegative or seroequivocal
- Non-fully diagnostic Lyme Western blot
- Uncommon or “one of a kind” manifestation
- Diagnostic uncertainty & a “state of limbo” can exist – anguishing for patient & physician alike
- Lyme disease has been called “the new great imitator” (Pachner)
[Syphilis being the original “great imitator”]

Controversy over Chronic Lyme Disease

- **Competing conceptualizations of the illness**
- **Does/can the Lyme organism persist after application of antibiotics?**
- **How reliable are standard tests in diagnosing Lyme disease at different stages of illness?**
- **Controversy thrives in absence of a highly reliable direct detection test that all can agree upon.**

Dogma:

Lyme disease is difficult to acquire, easy to diagnose,
readily cured with a short course of antibiotics.

If the patient has symptoms following treatment either:
initial diagnosis was wrong

or

patient now has

“Post-Treatment Lyme disease Syndrome” (PTLDS)
since there is no such thing as “chronic” Lyme disease

Catma:

Lyme disease can be difficult to diagnose

Tests are not always reliable

When we treat we can not be assured that the infectious agent is invariably eradicated with bacteriologic cure

Some individuals relapse following recommended treatment regimens

The agent of Lyme disease is highly complex and has many strategems to evade destruction by antimicrobial agents and the immune system.

Some cases of Lyme disease can be extraordinarily difficult to diagnose and treat.

500 years for medical science to have a good understanding of syphilis.

We are but 40 years 'in' to
Lyme disease.

(Be humble before this disease)

**Confounding Issue:
Role of Tick-transmissible
co-infections**

**[non-specific symptoms for these infections can
overlap with non-specific symptoms of Lyme disease!!!!]**

Babesia microti, B. duncani & ? other piroplasms????

Human granulocytic ehrlichiosis (Anaplasma phagocytophilum)

Human monocytic ehrlichiosis (Ehrlichia chaffeensis)

Bartonella henselae?

Mycoplasmas (e.g. fermentens??)

? Q-fever?

Rocky Mountain Spotted fever

Deer tick virus (Powassan-like)

Bourbon virus

Heartland virus

In Europe & Asia: TBE (tick-borne encephalitis virus)

Francisella tularensis (tularemia)

Relapsing Fever borreliae: *Borrelia hermsii* &

Borrelia miyamotoi

Other as yet unrecognized bacterial, viral or parasitic pathogens??????????

A Social Woika'

Recurrent erythema migrans despite extended antibiotic treatment with minocycline in a patient with persisting *Borrelia burgdorferi* infection

Kenneth B. Liegner, MD,^{a*} Judith R. Shapiro, MD,^{b*} David Ramsay, MD,^c
Alan J. Halperin, MD,^d Wayne Hogrefe, PhD,^c and Lilly Kong, DVM^e
Mount Kisco, New York City, and Bronx, New York, and Cypress, California

Erythema migrans recurred in a patient 6 months after a course of treatment with minocycline for Lyme disease. Polymerase chain reaction on heparinized peripheral blood at that time demonstrated the presence of *Borrelia burgdorferi*-specific DNA. The patient was seronegative by Lyme enzyme-linked immunosorbent assay but showed suspicious bands on Western blot. Findings of a Warthin-Starry stain of a skin biopsy specimen of the eruption revealed a *Borrelia*-compatible structure. Reinfection was not believed to have occurred. Further treatment with minocycline led to resolution of the erythema migrans. (J AM ACAD DERMATOL 1993;28:312-4.)

Controversy exists about whether ongoing signs and symptoms in patients previously treated for Lyme disease are caused by persisting infection, immunologic sequelae in the absence of infection, or a combination of the two.¹ We report a case that we believe emphasizes the stubborn and persisting nature of *Borrelia burgdorferi* infection.

CASE REPORT

A 68-year-old woman developed typical erythema migrans (EM) on her right anterior thigh; the lesion eventually attained a diameter of 10 cm. The patient had no

history of a tick bite, but she had gone hiking in Harri-man State Park in Rockland County, New York, 3 weeks earlier. She developed arthralgias of the fingers of both hands and of the left knee, ankles, and tibias, and she also had myalgia of the left thigh. Headache and fever were absent. Before the development of the lesion on the thigh, a dime-sized eruption had been noted on her right forearm. This eruption lasted approximately 3 weeks. Its intensely red and indurated center eventually sloughed.

