Activities and Expression of Lysosomal Enzymes and Metalloproteases in Type I Diabetes Mellitus

Peres, G.B.¹; Aguiar, J.A.K.¹; Simões, M.J.²; Juliano, M.A.³; Michelacci, Y.M.¹

¹Depto. de Bioquímica, ²Depto. de Morfologia, ³Depto. de Biofísica, Escola Paulista de Medicina, UNIFESP, SP, Brazil

The objective of the present study was to investigate the activities and expression of lysosomal enzymes and matrix metalloproteases (MMPs) in liver and kidney of type 1 diabetes mellitus (DM) in rats. DM was induced by streptozotocin, and DM rats and their matched controls (NL) were analyzed on the 10th and on the 30th day (NL10, n=10; DM10, n=8; NL30, n=7; DM30, n=4). The activities of lysosomal enzymes and MMPs were measured with synthetic substrates by either fluorimetric or colorimetric assays. Gelatinase activity of MMPs was also detected by zymography. The enzyme expression was assessed by qPCR, normalized by β-actin and S29 ribosomal protein. Tissues were also analyzed by histological staining (HE) and cathepsin B (CatB) immunohistochemistry. CatB activity was decreased in liver and kidney, both in DM10 and DM30. Other lysosomal enzymes were also decreased, especially in DM30 kidney. In contrast, a discrete increase was observed in DM30 kidney MMPs. Zymography revealed bands of high molecular weight gelatinase both in liver and kidney. Concerning the expression of lysosomal enzymes (mRNA), all were decreased or did not vary in kidney, while CatB and β-D-glucuronidase mRNAs were increased in DM30 liver. Histological images revealed, in DM30 kidneys, tubules with thinner walls, in lower amounts, with increased stroma among them, and glomerular capillary wall thickening. By immunohistochemistry, CatB was localized in the brush border of convoluted tubules. Taken together, these data suggest a decrease in activity of lysosomal enzymes and a discrete increase in kidney MMPs at early stages of DM.

Word Keys: diabetes mellitus, lysosomal enzymes, cathepsin B, metalloprotease

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