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Autophagy activity and expression pattern of autophagy-related markers in the podocytes of patients with lupus nephritis: association with pathological classification

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Objectives : To identify the significance of autophagy in lupus nephritis (LN), we counted the number of autophagosomes in podocytes and evaluated the expression of multiple molecular markers associated with autophagy in LN specimens.

Methods : Autophagosomes in podocytes were counted using transmission electron microscopy. Beclin-1, microtubule-associated protein light chain 3 (LC3), autophagy-related gene 7 (Atg7), and UNC-51-like kinase 1 (ULK1) expression levels were measured using immunohistochemistry in renal biopsy specimens from 90 patients with LN and 15 healthy controls.

Results : The number of autophagosomes in patients with LN types III, IV, and combined V-IV type were significantly higher than in controls ($p<0.0001$; $p<0.0001$; $p=0.009$, respectively). However, autophagosomes numbers in patients with II and V types LN were significantly lower than controls (both $p<0.0001$). Various levels of marker expression were identified, and correlated significantly with LN pathology classifications. The percentage of marker expression in LN types III, IV and V-IV were significantly higher than controls ($p<0.05$), while marker expression in types II and V were lower than controls, although the differences for LC3 and ULK1 were not statistically significant.

Conclusions : Autophagy activity and expression pattern of autophagy-related markers in podocytes were significantly positively correlated with LN types III, IV and V-IV, but negatively correlated with II and V types. Autophagy could therefore be a useful predictor of LN pathology type, and could be informative for the development of treatment strategies in a clinical setting.

Keywords : autophagy; podocyte; Beclin-1; LC3; Atg7; ULK1