

## Supplementary

|     | NCT Number ▼ | Study Title   | Conditions   |
|-----|--------------|---|--|
| 1.  | NCT06006403  | Safety and Efficacy of CD123-targeted CAR-NK for Relapsed/Refractory Acute Myeloid Leukemia or Blastic Plasmacytoid Dendritic Cell Neoplasm   | Acute Myeloid Leukemia Blastic Plasmacytoid Dendritic Cell Neoplasm (BPDCN) Relapse Leukemia Refractory Leukemia |
| 2.  | NCT05995028  | Universal 4SCAR7U Targeting CD7-positive Malignancies   | T-cell Acute Lymphoblastic Leukemia T-cell Acute Lymphoblastic Lymphoma Acute Myeloid Leukemia NK Cell Lymphoma  |
| 3.  | NCT05987696  | Natural Killer(NK) Cell Therapy in Acute Myeloid Leukemia   | AML, Adult Minimal Residual Disease  |
| 4.  | NCT05941156  | Clinical Study of Anti-CD56-CAR-T in the Treatment of Relapsed/Refractory NK/T Cell Lymphoma /NK Cell Leukemia  | Extranodal NK T Cell Lymphoma NK-Cell Leukemia   |
| 5.  | NCT05922930  | Study of TROP2 CAR Engineered IL15-transduced Cord Blood-derived NK Cells Delivered Intraperitoneally for the Management of Platinum Resistant Ovarian Cancer, Mesonephric-like Adenocarcinoma, and Pancreatic Cancer | Pancreatic Cancer Ovarian Cancer Adenocarcinoma  |
| 6.  | NCT05856643  | Single-arm, Open-label Clinical Study of SZ011 in the Treatment of Ovarian Epithelial Carcinoma   | Ovarian Epithelial Carcinoma   |
| 7.  | NCT05845502  | Single-arm, Open-label Clinical Study of SZ003 in the Treatment of Advanced Hepatocellular Carcinoma  | Advanced Hepatocellular Carcinoma  |
| 8.  | NCT05842707  | Study of Cord Blood-derived CAR NK Cells Targeting CD19/CD70 in Refractory/Relapsed B-cell Non-Hodgkin Lymphoma   | Refractory or Relapsed B-cell Non-Hodgkin Lymphoma   |
| 9.  | NCT05776355  | NKG2D CAR-NK & Ovarian Cancer   | Ovarian Cancer   |
| 10. | NCT05739227  | Safety and Efficacy of Allogenic CD19-CAR-NK Cells in Treating r/r B-cell Hematologic Malignancies  | Acute Lymphoblastic Leukemia B-cell Lymphoma Chronic Lymphocytic Leukemia  |
| 11. | NCT05703854  | Study of CAR.70-engineered IL15-transduced Cord Blood-derived NK Cells in Conjunction With Lymphodepleting Chemotherapy for the Management of Advanced Renal Cell Carcinoma, Mesothelioma and Osteosarcoma            | Advanced Renal Cell Carcinoma Advanced Mesothelioma Advanced Osteosarcoma  |
| 12. | NCT05686720  | Single-arm, Open-label Clinical Study of SZ011 in the Treatment of Advanced Triple Negative Breast Cancer   | Advanced Triple Negative Breast Cancer   |
| 13. | NCT05673447  | The Study of Anti-CD19 CAR NK Cells in the Treatment of Relapsed/Refractory Diffuse Large B Cell Lymphoma   | Diffuse Large B Cell Lymphoma  |
| 14. | NCT05667155  | Clinical Study of Cord Blood-derived CAR NK Cells Targeting CD19/CD70 in Refractory/Relapsed B-cell Non-Hodgkin Lymphoma  | B-cell Non Hodgkin Lymphoma  |
| 15. | NCT05654038  | A Study of Universal CD19-Targeted UCAR-NK Cells Combined With HSCT for B Cell Hematologic Malignancies   | B-Cell Lymphoblastic Leukemia/Lymphoma   |

