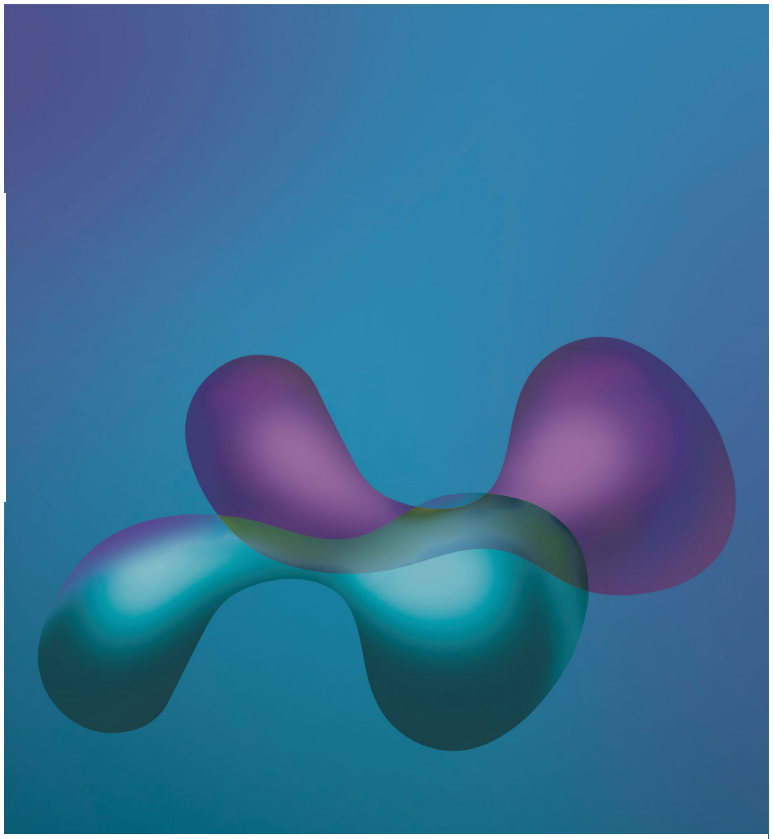
EFFICACY AND SAFETY OF TABELECLEUCEL IN PATIENTS WITH EPSTEIN-BARR VIRUS-ASSOCIATED LEIOMYOSARCOMAS (EBV+ LMS)

Lauren S. Kurlander,[1] Ashok Srinivasan,[2] Armin Ghobadi,[3] Stephanie Suser,[4] Ekaterina Doubrovina,[4] Farid Boulad,[4] Leo Mascarenhas,[5] Michael Laquaglia,[6] Anita Price,[7] Gerald Behr,[7] Barry Shulkin,[8] Akshay Sudhindra,[9] Wei Ye,[9] Minoti Hiremath,[9] Willis Navarro,[9] Richard O'Reilly,[4] Susan E. Prockop[4]

[1]Department of Pediatrics, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [2]Department of Bone Marrow Transplantation and Cellular Therapy, St. Jude Children's Research Hospital, Memphis, TN, USA; [3]Center for Gene and Cellular Immunotherapy (CGCI), Washington University School of Medicine, St. Louis, MO, USA; [4]Pediatric BMT, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [5]Children's Center for Cancer and Blood Diseases, Children's Hospital of Los Angeles, Los Angeles, CA, USA; [6]Department of Pediatric Surgery, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [7]Department of Radiology, Memorial Sloan Kettering Cancer Center, New York, NY, USA; [8]Department of Diagnostic Imaging, St. Jude Children's Research Hospital, Memphis TN, USA; [9]Atara Biotherapeutics, South San Francisco, CA, USA



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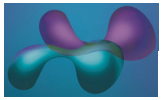
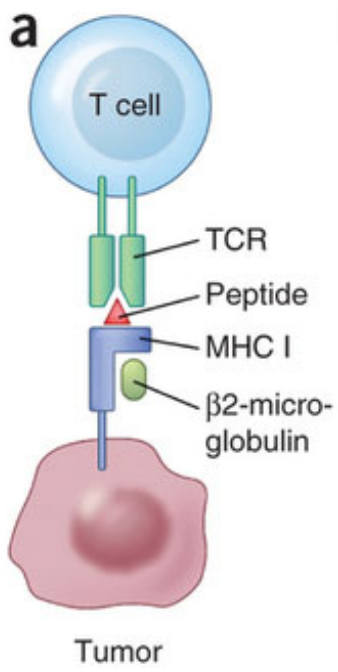
Disclosures

- I have no personal disclosures.
- Atara Biotherapeutics holds the license and IND to develop and commercialize the third party EBV cell therapy program (Tabelecleucel) I will be discussing today.
- MSKCC and several investigators at MSK hold an interest in Atara Biotherapeutics.
- Akshay Sudhindra, Wei Ye, Minoti Hiremath, and Willis Navarro are employees and stockholders of Atara Biotherapeutics.