The patient was treated for Lyme disease with tetracycline for 10 days. Results of Lyme serologies were negative. Her joint symptoms resolved and the eruption faded, leaving a faint, red-purple ring. Physical examination 4 months later revealed the skin lesion, tenderness of the left first metacarpalphalangeal joint, and discomfort with internal and external rotation of the left hip. Results of Lyme serology, antinuclear antibody, rheumatoid factor, and syphilis serology were negative.

The patient was treated with minocycline, 100 mg, twice daily, for 3 months. The eruption faded. Fleeting polyarthralgias continued after completion of treatment but gradually subsided.

Two months later she began to experience migratory

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*In private practice.

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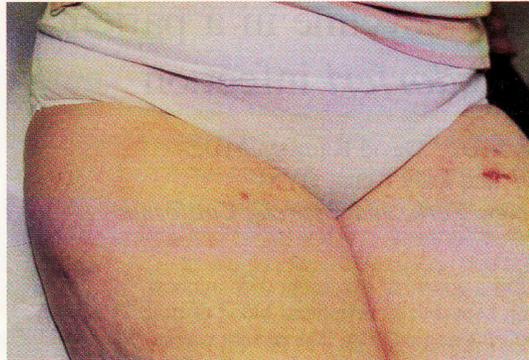


Fig. 1. EM lesions as they appeared November 1989, 17 months after onset of illness. Lesion on right thigh is remnant of original EM. Lesion on left thigh, which was biopsied, appeared in July 1989.



Fig. 2. Skin biopsy specimen shows a moderately dense perivascular infiltrate of lymphocytes cuffing vessels in papillary and upper reticular dermis. (Hematoxylin-eosin stain.)

“pin jab”-like sensations in her right leg, right sole, left palm, and right great toe. These sensations resolved in 1 month. A repeat Lyme serology was negative.

Three months later a new annular erythematous eruption suggestive of EM developed on her left anterior thigh. In addition, the original lesion on the right thigh, which had never entirely disappeared, became more erythematous (Fig. 1), and arthralgia of the left thumb recurred. She had no opportunity for reexposure to deer ticks.

A specimen of heparinized whole blood tested by the polymerase chain reaction (PCR) technique for *B. burgdorferi*-specific DNA by the method of Rosa and Schwan was positive.² T-cell blastogenic response to *B. burgdorferi* was negative. A repeat specimen for PCR analysis was again positive. A skin biopsy specimen from the left thigh revealed a slightly thinned epidermis. Within the papillary and upper reticular dermis there was a moderately dense, perivascular infiltrate of lymphocytes that cuffed vessels. Occasional plasmacytoid lymphocytes were found. Mild edema was noted within the papillary dermis, and lymphocytes in small numbers were scattered between collagen bundles, occasional mast cells, and one small focus of exocytosis of lymphocytes (Fig. 2). A single *Borrelia*-compatible structure was identified within



Fig. 3. Skin biopsy specimen. *Borrelia*-compatible form. (Warthin-Starry stain.) (Courtesy Alan MacDonald, MD.)

A Pediatric ICU Nurse

Vicki Logan

Diagnostic Reference Section, Bacterial Diseases Branch
 Division of Vector-Borne Infectious Diseases
 National Center for Infectious Diseases, Centers for Disease Control and Prevention (CDC)

HYVH

REPORT OF SEROLOGIC TESTS AND/OR CULTURE RESULTS

Specimen Data					Serologic Results		
Specimen Number	Patient Name	Collection Date	Type Spec. #	Cult. (12)	Borrelia burgdorferi IgM/IgG ELISA (13)	Western Blot Borrelia burgdorferi (14)	Borrelia burgdorferi IgM/IgG (15)
	LEONAR VIDUY	10/20/91	B	P			

“Identity of B. burgdorferi isolate confirmed by PCR on 2/18/92 R. Campbell”

Identity of B. burgdorferi isolate confirmed by PCR on 2/18/92. R. Campbell

* Type Spec. # 1) acute - original specimen 2) Convalescent 3) late stage 4) follow-up specimen
 12) General spinal fluid 13) synovial fluid 14) Culture 15) Tissue 16) Dried sera

Methods/References:

