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Reversal of type 1 diabetes through the immune modulation of human cord bloodderived multipotent stem cells

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Type 1 diabetes (T1D) is a T cell-mediated autoimmune disease that results in a shortage of islet  $\beta$  cells. Control of autoimmunity is the top priority for T1D treatment. We identified a novel type of stem cell from cord blood, designated cord blood-derived multipotent stem cells (CB-SC), which display embryonic stem (ES) cell characteristics. Animal data revealed that CB-SC can function as an immune modulator that can lead to control of autoimmune responses, which could in turn be used as a new approach to overcome the autoimmunity of T1D in patients. To translate this technology into clinics, we invented a device Stem Cell Educator that is optimized for CB-SC culture and clinical treatment via connecting with Blood Cell Separator. In collaboration with a medical center in China, Phase I clinical trial (n = 19) has demonstrated the feasibility and safety of Stem Cell Educator therapy. Ongoing studies have confirmed that T1D patients (n = 9) receiving Educator therapy experienced improvement of metabolic control, a marked reduction of HbA1c values, decreasing insulin doses, and increasing baseline C-peptide values. Additionally, immune characterizations have revealed the reversal of autoimmunity of T1D, the restoration of Th1/Th2 cytokine balance, the marked up-regulation of Foxp3+ regulatory T cells (Tregs) in peripheral blood. The whole procedure is simple, safe and very cost-effective. Thus, our findings have the potential for enormous clinical impact on T1D, by paving the way toward the development of novel Stem Cell Educator therapy to reverse diabetes in T1D patients.

## Biography

Dr. Yong Zhao has completed his M.D. and Ph.D from Shanghai Second Military Medical University (China) and postdoctoral studies from University of Chicago. He identified novel type of stem cells from human umbilical cord blood. He own 8 patents. He has published more than 25 papers in peer-reviewed manuscript.