New discoveries in lupus research

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Two separate findings by a University of Houston nationally recognized expert in systemic lupus erythematosus (SLE or lupus), a chronic autoimmune disease that affects multiple organs including the kidneys, skin, joints and heart, are being reported in scientific and medical

journals.

Chandra Mohan, M.D., Ph.D., Hugh Roy and Lillie Cranz Cullen Endowed Professor of biomedical engineering in the UH Cullen College of Engineering, has identified blood biomarkers that predict which lupus patients will develop heart disease in the future and found new urine biomarkers for diagnosing lupus nephritis (LN) in children with lupus.

Lupus and cardiovascular disease

Lupus is associated with an increased incidence of acute and chronic cardiovascular disease as compared to the general population.

Mohan's team, in collaboration with Dr. Maureen McMahon at UCLA, used a comprehensive metabolomic screen of baseline sera from lupus patients to identify metabolites that predict future carotid plaque progression, following eight to nine years of follow-up. Nine patients had SLE without plaque progression, eight had SLE and went on to develop atherosclerotic plaques, and eight patients were controls who did not have SLE.

"The arachidonic acid pathway metabolites, leukotriene B4 (LTB4) and 5-hydroxyeicosatetraenoic acid (5-HETE), and the oxidized lipids 9/13-hydroxyoctodecadienoic acid (HODE) were found to be significantly altered (p 2) in SLE patients compared to SLE patients without plaque progression," reports Mohan in *Frontiers in Cardiovascular Medicine*. "SLE patients also exhibited significantly altered levels of branched chain amino acid (BCAA) metabolites and plasmalogens compared to the non-SLE controls."

Taken together with the rich literature on these metabolites, the findings suggest that the identified metabolites may not only be prognostic of cardiovascular disease development in SLE patients, but they may also

be active drivers of atheroma formation. Early identification of these high risk SLE patients may help institute preventive measures early in the disease course.

Children and lupus nephritis

Lupus nephritis, or inflammation of the kidneys, is one of the most severe complications for SLE patients. Kidney disease is a leading cause of death among SLE patients—roughly a quarter of all lupus patients succumb to end-stage renal disease.

Mohan's team, on a mission to discover non-invasive biomarkers of LN to replace painful serial kidney biopsies in children, is reporting his recent findings in *Frontiers in Immunology*.

Together with collaborator, Dr. Scott E. Wenderfer at Texas Children's Hospital, Mohan's team evaluated the performance of ten urine protein markers of diverse nature including cytokines, chemokines and adhesion molecules in distinguishing disease activity in childhood SLE among 84 pediatric patients.

"Urine concentrations of ALCAM, KIM-1, PF4 and VCAM-1 were significantly higher in active LN patients compared to active non-renal SLE, inactive SLE and healthy controls, with strong diagnostic potential" Mohan reports.

"Urinary ALCAM, PF4, and VCAM-1 are potential biomarkers for predicting kidney disease activity in cSLE and hold potential as surrogate markers of nephritis flares and prognosis in these patients," he said.

More information: Sahar Baig et al, Baseline Elevations of Leukotriene Metabolites and Altered Plasmalogens Are Prognostic

Biomarkers of Plaque Progression in Systemic Lupus Erythematosus, *Frontiers in Cardiovascular Medicine* (2022). DOI: 10.3389/fcvm.2022.861724

Samar A. Soliman et al, Urine ALCAM, PF4 and VCAM-1 surpass conventional metrics in identifying nephritis disease activity in childhood-onset systemic lupus erythematosus, *Frontiers in Immunology* (2022). DOI: 10.3389/fimmu.2022.885307