T-Helper 17 Cell Cytokine Responses in Lyme Disease Correlate With *Borrelia burgdorferi* Antibodies During Early Infection and With Autoantibodies Late in the Illness in Patients With Antibiotic-Refractory Lyme Arthritis

Klemen Strle, Katherine B. Sulka, Annalisa Pianta, Jameson T. Crowley, Sheila L. Arvikar, Anthony Anselmo, Ruslan Sadreyev, Allen C. Steere

Clinical Infectious Diseases, Volume 64, Issue 7, 1 April 2017, Pages 930–938,
https://doi.org/10.1093/cid/cix002
Published: 11 January 2017 **Article history** ▾

Abstract

Background.

Control of Lyme disease is attributed predominantly to innate and adaptive T-helper 1 cell (T_H1) immune responses, whereas the role of T-helper 17 cell (T_H17) responses is less clear. Here we characterized these inflammatory responses in patients with erythema migrans (EM) or Lyme arthritis (LA) to elucidate their role early and late in the infection.

Methods.

Levels of 21 cytokines and chemokines, representative of innate, T_H1, and T_H17 immune responses, were assessed by Luminex in acute and convalescent sera from 91 EM patients, in serum and synovial fluid from 141 LA patients, and in serum from 57 healthy subjects. Antibodies to *Borrelia burgdorferi* or autoantigens were measured by enzyme-linked immunosorbent assay.

Results.

Compared with healthy subjects, EM patients had significantly higher levels of innate, T_H1, and T_H17-associated mediators ($P \leq .05$) in serum. In these patients, the levels of inflammatory mediators, particularly T_H17-associated cytokines, correlated directly with *B. burgdorferi* immunoglobulin G antibodies ($P \leq .02$), suggesting a beneficial role for these responses in control of early infection. Late in the disease, in patients with LA, innate and T_H1-associated mediators were often >10-fold higher in synovial fluid than serum. In contrast, the levels of T_H17-associated mediators were more variable, but correlated strongly with autoantibodies to endothelial cell growth factor, matrix metalloproteinase 10, and apolipoprotein B-100 in joints of patients with antibiotic-refractory LA, implying a shift in T_H17 responses toward an autoimmune phenotype.

Conclusions.

Patients with Lyme disease often develop pronounced T_H17 immune responses that may help control early infection. However, late in the disease, excessive T_H17 responses may be disadvantageous by contributing to autoimmune responses associated with antibiotic-refractory LA.

Keywords: Lyme disease, erythema migrans, Lyme arthritis, T_H17, antibodies

Issue Section: Major Article

Oxford Academic account

Email address / Username

Password

Sign In

Forgot password?

Don't have an account?

Infectious Diseases Society of America members

Sign in via society site

Sign in via your Institution

Sign in

Purchase

Subscription prices and ordering

Short-term Access

To purchase short term access, please sign in to your Oxford Academic account above.

Don't already have an Oxford Academic account? Register

T-Helper 17 Cell Cytokine Responses in Lyme Disease Correlate With *Borrelia burgdorferi* Antibodies During Early Infection and With Autoantibodies Late in the Illness in Patients With Antibiotic-Refractory Lyme Arthritis - 24 Hours access

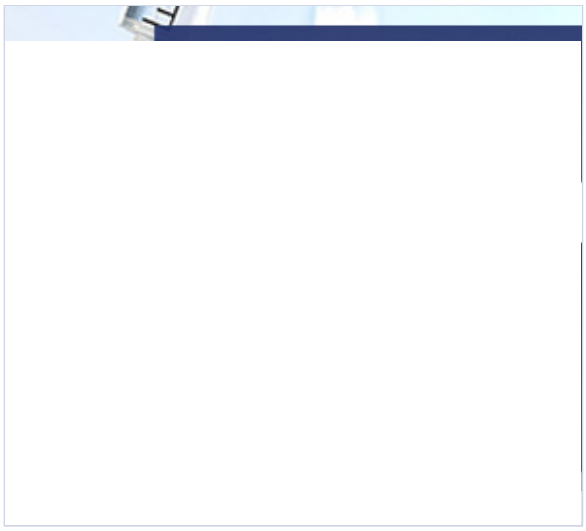
EUR €35.00 GBP £27.00 USD $44.00

Rental

Read this now at deepdyve

Skip to Main Content

This article is also available for rental through DeepDyve.



View Metrics

Email alerts

New issue alert

Advance article alerts

Article activity alert

Receive exclusive offers and updates from Oxford Academic

More on this topic

Persistence of Immunoglobulin M or Immunoglobulin G Antibody Responses to *Borrelia burgdorferi* 10–20 Years after Active Lyme Disease

Why Is Chronic Lyme Borreliosis Chronic?

Immunologic Aspects of Lyme Borreliosis

Disparity Between Serological Reactivity to *Borrelia burgdorferi* and Evidence of Past

Skip to Main Content

Disease in a High-Risk Group

Related articles in

Web of Science

Google Scholar

Citing articles via

Web of Science (2)

Google Scholar

CrossRef

Latest | **Most Read** | **Most Cited**

Expanding the use of primaquine for the radical cure of *Plasmodium vivax*

Primaquine Pharmacokinetics in Lactating Women and Breastfed Infant Exposures

Intestinal barrier dysfunction and microbial translocation in HIV-infected pregnant women is associated with preterm birth

First line raltegravir/emtricitabine/tenofovir combination in HIV-2 infection: phase 2 non-comparative trial (ANRS 159 HIV-2)

Increase in Childhood Nontuberculous Mycobacterial Infections after BCG Coverage Drop – a Nationwide Population-Based Retrospective Study, Finland, 1995 to 2016

Twitter

Online ISSN 1537-6591
Print ISSN 1058-4838