1. Borrelia burgdorferi IgM/IgG ELISA (Lyme disease): Cut-offs are calculated for each ELISA plate. Therefore 20 (optical density) values are not given. An OD 4x mean of neg. controls + 3 SD is considered POSITIVE (P), while an OD 4x mean of pos. controls + 1 SD is NEGATIVE (N). Values between these two cut-offs are considered SUSPICIOUS (S) and the sample is tested by Western Blot. A positive Western blot is interpreted as a POSITIVE (P) test. Cross reactions may occur to ELISA with a variety of infections including syphilis. Syphilis can be ruled-out by RPR or VDRL testing.
2. Western blot (WB) interpretation: Western blot strip is performed on sera considered POSITIVE to ELISA. WB results change equivocal status of the specimen to either POSITIVE or NEGATIVE for Lyme disease. See Crossler et al, J. INFECT. DIS. 167: 303-306, 1993.
3. Borrelia burgdorferi (tick borne relapsing fever). WB = whole cell extracts. This is an experimental test undergoing clinical validation. Results should be interpreted accordingly.
4. Culture: P = POSITIVE, N = NEGATIVE, S = UNDETERMINED

Agency:

DR DON LINDSEY
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 ARMONK NY 10504

CDC Accession # 92-111202
 Date Recd: 12/16/91
 Date Rep'd: 1/14/92

By: *M.C.A.*
 Chief, Diagnostic Reference

Through: Chief, Serology Section *Clamp*

Chief, Bacterial Diseases Branch
 Division of Vector-Borne Infectious Diseases
 CDC, CDC
 P.O. Box 2087
 Fort Collins, CO 80522-2087

V International Conference
on Lyme Borreliosis

PROGRAM AND ABSTRACTS



Arlington, Virginia, U.S.A.
May 30-June 2, 1992
Hyatt Regency Crystal City

CULTURE-CONFIRMED TREATMENT FAILURE OF CEFOTAXIME AND MINOCYCLINE IN A CASE OF LYME MENINGOENCEPHALOMYELITIS IN THE UNITED STATES.

Kenneth B. Liegner, Carl E. Rosenkilde, Grant L. Campbell*, Thomas J. Quan, and David T. Dennis, Armonk, NY, USA, Mount Kisco, NY, USA, and Centers for Disease Control, Fort Collins, CO, USA.

of bowel and bladder control. CSF contained 19 WBC/mm³ (80% lymphs). A test for antibodies to *Borrelia burgdorferi* (*Bb*) in serum was negative. No etiology was established despite an extensive workup. Symptoms and signs reportedly worsened gradually from 1988 to present. There was a past history of splenectomy for idiopathic thrombocytopenic purpura diagnosed in 1975. In 1989, the right frontal region and right basal ganglia were abnormal on brain MRI. In January 1990, CSF contained 6 WBC/mm³ (93% lymphs), but no oligoclonal bands or myelin basic protein. Paired CSF and serum tests for antibodies to *Bb*, and PCR for *Bb*-specific oligonucleotides in CSF, were negative. An empiric 21-day course of cefotaxime (3 g/12 hr i.v.) was given in January, 1990 with no clear clinical benefit. Following treatment, CSF

Culture of this CSF specimen in BSK-II yielded a strain of *Bb*. Culture-confirmed treatment failures have been previously reported for three Lyme neuroborreliosis cases in Europe. The present case apparently is the first of this type to be reported from the United States.

Lyme Disease: Does It Really Linger?

Those who claim
long-term ailments
pose a puzzle.

By ELISABETH ROSENTHAL

FROM her bed at Northern Westchester Hospital Center, Vicki Logan begs to differ with academic scientists who claim that there is no such thing as chronic Lyme infection and that Lyme is cured with at most four weeks of antibiotics.

Since 1987, Ms. Logan has battled headaches, fevers, fatigue, progressive paralysis, seizures, periods of dementia and memory loss so severe that she remembers only the previous three weeks out of the last year. For much of her illness doctors told her she could not possibly have Lyme disease and prescribed no antibiotics.

Two years ago Dr. Kenneth Liegner, a Westchester internist, decided to buck conventional wisdom and try giving her prolonged courses of antibiotics that could kill the Lyme spirochete: She improved somewhat during each course of the drugs, and relapsed when they were stopped. Dr. Liegner became convinced that Ms. Logan had chronic active Lyme infection that could be controlled but not cured through daily drug treatment.

