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Human Umbilical Cord Blood Mononuclear Cells and Mice With Type 1 Diabetes.

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Previously we successfully delayed the onset of vasculitides and death in MRL-Lpr/Lpr mice considered to have an autoimmune disease similar to human lupus. Likewise, with the use of megadoses of human umbilical cord blood mononuclear cells, we were able to delay the onset of symptoms and death in SOD1 mice that carry a transgene for amyotrophic lateral sclerosis also considered by some to be an autoimmune disease. We used a similar approach to NOD/LtJ mice with type 1 diabetes. No immunosuppression was used in this study. It is known that marrow transplantation will ameliorate type 1 diabetes in mice.

We divided 30 diabetic mice (NOD/LtJ) into 3 groups: (1) 10 untreated control mice; (2) 10 mice that received congenic bone marrow, 5.6×10^6 mononuclear cells; and (3) 10 mice that received 100×10^6 human umbilical cord blood mononuclear cells.

All animals that survived were killed at 137 days of age. At that time in group 1, only 4 of 10 mice were alive, with an average blood glucose level of 474 mg/dL and an average urine glucose level of 607.5 mg/dL. In group 2, 6 of 10 mice were alive with an average blood glucose level of 358.8 mg/dL and a urine glucose level of 441 mg/dL. In group 3, 8 of 10 mice were alive at 137 days with an average blood glucose level of 239.7 mg/dL and an average urine glucose level of 400 mg/dL.

The survival curves of animals receiving congenic bone marrow and human cord blood mononuclear cells were significant ($P < .05$; $P < .01$ respectively). This study raises the possibility of using human cord blood mononuclear cells, particularly in conjunction with pancreatic islets, to produce a successful long-term remission in type 1 diabetes.