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Esma S Yolcu

University of Louisville, USA

Engineering bone marrow cells with an immunomodulatory protein for the prevention of graft-vs-host disease

Allogeneic hematopoietic stem cell transplantation (AHSCT) is an effective therapy for treatment of various inherited and acquired hematological disorders. Acute graft versus host disease initiated and perpetuated by donor. T cells is a major barrier for safe and wide-spread application of AHSCT as a therapeutic intervention in the clinic. Although elimination of donor T cells from the AHSC inoculum is effective in curtailing GVHD, it results in compromised engraftment and delayed immune reconstitutions. Thus, strategies targeting specific and effective elimination of only the pathogenic T cells may have important implications for routine application of AHSC to the clinic. We have developed a novel approach, designated as ProtEx™, to engineer HSCs with an exogenous immunoregulatory protein and tested the efficacy of the engineered cells to engraft in allogeneic recipients without GVHD. Our results demonstrate the robust efficacy of this approach to establish engraftment and overcome acute GVHD mediated by alloreactive T cells. This novel immunomodulatory approach has significant implication for clinical translation.

Biography

Esma S Yolcu is an Associate Professor of Microbiology and Immunology and a Member of James Brown Cancer Center, University of Louisville, Louisville, KY. She has received her PhD degree from the University of Ankara, Ankara, Turkey. She has joined the Institute for Cellular Therapeutics, University of Louisville, to pursue her Post-doctoral training. She has Co-pioneered a novel technology described as ProtEx™ as a practical alternative to gene therapy to display immunological molecules on the surface of cells and use such engineered cells as a means of immunomodulation to treat various genetically inherited hematologic disorders and acquired diseases. In particular, her research focuses on engineering bone marrow cells with immunoregulatory ligands of interest to facilitate engraftment and establishment of durable mixed allogeneic hematopoietic chimerism under nonmyeloablative conditions as a means of inducing tolerance. Her research has been published in highly prestigious scientific journals, such as *Immunity, Circulation, and Stem Cells* and funded by various federal and nonfederal funding agencies including the National Institutes of Health, AHA, ADA, and JDRF. She serves on many Editorial Boards for peer-reviewed journals. She is the recipient of several awards and member of several national and international societies.

esma.yolcu@louisville.edu

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