**Supplementary Table S1. Clinical trials for CAR-NK application in cancer patients.** A search was performed at clinicaltrials.gov using “cancer” as a condition query and “CAR-NK cells” for Intervention/treatment. We retrieved 70 studies applying CAR-NK cells therapy alone or in conjunction with other treatments for solid and hematologic cancers, the table shows top 15 registered trials.

|    | NCT Number ▾ | Study Title   | Conditions  |
|----|--------------|---|---|
| 1. | NCT05007379  | Cohort Study to Determine the Antitumor Activity of New CAR-macrophages in Breast Cancer Patients' Derived Organoids      | Breast Cancer   |
| 2. | NCT04660929  | CAR-macrophages for the Treatment of HER2 Overexpressing Solid Tumors   | HER2-positive Adenocarcinoma Bile Duct Cancer Biliary Tract Cancer Bladder Cancer Breast Cancer Breast Neoplasm Carcinoma, Ductal Carcinoma, Hepatocellular Cancer Lung Cancer, Non-Small-Cell Carcinoma, Ovarian Epithelial Carcinoma, Small Cell Carcinoma, Squamous Carcinoma, Transitional Cell Colorectal Cancer Esophagogastric Junction Neoplasms Inflammatory Breast Cancer Stomach Neoplasms Malignant Neoplasms Ovarian Neoplasms Pancreatic Cancer HER2-positive Solid Tumors HER2-positive Breast Cancer HER2-positive Gastric Cancer HER-2 Protein Overexpression HER-2 Gene Amplification Prostate Cancer Head and Neck Cancer Endometrial Cancer Lung Cancer, Small Cell |
| 3. | NCT04314843  | Study of Lenzilumab and Axicabtagene Ciloleucel in Participants With Relapsed or Refractory Large B-Cell Lymphoma         | Relapsed/Refractory Large B-cell Lymphoma   |
| 4. | NCT03827343  | Retrospective Study of Immunotherapy Related Toxicities and Factors Impacting Outcomes in Children and Adults With Cancer | Macrophage Activation Syndrome Primary Hemophagocytic Lymphohistiocytosis   |
| 5. | NCT03392545  | Combination of Immunization and Radiotherapy for Malignant Gliomas (InSituVac1)   | High Grade Glioma Glioblastoma Glioma of Brainstem Glioma, Malignant  |

**Supplementary Table S2. Clinical trials for CAR-macrophages application in cancer patients.** A search was performed at clinicaltrials.gov using “cancer” as a condition query and “CAR-macrophages” for Intervention/treatment. We retrieved 5 studies applying CAR-macrophages therapy alone or in conjunction with other treatments for solid and hematologic cancers.

|    | NCT Number ▾ | Study Title  | Conditions   |
|----|--------------|--|--|
| 1. | NCT05631899  | Combination of CAR-DC Vaccine and ICIs in Local Advanced/Metastatic Solid Tumors   | Solid Tumor, Adult EphA2 Overexpression KRAS G12V KRAS G12C KRAS G12D                        |
| 2. | NCT05631886  | Combination of CAR-DC Vaccine and ICIs in Malignant Tumors   | Solid Tumor, Adult Lymphoma EphA2 Overexpression TP53 R273H TP53 R175H TP53 R248Q TP53 R249S |
| 3. | NCT05585996  | Exploratory Clinical Study of CD19-targeted CAR-T and CAR-DC in the Treatment of Relapsed and Refractory B-cell Lymphoma | Relapsed and Refractory B-cell Lymphoma  |
| 4. | NCT05277753  | NGS-MRD Assessment of Combination Immunotherapies Targeting T-ALL  | T-Cell Acute Lymphoblastic Leukemia  |
| 5. | NCT05262673  | NGS-MRD Assessment of Combination Immunotherapies Targeting B-ALL  | B-Cell Acute Lymphoblastic Leukemia  |

**Supplementary Table S3. Clinical trials for CAR-DC (CAR-dendritic cells) application in cancer patients.** A search was performed at clinicaltrials.gov using “cancer” as a condition query and “CAR-DC” for Intervention/treatment. We retrieved 5 studies that applied CAR-DC therapy alone or in conjunction with other treatments for solid and hematologic cancers.