A Phase I Study of PNK-007, an Allogeneic, Off the Shelf NK cell in relapsed/refractory Acute Myeloid Leukemia (NCT02781467)
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INTRODUCTION
Background
• Natural Killer (NK) cells are innate immune cells which play an important role in host immune surveillance against antigens and cell transformation. Multiple studies adaptively transforming NK cells in clinical settings have demonstrated the potential of NK cells to induce remissions for hematology indications with a consistent safety profile.1

Celularity has adapted a GMP procedure for generating Placental Hematopoietic Stem Cells Derived Natural Killer cells (PNK-007). This technology platform enables the scalable production of an off the shelf, allogeneic NK cell therapy.

• PNK-007 shows cytotoxic activity against various cancer cell lines and secretes cytokines such as interferon gamma (IFN-γ) during co-culture with cancer cells.

• PNK-007 has been evaluated for the treatment of multiple myeloma patients post-autologous transplant in a Phase I study (PNK-007-MM-001). The completed study is presented in Poster #CT108.

• Immune monitoring of AML patients treated with PNK-007 under this study was performed. Results are presented in Poster #BLJ070.

Here, we present results of the Phase I first-in-man study in relapsed/refractory (r/r) acute myeloid leukemia (AML) patients (PNK-007-AML-001).

PNK-007 manufacturing process overview
Placental CD34+ cells were cultured in the presence of cytokines including thrombopoietin (Tpo), stem cell factor (SCF), Fas ligand, IL-7, IL-15 and IL-2 for 35 days to generate PNK-007 under the cGMP standards followed by release testing.

• PNK-007 was >95% pure for CD34+CD3- cells that exhibited in vitro cytotoxicity against K562 cells.

Results
• PNK-007 was >95% pure for CD34+ cells that exhibited in vitro cytotoxicity against K562 cells.

Key Inclusion Criteria
• Related/refractory patients, including:
  • Primary AML induction failure, relapsed AML who failed standard induction therapy, or Secondary (MDS or Treatment-related) AML who have undergone 1 prior AML therapy
  • Age 18 to 70 years
  • KPS ≥ 70%
  • Ability to stop immunosuppressive drugs for at least 3 days prior to PNK-007 infusion.

CONCLUSIONS
We thank the patients, care givers, sites and research staff for contributing to this research study. We wish to acknowledge and thank staff members of the Translational Therapy Research Group of Minnesota at University of Minnesota and special thanks to Dr. Julie Curtanger, PhD

REFERENCES

A single infusion of PNK-007 up to 10 x 10^6 cells/kg with rhIL-2 following Cy-Fu conditioning was safe and well tolerated, in a manageable CRS-like event observed.

Two of 10 patients treated achieved clinical response, assessed by the investigators using the International Workgroup AML Response Criteria as CRp and MILFS.

Observed clinical data warrant further evaluation of PNK treatment in AML.

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SUPPORTING INFORMATION
Additional supporting information may be found in the online version of this article.