intratumoral TLR3 expression and T-cell infiltration is currently analyzed.

Results Global deficiency of murine Tlr3, or TRIF, induced significantly increased tumor formation, associated with increased morbidity indicating a tumor suppressive role. Coherently, TLR3 expression is highly significantly decreased in human colorectal cancer compared to normal mucosa, significantly correlated with poor survival. TLR3 deficient cell lines show reduced migration and slightly declined proliferation suggesting an oncogenic role on the cell-autonomous level. Nevertheless, gene expression analysis revealed that the dsRNA induced expression of T-cell attracting cytokines CXCL10 and CXCL11 in colon cancer cell lines is exclusively dependent on TLR3. These chemokines were shown to favor a TH1-type antitumor response.

Conclusions TLR3 favors tumor suppression in vivo, presumably resulting from non-cell-autonomous factors such as the production of CXCL10 and 11 and resulting T-cell infiltration. This may outweigh the putative cell-autonomous oncogenic functions of TLR3 deficiency.


P09.12 BIFUNCTIONAL SIRPα-CD123 FUSION ANTIBODY FOR THE ELIMINATION OF ACUTE MYELOID LEUKEMIA STEM CELLS

1S Tahk*, 1SM Schmitt, 2,3B Vick, 4C Augsberger, 4L Pascual Ponce, 2,3,5 Leoni, 6G Wittmann, 6,7M Subklewe, 7NC Fenn, 8K Hopfner. 1Department of Biochemistry and Gene Center, Ludwig-Maximilians-Universität München, Munich, Germany; 2Research Unit Apoptosis in Hematopoietic Stem Cells, Helmholtz Zentrum München, German Research Center for Environmental Health, Munich, Germany; 3German Cancer Consortium (DKTK) and German Cancer Research Center (DKFZ), partner site Munich, Heidelberg, Germany; 4Laboratory of Translational Cancer Immunology, Ludwig-Maximilians-Universität München, Munich, Germany; 5Department of Oncology, Dr von Haunersches Kinderspital, Ludwig Maximilians-Universität München, Munich, Germany; 6Department of Transfusion Medicine, University Hospital, Ludwig-Maximilians-Universität München, Munich, Germany; 7Department of Hematology and Oncology, Medizinische Klinik und Poliklinik III, Klinikum der Universität München, Munich, Germany

Background Despite advances in the development of novel strategies against acute myeloid leukemia (AML), treatment options are limited and most patients relapse. Relapse occurs due to the persistence of chemotherapy-resistant leukemic stem cells (LSCs), which re-initiate the outgrowth of the disease, highlighting the need of targeting LSCs to improve patient survival. LSCs are characterized by the expression of the interleukin-3 receptor α, also known as CD123. CD123 is expressed on AML blasts and LSCs, and shows a moderate expression on normal hematopoietic stem cells, claiming CD123 as a suitable target antigen. CD47 is a ubiquitously expressed immune checkpoint upregulated on LSCs where it acts as an immune escape mechanism. CD47 transmits a ‘don’t eat me’ signal upon its interaction with the signal regulatory protein alpha (SIRPα) receptor on macrophages, thus inhibiting phagocytosis. In order to efficiently eliminate LSCs, we have designed a bifunctional antibody that specifically targets CD123 and simultaneously blocks CD47. Importantly, our strategy restricts the benefits of the CD47 blockade to CD123+ AML cells. Thus, we hypothesize a lower risk for on-target off-leukemia toxicity.

Materials and Methods The bifunctional SIRPα-CD123 antibody was generated by fusing an extracellular domain of the SIRPα receptor, which functions as the CD47 blocking domain, to the CD123 antibody. The biological activity of the SIRPα-CD123 antibody was examined using AML-derived MOLM-13 cells, primary AML patient material and patient-derived xenografted (PDX) AML cells with NOD.Cg-Prkdcscid IL2rgtm1Wjl/SzJ (NSG) mice.

Results The SIRPα fusion improved the binding of the bifunctional SIRPα-CD123 antibody to AML cells compared to a conventional CD123 antibody. The SIRPα-CD123 antibody enhanced the elimination of the AML-derived MOLM-13 cells by antibody-dependent cellular cytotoxicity via NK cells. Additionally, the cytotoxicity was confirmed using primary patient-derived AML cells. Furthermore, an improved cytotoxicity towards leukemia initiating AML PDX cells was observed with the SIRPα-CD123 antibody using luciferase bioluminescence in vivo imaging. With regards to the inhibition of CD47 signaling, we were able to show a blockade of CD47 on CD123+CD47+ cells by the SIRPα-CD123 antibody. Corre- spondingly, a significant increase in phagocytosis of primary patient-derived AML cells mediated by monocyte-derived macrophages was observed in both allogenic and autologous setting. We were also able to show a preferential binding to MOLM-13 in the presence of a 20-fold excess of red blood cells indicating a potential low on-target off-leukemia toxicity.

Conclusions The bifunctional SIRPα-CD123 fusion antibodies target the CD123+CD47+ cells and stimulate their phagocy- tosis by blocking the inhibitory CD47 signal. The dual mode of action of the SIRPα-CD123 has the potential to deplete the AML LSCs through NK cell cytotoxicity and macrophage-mediated phagocytosis while restricting the CD47 related on-target off-leukemia toxicity.

Support H2020-EU grant agreement no 641549


P09.13 OPTIMIZATION OF A GMP-GRADE LARGE-SCALE EXPANSION PROTOCOL FOR CYTOKINE-INDUCED KILLER CELLS USING GAS-PERMEABLE STATIC CULTURE FLASKS

1A Ventura*, 2P Palmerini, 3A Dalla Pietà, 4R Sommaggio, 4G Astori, 4C Chieregato, 3M Tisi, 1C Visco, 8O Perbellini, 3M Ruggieri, 3E Cappuzzello, 1A Rosato. 1University of Padua, Padua, Italy; 2Veneto Institute of Oncology IDOV – IRCCS, Padua, Italy; 3Advanced Cellular Therapy Laboratory, Department of Hematology, Vicenza Hospital, Vicenza, Italy; 4Hematology Department, San Bortolo Hospital, Vicenza, Italy; 5Department of Medicine, Section of Hematology, University of Verona, Verona, Italy

Background Cytokine-Induced Killer (CIK) cells are ex vivo expanded T cells with NK cell-like phenotype. They express both CD3 and CD56 antigens, and exert a potent antitumor activity against a variety of tumors. Several clinical trials demonstrated the safety and the feasibility of CIK cell therapy, with very low side effects and minimal graft-versus-host toxicity. In this study, we developed a GMP-compliant protocol for robust large-scale expansion of CIK cells using G-Rex® gas-permeable static culture flasks.

Materials and Methods CIK cells were obtained by stimulating healthy donor PBMCs with GMP-grade IFN-γ, IL-2 and CD3 mAbs, and were cultured in G-Rex6® or G-Rex®6M well