MCP-1 in urine as biomarker of renal lupus in absence of cytokines, interferon-γ and growth factors

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Objective: To characterize 17 immunological markers in the Urine of patients with SLE.

Introduction: Lupus nephritis is an inflammatory disease affecting the renal parenchyma. Cytokines and chemokines are key immune mediators that have been related with the pathogenesis of the disease. Obtaining non invasive prognosis markers is a highly desirable objective in order to improve the clinical management of these patients.

Patients and methods: In this study we profiled 17 immune mediators (Th1, Th2, Th17 cytokines, chemokines and growth factors) in the urine of 25 patients with systemic lupus erythematosus with active renal disease by using a Biorad 17-plex kit on a Luminex platform. A group of healthy volunteers of similar age and comparable sex distribution was recruited as control (n=10).

Results: Results evidenced that the only detectable mediators in urine were IL-8, MCP-1 and MIP-1β. When levels of these mediators were compared between patients and controls, significantly higher levels of MCP-1 were observed in the urine of the patients. MCP-1 levels in urine correlated positively with the SLEDAI score in a significant way and negatively with plasma levels of complement C4.

Conclusions: Our results reinforce the role of MCP-1 in urine as biomarker of disease activity in renal lupus, excluding the detection of other soluble immune mediators such as Th1, Th2, Th17 cytokines and growth factors as suitable markers in this non invasive sample.

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Lupus nephritis is an inflammatory disease affecting the renal parenchyma. Cytokine and chemokines are the key immune mediators that have been related with the pathogenesis of the disease. Obtaining non-invasive prognostic markers is a key objective to improve the clinical management of these patients. The presence of chemokines in the urine of patients with lupus nephritis has been proved. The multiplex assays available today allow for the simultaneous detection of a great variety of mediators in a very small amount of urine. Monocyte chemoattractant protein-1 (MCP-1) is considered a renal inflammation marker, but it is not exclusive to lupus. It is present in high levels in the urine of patients with diabetes mellitus, IgA nephritis, and certain types of vasculitis, among other conditions.

Material and methods

In this study, we profiled 17 molecules present in urine, from the first morning urination, of 25 patients with systemic lupus erythematosus (SLE) with active renal disease by using a Bioplex 17-plex kit on a Luminex® platform. The selected mediators included Th1 cytokines (IL-2; IL-12p70); Th2 cytokines (IL-4; IL-5; IL-10; IL-13); Th17 cytokines (IL-6; IL-17); growth factors (GM-CSF; GCSF); chemokines (IL-8; MCP-1; MIP-1β); and also IL-7. Patients with SLE were selected from the Autoimmune Disease Unit at our hospital. A group of 10 healthy people who work at the University of Valladolid (Spain) of similar age and comparable gender distribution to that of the group of patients was selected as control group. The definition of patients with SLE was that of the American College of Rheumatology. All patients with SLE were receiving immunomodulator treatment at the time of sample collection, either with non-steroidal anti-inflammatory drugs, steroids, chloroquine, or immunosuppressive medication. Disease activity in each patient was assessed at the moment of sample collection using the SLE Disease Activity Index 2000. Renal disease was defined as the presence of proteinuria (>0.5 g/24 h), which is the predominante characteristic in lupus nephritis, of pyuria (>6 leukocytes/field), the presence of urinary casts detected by microscopic examination of urinary sediment, haematuria (>5 red blood cells/field), creatinine levels in blood serum above 1.1 mg/dL for women and 1.3 mg/dL for men, and the clearance of creatinine below 70 mL/min in women or 97 mL/min in men. The best method to evaluate renal function is estimating the glomerular filtration rate (GFR) using the Cockroft-Gault or MDRD formulae. The results of the estimated GFR are expressed as the Cockroft-Gault or MDRD formulae of patients, with the mean being 89.57 mL/min/1.73 m².

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Conflict of interest

The authors declare no conflict of interests.

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