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Rat model for diabetic nephropathy: With or without insulin injection?

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Abstract

This study was designed to check whether insulin supplementation is crucial for inducing diabetic nephropathy (DNP) in wistar rats. Diabetes was induced by intraperitoneal injection of STZ (45mg / kg body weight) and blood glucose was maintained around 300mg/ dl by subcutaneous injection of long acting insulin. At the end of both 20, and 28 weeks, the histological changes in the kidney were observed by haematoxylin and eosin, periodic acid schiff and masson trichrome staining. Immunohistochemical analyses of VEGF, ERK-1, NF-Kappa B and Bcl-2 expression were performed. The biochemical parameters such as albumin, creatinine, glucose, and urea nitrogen were significantly altered ($p<0.0001$) in the diabetic animals compared to that of the diabetic animals supplemented with insulin. Our histological analysis revealed thickening of the glomerular basement membrane, macrophage infiltration, mesangial expansion and proliferation along with the tubular changes such as glycosuria and proteinuria in diabetic rats. But these glomerular changes were not observed in the diabetic animals supplemented with insulin though there were tubular changes such as glycosuria and proteinuria. More than 50% increase in the expression of VEGF, ERK-1, and NF-Kappa B was observed in the diabetic animals at the end of the study, with no change in the expression of Bcl-2. We conclude that 45 mg/kg body weight of STZ is more appropriate for inducing DNP in wistar rats with a body weight of 250 g, and the effect of various treatments on DNP could be studied within a period of 7 months without the use of insulin injection.

Biography

Pragasam Viswanathan has completed his Ph.D., at the age of 30 years from University of Madras, Chennai and postdoctoral studies from Medical College of Wisconsin, Milwaukee, USA. Currently he is an Associate Professor and Division Head of Bio Medical Sciences, School of Bio Sciences and Technology a premier educational University in India. He has published more than 25 papers in reputed journals and serving as an editorial board member of repute.