Potential biomarkers identified for neuropsychiatric symptoms of lupus

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A globally renowned expert in autoimmune diseases and systemic lupus erythematosus (SLE) at the University of Houston has identified potential biomarkers for neuropsychiatric symptoms of lupus. Lupus is an autoimmune disease in which the immune system attacks its own tissues, causing widespread inflammation and tissue damage in the affected organs.

While most people with lupus experience a variety of symptoms that include fatigue, skin rashes, fever, and pain or swelling in the joints, about half of people with SLE suffer neuropsychiatric symptoms. Those include seizures, aseptic meningitis, acutely confused states, cerebrovascular disease psychosis and mood disorders.

"The diagnosis of neuropsychiatric lupus is difficult because the neurological symptoms could very well be due to other causes. As no gold-standard diagnostic test exists for neuropsychiatric systemic lupus erythematosus (NPSLE), we executed a broad screen of NPSLE cerebrospinal fluid using an aptamer-based platform," reports Chandra Mohan, Hugh Roy and Lillie Cranz Cullen Endowed Professor of biomedical engineering, in the journal *Arthritis & Rheumatology*. Aptamers are short sequences of nucleic acids that can be further selected based on their binding specificities. Commercially available libraries of aptamers allow comprehensive screening of >1000 human protein targets, representing some of the largest screening platforms currently available in targeted proteomics.

Mohan's team screened more than 1,100 proteins in the fluid surrounding the brains of neuropsychiatric lupus patients and identified a few proteins that could potentially be used to diagnose neuropsychiatric lupus. The proteins that showed up in most samples are CSF Lipocalin-2, M-CSF, IgM and complement C3.

"These proteins emerged as promising cerebrospinal fluid biomarkers of NPSLE with diagnostic potential," Mohan reported. "Elevated CSF C3 was associated with acute confusional state. Eleven molecules elevated in the fluid exhibited concordant elevation in the choroid plexus, suggesting shared origins."

Neuropsychiatric events occur most frequently early during the disease course in most cases, either as a presenting symptom or within the first

five years of disease onset.

Cerebrospinal fluid samples used in this study were provided by collaborators John Hanly from Dalhousie Lupus Clinic, Halifax, Nova Scotia, Canada and C.C. Mok from Tuen Mun hospital in Hong Kong, China. Laboratory studies were carried out by UH researcher Kamala Vanarsa in Mohan's lab.

"We believe proteomic investigations of blood and cerebrospinal fluid will eventually lead to the fabrication of a serum or cerebrospinal fluid-based diagnostic panel that permits accurate diagnosis of NPSLE, with significantly higher specificity for this disease, compared to other neuroinflammatory diseases or infections," said Mohan.

More information: Kamala Vanarsa et al, Aptamer-based screen of Neuropsychiatric Lupus cerebrospinal fluid reveals potential biomarkers that overlap with the choroid plexus transcriptome, *Arthritis & Rheumatology* (2022). DOI: 10.1002/art.42080

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