

Role of Human Wharton's Jelly Mesenchymal Stem Cells Conditioned Media in Alleviating Kidney Injury via Inhibition of Renin-Angiotensin System in Diabetic Nephropathy

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Abstract : Background: Diabetic nephropathy is a serious health problem described by specific kidney structure and functional disturbance. Renoprotective effects of the stem cells secretase have been shown in many kidney diseases. The aim is to evaluate the capability of human Wharton's jelly mesenchymal stem cells conditioned media (hWJMSCs-CM) to alleviate DN in streptozotocin (STZ)-induced diabetes. Methods: Diabetic nephropathy was induced by injection of STZ (60 mg/kg, IP) in twenty rats. Conditioned media was extracted from hWJMSCs at third passages. At week 8, diabetic rats were divided into two groups: treated (hWJMSCs-CM, 500 µl/rat for three weeks, IP) and not treated (DN). In the 11th week, three groups (control, DN and DN+hWJMSCs-CM) were kept in metabolic cages and urine was collected for 24h. Blood pressure (BP) and heart rate (HR) were continuously recorded. The serum samples were maintained for measuring BUN, Cr and angiotensin-converting enzyme (ACE) activity. The left kidney was kept at -80°C for ACE activity assessment. The right kidney and pancreas were used for histopathologic evaluation. Result: Diabetic nephropathy was detected by microalbuminuria and increased albumin/creatinine ratio, as well as the pancreas and renal structural disturbance. Glomerular filtration rate, BP and HR increased in the DN group. The ACE activity was elevated in the serum and kidneys of the DN group. Administration of hWJMSCs-CM modulated the renal functional and structural disturbance and decreased the ACE activity. Conclusion: Conditioned media was extracted from hWJMSCs may have a Renoprotective effect in diabetic nephropathy. This may happen through regulation of ACE activity and renin-angiotensin system inhibition.

Keywords : diabetic nephropathy, mesenchymal stem cells, immunomodulation, anti-inflammation

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