Others, including consultants at the Mayo Clinic, disputed the diagnosis, saying that after months of antibiotics, Ms. Logan — if she ever had Lyme — had certainly been cured. But recently, Dr. Liegner was vindicated: scientists at the Centers for Disease Control and Prevention in Atlanta found the Lyme spirochete, *Borrelia burgdorferi*, swimming in a sample of Ms. Logan's spinal fluid.

"My life prior to the last three weeks is a blank," Ms. Logan said in a halting voice. "I've lost everything and I'll be going to a nursing home when I get out of the hospital. If you think you have Lyme disease, you have to pursue the diagnosis."

A handful of cases like Ms. Logan's are challenging conventional assumptions about Lyme disease and igniting a fiery debate about the usual course of this increasingly common infection: Are disastrous experiences with Lyme like hers the rare exception or the rule?

Most people who are treated shortly after a tick bite tend to recover uneventfully, but a small number go on to develop chronic symptoms which they attribute to Lyme infection despite extensive antibiotic treatment. These patients, who sometimes receive months of home intravenous treatments and experience serious disability, account for the lion's share of the health care dollars spent on the illness. They fill the growing number of Lyme support groups.

And yet doctors are unsure which, if any, of them actually has active Lyme. Many of the country's leading Lyme experts believe that the number is microscopic. "I think persistent infection occurs but it is very, very rare," said Dr. John J. Halperin, professor of neurology at North Shore University Hospital on Long Island. "There are a lot of people being labeled chronic Lyme with very little evidence of it. They don't have Lyme and so they won't respond to a zillion months of antibiotics." Some of the patients' complaints — generally fatigue, joint aches and cognitive problems — may be due to permanent tissue damage from Lyme sustained before antibiotic treatment, Dr. Halperin said, or to some poorly defined

Continued on Page C8

Experts Debate Whether Lyme Can Linger

Continued From Page C1

immune reaction set off by prior infection. He and many other doctors say they believe that the majority never had Lyme at all.

On the other side are Dr. Liegner and other doctors who say their practices are filled with Lyme patients who do not get better. They say academic experts are so blinded by what they "know" that they cannot see the evidence piling up in front of their eyes.

"I think that Lyme is an incurable disease in many patients — there's no question in my mind about that — and I think that's being suppressed and denied," Dr. Liegner said. "Cases like Vicki Logan's are not exceptions; they reveal the problems with our current paradigm."

The resolution of this scientific question has tremendous implications for patients and has spilled over into economics and politics as well.

Although some doctors prescribe long-term, high-dose intravenous antibiotics, most do not. And many insurers refuse to pay for these long courses, which cost over \$100,000 annually, citing scientists who do not believe that extended therapy is necessary. Politicians at both the state and Federal levels, including the Labor and Human Resources Committee, are holding hearings in part to address patients' complaints that the practice is unfair.

"I think the jury is still out on what chronic Lyme disease is and is not and that has resulted in quite a controversy," said Dr. David Dennis, head of the Lyme disease effort at the C.D.C.

Carl Brenner, a marine geologist who has been unable to work for two years due to the neurologic effects of Lyme, said: "A lot of people aren't getting better. I'm not sure if that's because of persistent infection or not — I happen to think it often is — but I think it's disingenuous for experts to say, you're done, you're cured. Sure, the evidence for persistent infection is anecdotal, but if 100 people tell you that your fly is open, you look down."

New Diagnostic Tests

The debate will probably eventually be resolved by a number of exquisitely sensitive new tests currently under development to detect the normally hard-to-find spirochete by recognizing its DNA or the proteins on its surface. In studies these probes have discerned traces of the organism in some people who have suffered chronic symptoms but who were told they did not have Lyme or that they had been successfully treated.

While patients' groups are quick to use such results as evidence that chronic Lyme might well be common, the doctors who developed them are a good deal more cautious. They say that the new tests, which are still experimental, are in some cases prone to contamination and in any



Joyce Dopke/The New York Times

Dr. Kenneth Liegner examining Vicki Logan, who has Lyme disease, at the Northern Westchester Hospital Center in Mount Kisco.

ogy and immunology at Tufts-New England Medical Center in Boston, one-third of patients complained of symptoms after treatment.

Scientists have been unsure what to make of these complaints. Dr. Steere, who identified Lyme disease 15 years ago, does not believe they result from longstanding or relapsing infections. But some prominent researchers have come to believe that at least a few patients with lingering symptoms indeed still harbor the bacterium.