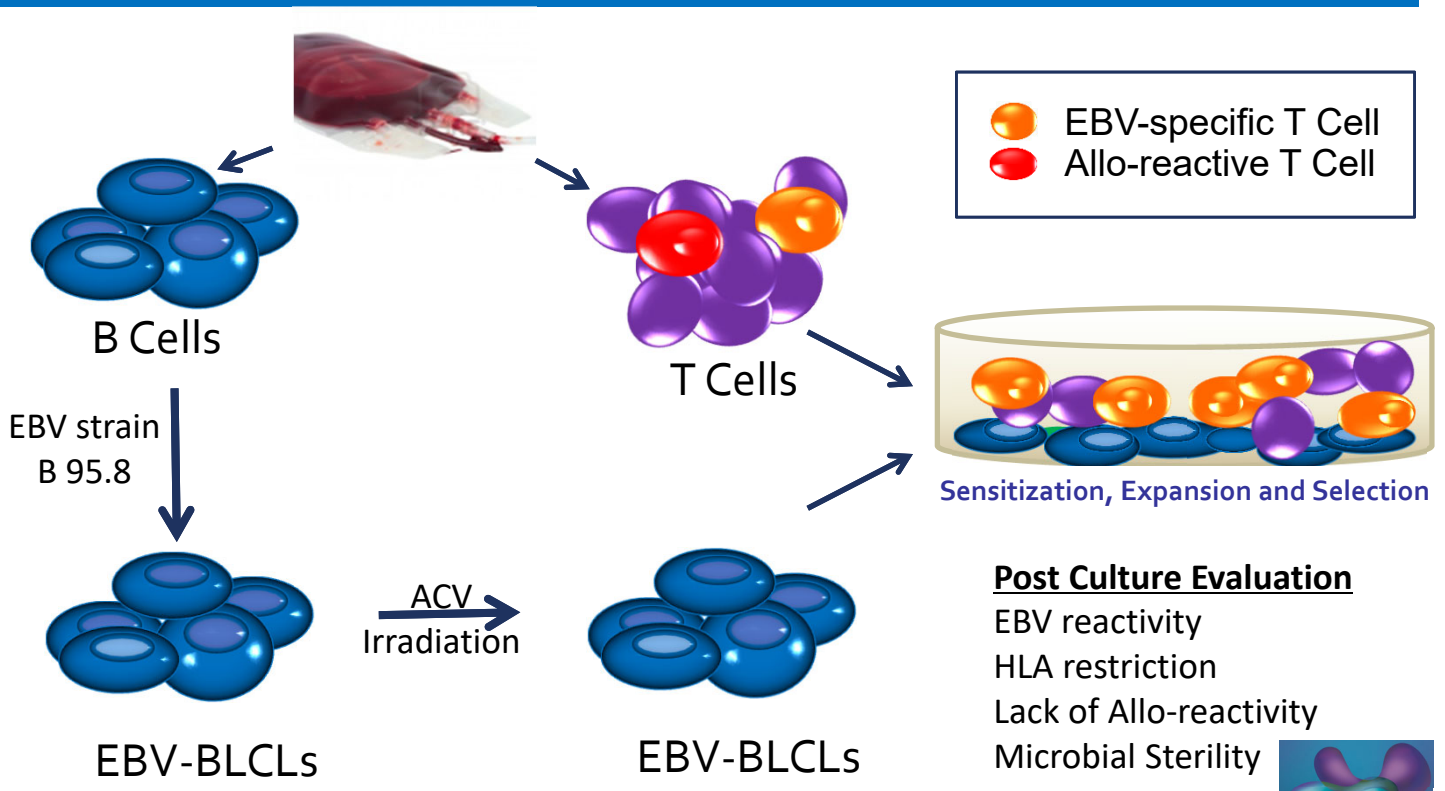


Tabelecleucel Manufacturing

Investigational, off-the-shelf, genetically unmodified, allogeneic T-cell immunotherapy that targets EBV antigens



From Restifo et al.
Nature Biotech 2013



Post Culture Evaluation

EBV reactivity
HLA restriction
Lack of Allo-reactivity
Microbial Sterility

EBV+ Leiomyosarcoma Subset

Disease Background

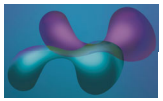
Incidence	• Very Rare EBV+ Disease • 0.7/1000 pt-yrs in SOT recipients[1]
Tumor Character	• Stromal cell soft tissue sarcoma • Typically aggressive • Exhibit EBV latency II pattern
Established Therapies	• Responds poorly to radiation and chemotherapy resulting in limited treatment options and poor outcomes[2]
Survival	• Median OS 19.9, 7.6, and 0.9 months for patients with 0, 1 or 2, and ≥3 risk factors[2*]

[1]Stubbins RJ et al. Transpl Infect Dis. 2018:e13010.
[2]Wang Z et al. Cancer Med. 2016;5(12):3437-3444.
*Hemoglobin <10 g/dL, BMI<30 kg/m2 , albumin <3.5 g/dL, and neutrophilia.

