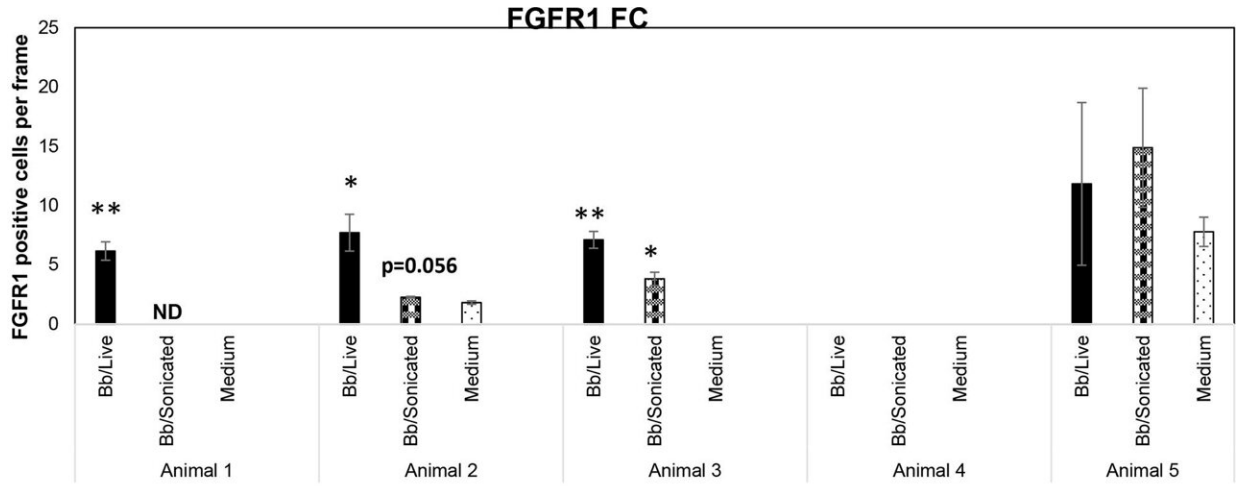
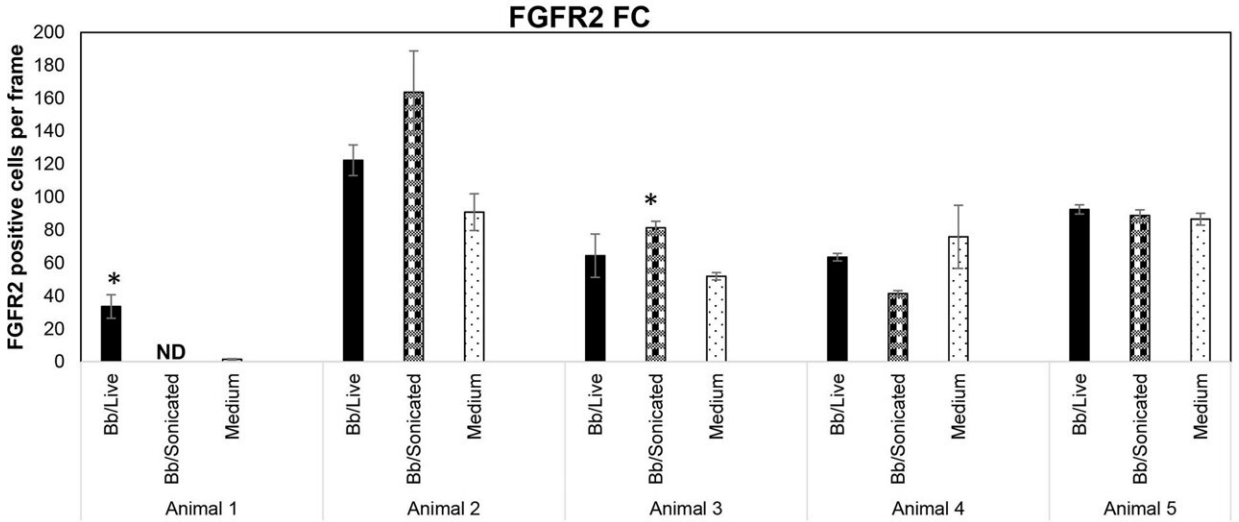
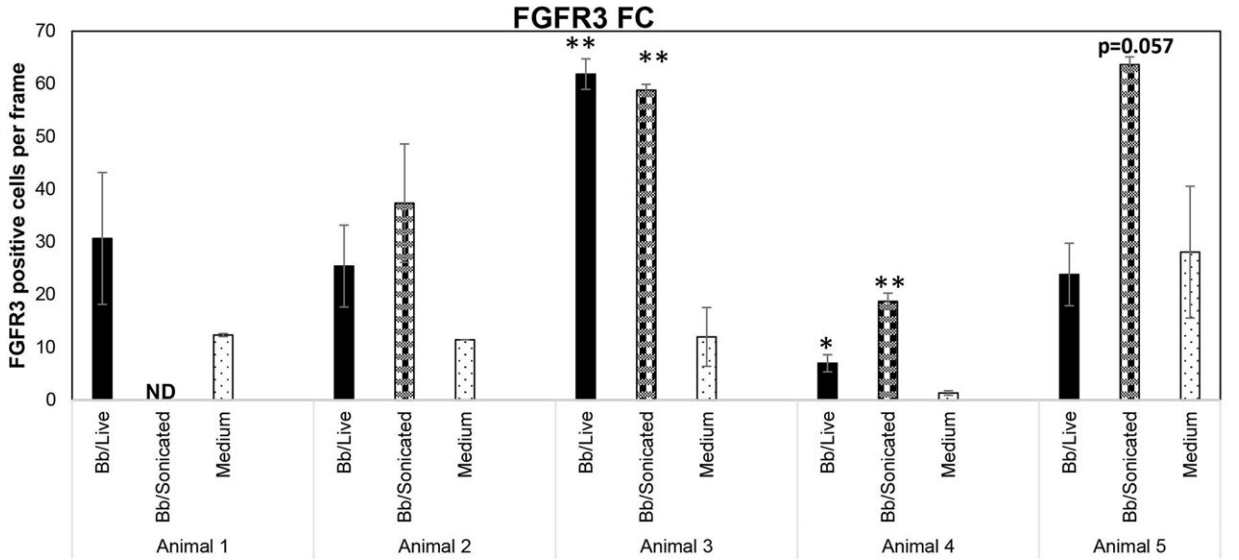
Medical Xpress

