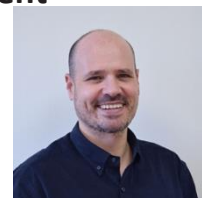


Selection, expansion, and unique pretreatment of allogeneic human natural killer cells with anti-CD38 monoclonal antibody for efficient multiple myeloma treatment

Juli R. Bagó

University Hospital of Ostrava, Czech Republic



Abstract

The outcome of patients with multiple myeloma has improved in the past decade as a result of novel therapeutic agents such as immunomodulatory drugs, proteasome inhibitors, monoclonal antibodies, and autologous stem cell transplantation. Still, despite significant treatment efficacy, the probability of recurrent multiple myeloma remains high, with a short progression-free survival period. Thus, new therapeutic approaches such as cell-based therapy are emerging and providing a promising avenue for cancer treatment. Cellular immunotherapy is becoming a clinical reality with breathtaking clinical trials using chimeric antigen receptor T cells. Nevertheless, this innovative therapy is not free from challenges such as tumor recurrence in heterogeneous tumors, affordability, and off-tumor toxicity. To circumvent these limitations, we harness the singular anti-tumor characteristics of natural killer (NK) cells to treat multiple myeloma. We obtained a clinically relevant number of allogeneic NK cells derived from peripheral blood (median of 14,050 million cells from a single donor), capable of targeting a broad spectrum of liquid and solid tumors. To increase their anti-tumor activity, we combined the NK cells with Daratumumab, an approved anti-cluster of differentiation 38 monoclonal antibody. The synergistic therapeutic effect observed against multiple myeloma cells was refined with CD16 polymorphism donor selection and a straightforward novel in vitro pretreatment to bypass undesired fratricide. This approach increased more than 20% the specific killing capacity against the multiple myeloma cell line RPMI 8226. The combinatorial therapy was assessed in mice models with established human multiple myeloma xenografts, revealing tumor volumes 43-fold smaller than control ones. The results obtained support the continued development of allogeneic NK cells combined with monoclonal antibodies for the treatment of multiple myeloma.



Biography

Juli R. Bagó received his Ph.D. in Biomedicine with cum laude mention in 2012 at the University of Barcelona, Catalonia, Spain, where he developed an in vivo non-invasive bioluminescent imaging system to monitor cell proliferation and differentiation for tissue regeneration. His Ph.D. work resulted in fifteen publications in preeminent journals in the field of regenerative medicine. In 2013, following his research at the University of Barcelona, Dr. Bagó held a post-doctoral fellowship position at The University of North Carolina at Chapel Hill, USA. Building on technology that won the Nobel Prize in 2012, Dr. Bagó pioneered a new approach to personalized cancer therapy where skin cells are directly converted into tumoricidal "induced neural stem cells." These studies are published in fourteen top-tier journals that include the first author in Nature Communications and Science Translational Medicine and produced three U.S. patents where he is an inventor and established the basis for engagement with the FDA to discuss first-in-human clinical trials. Currently, he is working at the University Hospital of Ostrava as a principal investigator, seeking to harness the potential of immune cells against cancer to develop new and better methods for treating incurable hematological malignancies.

Publications

1. Macrophage-derived extracellular vesicles as drug delivery systems for triple negative breast cancer (TNBC) therapy
2. Neural stem cell therapy for cancer
3. In Vivo Bioluminescence Imaging of Cell Differentiation in Biomaterials: A Platform for Scaffold Development
4. Tumor-homing cytotoxic human induced neural stem cells for cancer therapy
5. Reactive astrocytes potentiate tumor aggressiveness in a murine glioma resection and recurrence model

[4th World Congress on Vaccines & Immunization](#) | London, UK | June 09, 2021

Citation: Juli R. Bagó, Selection, expansion, and unique pretreatment of allogeneic human natural killer cells with anti-CD38 monoclonal antibody for efficient multiple myeloma treatment, Vaccines 2021, 4th World Congress on Vaccines & Immunization, London, UK, June 09, 2021