Patient Demographics

Number of Patients	12[a,b]
95-024	5
11-130	3
201	4
Age Group	
<16 / ≥ 16 years	8 (66.7%) / 4 (33.3%)
Group	
SOT	Heart (3), kidney (2), small bowel (1[b]), multi-visceral (1[a]), HCT followed by lung and kidney (1)
Other ID	3

[a]1 patient treated on both 95-024 and 11-130.
[b]1 patient received autologous EBV-CTLs and tabelecleucel.



Tabelecleucel Treatment and Safety Results - EBV+ LMS Patients

Tabelecleucel Treatment

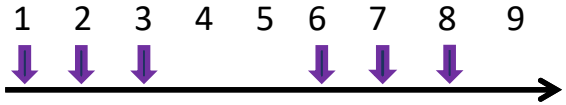
HLA Matching

- Tabelecleucel was matched for at least 2/8 HLA alleles at high resolution and restricted by an HLA allele shared by the patient

Tabelecleucel Administration

- 1 dose per week x 3 of 1-2 x 10^6 cells/kg/dose every 4-6-week cycle

Imaging



- Performed before the 1st dose of each cycle

Key Assessments

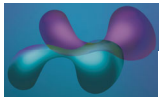
- Efficacy: Overall Response Rate as determined by RECIST 1.1 Overall Survival
- Safety: Studies are ongoing, so safety assessments reported herein are based on SAEs collected by the data snapshot of Nov 16th, 2018

Tabelecleucel Administration

Median number of cycles of tabelecleucel: 6 (range: 1 - 15) months
Median treatment duration: 7.5 (range: 1.4 – 52.5) months

Safety Data

- Treatment-emergent SAEs (TESAEs)
  - 6 of 12 patients (50%) with TESAEs
- Events occurred once, except pyrexia (n = 2)
- The events observed in this subset of patients are reflective of a population of ill patients
- No TESAE was assessed as related to treatment
- No TESAEs led to treatment discontinuation
- No specific safety trends were observed



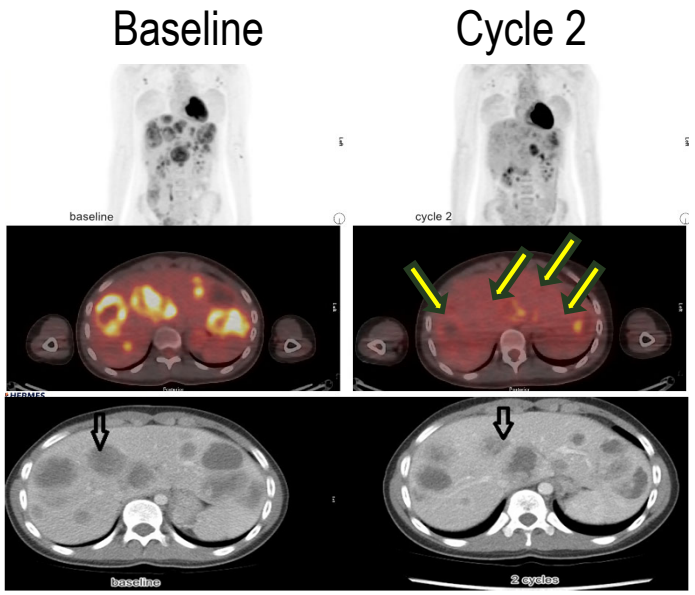
Response to Tabelecleucel in Patients Treated for EBV+ LMS

(RECIST 1.1)

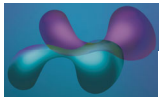
N	12
ORR (95% CI)	**16.7% (2.1%,48.4%)**
CR	0
PR	2
SD	8
PD	0
NE*	2
Median OS (months)	77.4 (95% CI: 18, NE)
Median Follow-Up (months)	22.5 (Range: 2.8, 109.3)
Longest Time to PD (months)	15.5 (2.8 – 65.4)

- Immune response criteria were not used.
- Metabolic responses were observed (by PET) in 3 of 4 (75%) patients on study 201.
- *Not Evaluable – 1 patient received tabelecleucel and autologous product.
  1 patient was too early to evaluate.

15 yo female w/ LMS post- heart transplant



Patient switched tabelecleucel product due to limited availability and eventually progressed at Cycle 3.



Conclusions

1. This analysis represents one of the larger prospective studies of patients with EBV$^+$ LMS.
2. Tabelecleucel available as an off-the-shelf cellular therapy to treat patients with EBV$^+$ LMS, a disease for which there are no established treatment options.
3. The combination of CT-based and metabolic responses to tabelecleucel, in the context of prolonged survival, demonstrate that tabelecleucel may provide clinical benefit in this typically radiation- and chemotherapy-resistant disease.
4. The safety profile of tabelecleucel appears consistent with a favorable risk profile and our previous observations.