Study finds potential new treatment path for lasting Lyme disease symptoms

April 18 2024


FGFR1 FC
FGFR1 positive cells per frame
25
20
15
10
5
0
**
ND
*
p=0.056
**
*
Bb/Live
Bb/Sonicated
Medium
Animal 1
Animal 2
Animal 3
Animal 4
Animal 5


FGFR2 FC
FGFR2 positive cells per frame
200
180
160
140
120
100
80
60
40
20
0
*
ND
*
Bb/Live
Bb/Sonicated
Medium
Animal 1
Animal 2
Animal 3
Animal 4
Animal 5


FGFR3 FC
FGFR3 positive cells per frame
70
60
50
40
30
20
10
0
ND
**
**
*
**
p=0.057
Bb/Live
Bb/Sonicated
Medium
Animal 1
Animal 2
Animal 3
Animal 4
Animal 5

Expression levels of FGFRs from rhesus frontal cortex (FC) in response to live and non-viable *B burgdorferi*. FC tissue explants exposed to either live or sonicated *B burgdorferi* for 4 hrs. were probed for FGFR1-3 expression levels by immunofluorescence. Tissue explants exposed to medium alone were used as controls. FGFR positive cells per frame were quantified and graphed. Bars represent standard deviation. * p Frontiers in Immunology (2024). DOI: 10.3389/fimmu.2024.1327416

Tulane University researchers have identified a promising new approach to treating persistent neurological symptoms associated with Lyme disease, offering hope to patients who suffer from long-term effects of the bacterial infection, even after antibiotic treatment. Their results were published in *Frontiers in Immunology*.

Lyme disease, caused by the bacterium Borrelia burgdorferi and transmitted through tick bites, can lead to a range of symptoms, including those affecting the central and peripheral nervous systems. While antibiotics can effectively clear the infection in most cases, a subset of patients continues to experience symptoms such as memory loss, fatigue, and pain—a condition often referred to as post-treatment Lyme disease syndrome.

Principal investigator Geetha Parthasarathy, Ph.D., an assistant professor of microbiology and immunology at the Tulane National Primate Research Center, has discovered that fibroblast growth factor receptor inhibitors, a type of drug previously studied in the context of cancer, can significantly reduce inflammation and cell death in brain and nerve tissue samples infected with Borrelia burgdorferi.

This discovery suggests that targeting FGFR pathways may offer an

exciting new therapeutic approach to addressing persistent neuroinflammation in patients with post-treatment Lyme disease syndrome.

"Our findings open the door to new research approaches that can help us support patients suffering from the lasting effects of Lyme disease," Parthasarathy said. "By focusing on the underlying inflammation that contributes to these symptoms, we hope to develop treatments that can improve the quality of life for those affected by this debilitating condition."

Researchers treated nerve tissue with live or inactivated Borrelia burgdorferi, followed by an application of FGFR inhibitors. Study results revealed a significant reduction in both inflammatory markers and cell death.

While further research is needed to translate these findings into clinical treatments, the study represents an important step forward in understanding and potentially managing the complex aftermath of Lyme disease.

More information: Geetha Parthasarathy, Fibroblast growth factor receptor inhibitors mitigate the neuropathogenicity of Borrelia burgdorferi or its remnants ex vivo, *Frontiers in Immunology* (2024). DOI: 10.3389/fimmu.2024.1327416

Provided by Tulane University