"The issue of post-infectious syndrome is very difficult and I suspect it is a mixed bag," said Dr. Coyle. "Some are due to an immune or inflammatory reactions. But I do think that some are due to persistent infection. I certainly think that relapsing Lyme can happen."

Clues to Prolonged Infection

The Lyme organism is extremely difficult to culture, particularly when the disease is advanced, so doctors

that chronic Lyme may be difficult to detect and treat because it is caused by a very few free floating organisms that are confined to the joint spaces and central nervous system — sites that many antibiotics do not reach. Recent work in Dr. Klemper's lab has shown that the spirochete may well spend at least part of its life cycle inside cells, where they are similarly protected.

Concerns About Profiteering

Unfortunately, scientific advances have not clarified whether the small number of well-documented cases of chronic Lyme represent anomalies or the tip of a huge iceberg.

Dr. Dennis said: "Is there evidence of persisting infection despite antibiotics? Yes, there are a few case reports. But when you look into it, some didn't have adequate treatment, and there are things about some of these people that make you think they don't have a normal host immune reaction. And like anything in medicine, there are a few outliers."

But Carol Stolow, who runs the Lyme Disease Network of New Jersey, says her hotline is "ringing off the hook" with calls from desperate people with chronic Lyme who are battling insurers and having trouble finding doctors who will prescribe antibiotics. "Until you completely understand this spirochete, don't tell me you know it can be cured in four weeks," said Mrs. Stolow, who has three children who have been treated for chronic Lyme.

There are similarly loud disagreements about how often people who test negative on the standard Lyme antibody tests can nonetheless have Lyme disease. It was because Ms. Logan initially tested negative on this test that she went untreated for years. The newer lab methods have proved that this is possible, but no one is sure how common it is.

Dr. Halperin, whose own lab has uncovered a few such cases using a genetic technique, takes issue with the spin that Lyme activists put on his results. "We all feel that this is very rare, but getting the statistic is like trying to estimate the number of angels on the head of the pin," he said.

He and others worry that while a few people may have chronic Lyme disease, thousands more are being treated for the condition with high — sometimes dangerously high — doses of antibiotics.

"I'm concerned that there are people who are marketing very long courses of antibiotics to treat Lyme without a good prospective study, and I am very concerned about profiteering," said Dr. Klemper.

Hoffmann-Roche Inc., the maker of ceftriaxone, an intravenous drug marketed as Rocephin that is commonly used to treat advanced Lyme, has underwritten teaching videos about Lyme disease featuring doctors who believe in extended treatment. Many of the patient support

Until we have a better diagnostic test that actually finds or measures multiplying bacterium, we're going to have problems knowing which if any of these patients have an ongoing infection and who might benefit from treatment."

Labs working on the new DNA and antigen tests to detect the parasite itself have been deluged with fluid samples from patients with late-stage symptoms but no clear lab results. In some of these cases the tests have come up positive.

Scientists are just beginning to un-

'If you think you have Lyme disease, you have to pursue the diagnosis.'

GUEST COMMENTARY

Lyme Disease: the Sensible Pursuit of Answers

KENNETH B. LIEGNER

*Lyme Borreliosis and Related Disorders, Internal and Critical Care Medicine,
8 Barnard Road, Armonk, New York 10504*

Disease is very old and nothing about it has changed. It is we who change as we learn to recognize what was formerly imperceptible.

—John Martin Charcot, *De l'Expectation en Médecine*

In 1989, Preac-Mursic et al. published a landmark article (30) documenting recovery by culture of living *Borrelia burgdorferi* from patients who had been previously treated with regimens believed to cure the disease. Included was one

