The Effect of Human Cord Blood Mononuclear Cells on Mouse Animal Model B6.V-Lepob Type 2 Diabetes

Norman Ende, MD, Ruifeng Chen, MD, and Allum Reddi, MD
University of Medicine and Dentistry, Newark, NJ.

We have demonstrated that there are stem cells in human umbilical cord blood (HUCB) that may have all the therapeutic potential that has been postulated for embryonic stem cells. Having shown a significant delay in onset of symptoms and prolongation of life in transgenic mouse models of amyotrophic lateral sclerosis, Alzheimer disease, Huntington disease, prostate carcinoma, and type 1diabetes, we have initiated studies on type 2 diabetes using a mouse animal model (B6.VLepob). These animals are homozygous for the obese spontaneous mutation (Lepob). They increase in weight rapidly, may exhibit hyperphagia, a diabetes-like syndrome of hyperglycemia and hyperinsulinemia.

The mice were divided into 2 groups: 10 control mice received no treatment, and 10 mice received 200×10^6 HUCB mononuclear cells. Both groups received a standard rodent diet. Urine, blood glucose, and body weight were measured at regular intervals. The study was continued until half of the treated mice had died.

The mice treated with HUCB mononuclear cells developed significantly lower blood glucose levels and less glucosuria, gained less weight, and lived longer than mice receiving the same diet and no treatment. Control mice had glomerular hypertrophy, which was normalized in treated mice.

Treatment of type 2 diabetic mice with HUCB mononuclear cells improved the blood glucose level and survival with normalization of glomerular hypertrophy. Thus, HUCB mononuclear cells may have similar potential as human embryonic stem cells in the treatment of type 2 diabetes.

Supported by Abraham S. Ende Research Foundation