SYNERGISTIC ANTI-TUMOR EFFECT OF ALLOCETRA-OTS, A CELLULAR IMMUNE-THERAPY, IN COMBINATION WITH IMMUNE CHECKPOINT INHIBITORS/ CHEMOTHERAPY/CAR T, THROUGH IN-VIVO REPROGRAMMING OF MACROPHAGES

Dror Mevorach*, Barak Reicher, Oren Hershkovitz, Yehudit Shabat. Hadassah-University Hospital, Jerusalem, Israel; Enlivex Therapeutics, Jerusalem, Israel

Background Immune checkpoint inhibitors (ICI) revolutionized solid tumor treatment, however, in many tumors only partial response is achieved. Allocetra-OTS has an immune modulating effect on macrophages and showed an excellent safety profile in patients including patients with sepsis. Here we investigated the anti-tumoral effect of Allocetra-OTS cellular therapy, in solid tumor animal models.

Methods Allocetra-OTS is manufactured from enriched mononuclear fractions and induced to undergo early apoptosis. In an immunocompetent model, Balb/c mice were inoculated intraperitoneally (IP) with AB12 (mesothelioma) with pLenti-PGK-V5-Luc-Neo and treated with anti-CTLA4 with or without Allocetra-OTS. Mice were monitored daily for clinical score and weekly using IVIS. Kaplan-Meier log rank test was done for survival. For Allocetra-OTS preparation, enriched mononuclear fractions were collected by leukapheresis from healthy eligible human donors and induced to undergo early apoptosis. To follow tumor growth in vivo, HeLa-CD19 cells were stably transduced with pLenti-PGK-V5-Luc-Neo. For CAR preparation, fresh mononuclear cells (MNC) were transduced with CD19-CAR plasmids. SCID-Bg mice were injected IP with human HeLa-CD19 or HeLa-CD19-luciferase cells, 10×10 allocetraOTS or vehicle, and 10×10 CD19-CAR T cells or mock T cells.

Results In immune competent Balb/c mesothelioma model, anti-CTLA4 standalone therapy significantly improved survival from mean 34±9 to 44.9±20 days (p<0.05). Similarly, Allocetra-OTS standalone therapy improved survival to 52.3±20 days (p<0.02). However, anti-CTLA4 + Allocetra-OTS combination therapy, ameliorated survival to 86.7±20 days (p<0.0001) with complete cancer remission in 60-100% of mice (figure 1 & 2). Similar anti-tumoral effects of Allocetra-OTS were seen in mesothelioma model in a combination therapy with either anti-PD1 or cisplatin.

In the CAR-T model, SCID-Bg mice were sacrificed or died from tumor progression in 30±5 days (range 27–37). CAR T cell therapy significantly improved survival to 55±11 days (p < 0.05 vs MOCK) but Allocetra-OTS further improved survival to 75±10 (p < 0.001) with 20-40% complete remission. Conclusions During IP tumor progression, Allocetra-OTS as a standalone therapy or in combination with ICI, cisplatin or CAR-T therapy, significantly reduced tumor size and resulted in complete remission in up to 100% treated mice.

Based on excellent safety profile in > 40 patients treated in prior clinical trials for sepsis and Covid-19, Phase I/II clinical trial of Allocetra-OTS plus chemotherapy has started and first patient already recruited. A second Phase I/II clinical trial of Allocetra-OTS plus anti-PD1, as a second- and third-line therapy in various cancers, is planned for Q4 2022.

REFERENCES