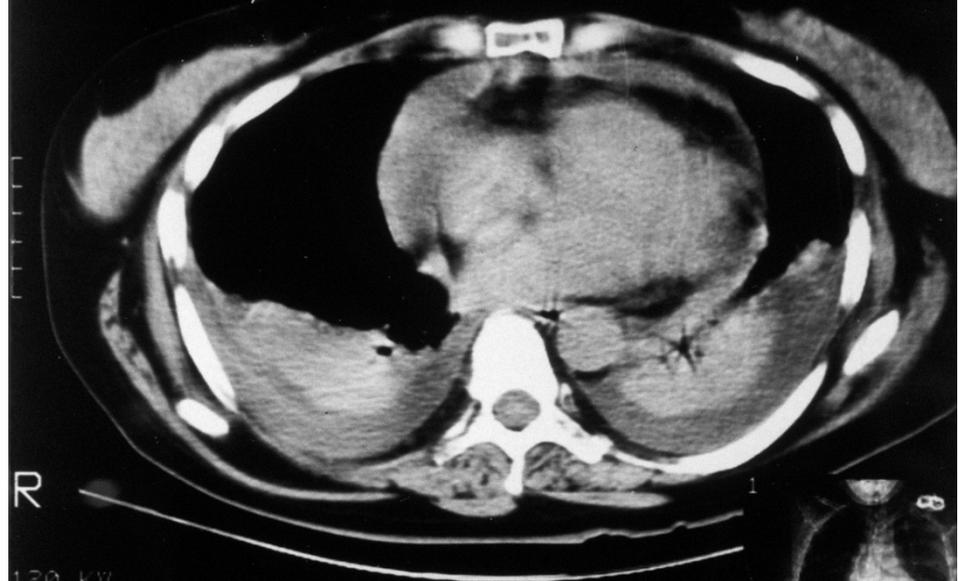
tain subsets of patients with Lyme disease may require prolonged antibiotic treatment and that presently available chemotherapeutic modalities may be suppressing but not eradicating the infection. Thus, individuals who have demonstrated relapses following aggressive treatment may require an open-ended antibiotic approach provided that they are deriving clinical benefit and not experiencing any adverse effects and that they wish to be treated (24). Oral antibiotics often suffice to keep patients well, and these are

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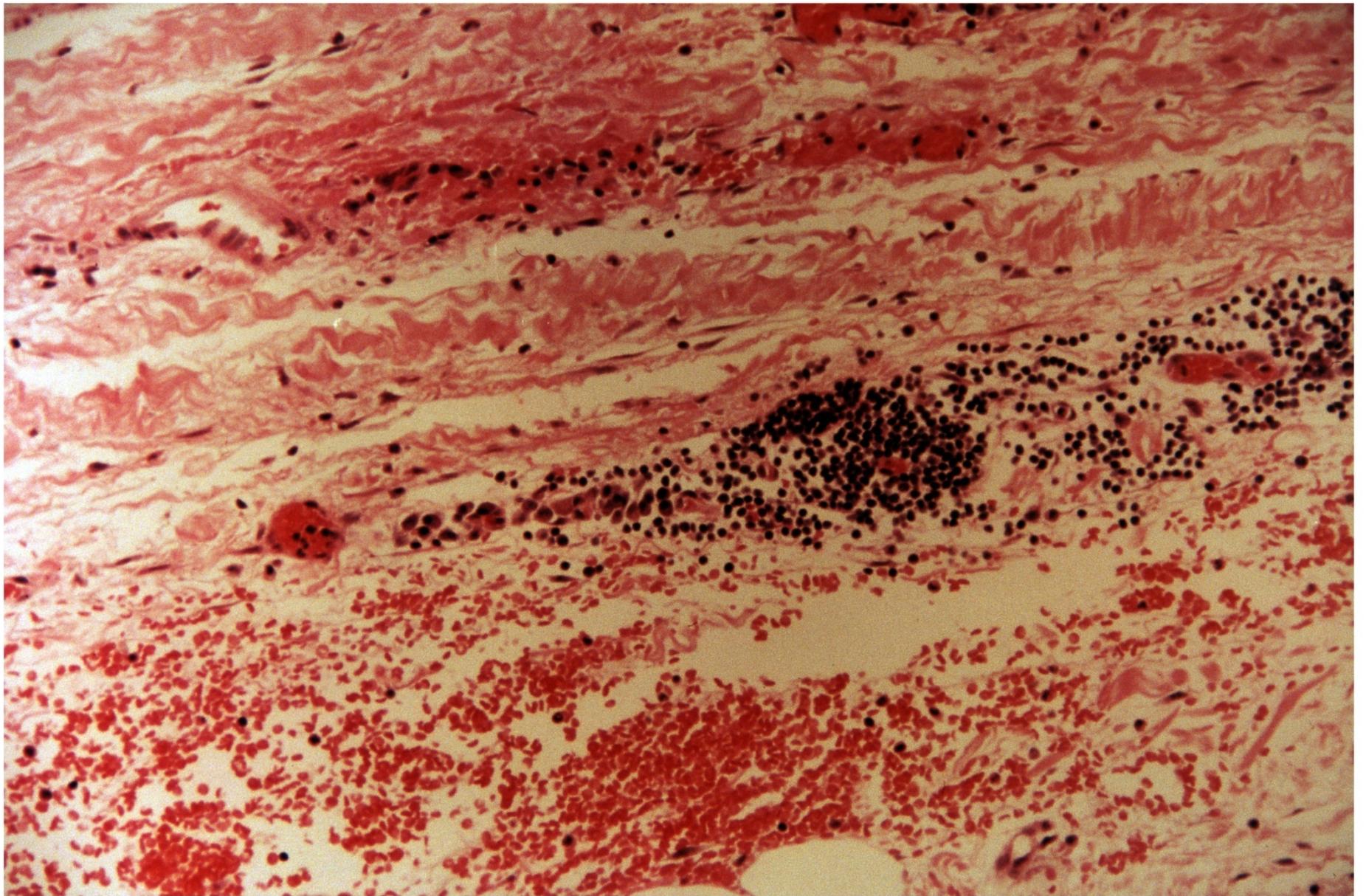




