Race-specific lupus nephritis biomarkers

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University of Houston Hugh Roy and Lillie Cranz Cullen Endowed Professor of biomedical engineering, Chandra Mohan, and his team have discovered a difference in urinary biomarker proteins of lupus nephritis (LN) in patients according to race. He is reporting his findings in *Nature Communications*.

"Among African American patients, the most discriminatory biomarkers that distinguished active LN from inactive disease were urine ALCAM, PF-4, properdin, and VCAM-1," reports Mohan. Mohan is already

collaborating with a biotech partner targeting the ALCAM protein with new therapeutics that can potentially block it in patients with LN. Yet other urine proteins were noted to be discriminatory among Caucasian and Asian patients.

"The best biomarkers lend themselves to be the best therapeutic targets because they tend to be disease drivers, and that is what is happening here with ALCAM," said Mohan.

Systemic Lupus Erythematosus (SLE), also called lupus, is an autoimmune disease that occurs when the body attacks its own tissues and organs. Inflammation from the disease can impact many different parts of the body including joints, skin, kidneys, blood cells, brain and heart. Lupus nephritis is one of the most frequent and severe clinical manifestations of SLE, representing a leading cause of morbidity and mortality.

"While patient demographics are widely known to affect SLE disease manifestations and outcomes, there are virtually no studies investigating this phenomenon in the context of disease biomarkers," reports Mohan. "Most SLE biomarker studies focus on one demographic group or all ethnic groups combined, which yield results that may not be equally predictive in all demographic groups of SLE patients."

Mohan's team used an aptamer-based screen with the power to simultaneously interrogate over 1,100 unique proteins, rather than traditional biomarker discovery study designs, which are either based on prior understanding of established pathways underlying LN or analysis of proteins.

"In this assay, streptavidin-coated beads labelled with 1,129 unique aptamers are added to each urine sample to allow them to bind to their designated protein targets," said Mohan. Aptamers are synthetic, single-

stranded DNA-based molecular recognition elements, which selectively recognize and quantify a wide spectrum of proteins in body fluids or cells.

"This is one of the largest, if not the largest, screening platforms currently available," said Mohan, who used the screening on 127 patients with inactive lupus, 107 patients with active lupus nephritis, 67 with active non-renal lupus and 74 healthy individuals.

Given the observed variation in urine biomarkers across ethnicities, Mohan's team is planning a longitudinal study which tracks patients for months or years, so that disease flares can be predicted before they actually happen.

More information: Samantha Stanley et al, Comprehensive aptamer-based screening identifies a spectrum of urinary biomarkers of lupus nephritis across ethnicities, *Nature Communications* (2020). DOI: 10.1038/s41467-020-15986-3

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