Fig 5, Case 1: Touch preparation of pericardium, showing spirochete-compatible structure [original magnification 1000x].

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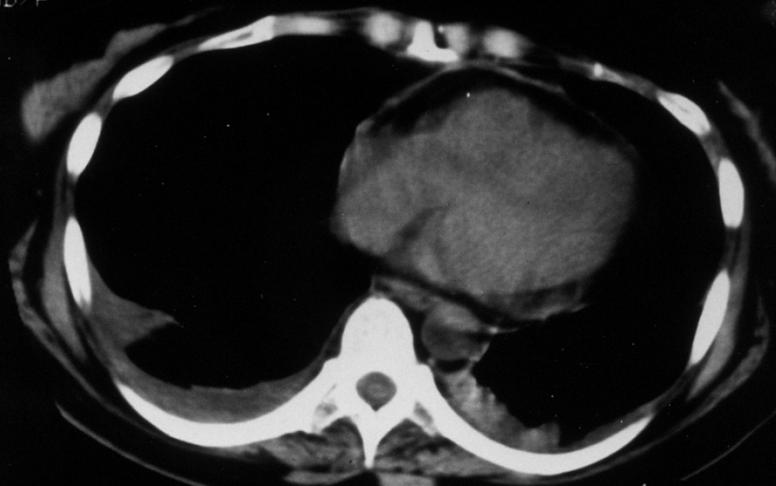
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MAGNIF

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1

2



R

20 KV
40 MA
RG SFOV
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0 0 TILT
0 SEC 15 20 24
L= +14 W= 350



L= -114 W= 400



Lyme Disease and the Clinical Spectrum of Antibiotic Responsive Chronic Meningoencephalomyelitides

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ABSTRACT

Intensive study of four patients with chronic meningoencephalomyelitis believed due to Lyme disease revealed seronegativity and/or variable seroreactivity and chronic persistent infection as common threads. Evaluation of these complex cases required determined study over time using all known methods (i.e., culture isolation, histologic, immuno-

histochemical, electron micrographic, direct antigen detection as well as standard serologic methods) on tissues as well as serial study of blood, cerebrospinal fluid (CSF) and urine. Prolonged intravenous antibiotic therapy conferred clinical benefit in each case and withholding of treatment resulted in clinical deterioration.

Key words: Lyme disease, meningoencephalomyelitis, persisting infection, seronegativity, *B. burgdorferi*, syphilis, multiple sclerosis, systemic lupus erythematosus

Positive Developments

- **NYS legislation protecting exercise of independent judgment in the treatment of Lyme disease**
- **Research groups for improved methods of both diagnosis, treatment and prevention**
- **Federal HHS Tick-borne Diseases Working Group**
- **NYS Tick-borne Diseases Working Group**
- **Dutchess County Legislative Tick Task Force!!!**

What is needed?

- Much greater commitment to funding to solve the problems posed by tick-borne illness on State and Federal levels
- Education of health care practitioners regarding the complexity of tick-borne illnesses
- REFORM surrounding Standard of Care for Persons with Tick-borne Illnesses
- Further improvements in diagnostics, therapeutics and prevention
- Spirit of collaboration & cooperation between all involved in the endeavor to solve these problems: patients, front-line clinicians, academicians, research scientists, government at all levels.

**We will have better
methods of:
diagnosis
treatment
&
prevention!!!!**

Ignorance is the Enemy