Chimeric Antigen Receptor T Cell Therapy in Lymphoma and Leukemia

Elizabeth Budde, MD, PhD

Department of Hematology & HCT
T Cell Therapeutics Research Laboratory
Beckman Research Institute
City of Hope National Medical Center
Duarte, CA
DISCLOSURES

Advisory board for Precision Biosciences, Promab Biotechnologies

Research supports from Mustang Therapeutics, Amgen Inc, Merck & Co.

Speaker Bureau for AstraZeneca, Gilead Inc.
Presentation Objectives

• Introduction of CAR T therapy
• Current status of relevant CAR T trials
• Toxicity management
• Patient screening and consultation
• Future directions
Chapter 1: The Tool

What is CAR T Cell Therapy
CAR T Therapy: an Evolution of Cancer Therapy

1940s
1st Chemotherapy approved

1997
1st targeted antibody approved

2014
Checkpoint inhibitors approved

2017
CD19 CAR T therapy Approved

Indiscriminate Kills both healthy & cancer cells

Target receptor/ molecular Oncogenic drivers

Immuno-oncology modulators

Cell based engineered T cell immunotherapy
CAR T Cell Therapy: A Living Drug

- Genetic modification of T cells to redirect them to become robust tumor specific T cells.
Design & Engineering of CARs
Not All CD19CARs Are Created Equal

MSKCC
JCAR-015

NCI
KTE19

COH

UPENN
CTL-019

FHCRC/SCH
JCAR017

CD28

CD28

CD28

4-1BB

4-1BB

ζ

ζ

ζ

ζ

ζ

ζ
Adoptive Therapy Using CAR T Cells

1. PBMC collection
2. T cell activation
3. CAR delivery
4. Ex vivo cell engineering and processing
5. Lymphodepletion
6. T cell infusion

Variables:
- the starting population: VST, subset enrichment/depletion, ...
- manufacturing process activation method, cytokines, expansion time, ...
- infused products: bulk or defined population, ...
Chapter 2: The Speed and Accidents

Efficacy and safety of Current Relevant CAR T-Cell Therapies in Hematologic Malignancies
CD19CAR: The first CAR with demonstrated clinical benefits

- **CD19** Limited normal tissue expression restricted to B cells
- **CD19** Expresses on all B cell malignancies.
- Remarkable clinical responses observed in a subset of patients in both ALL, NHL and CLL

Blanc *et al.* Clin Cancer Res 2011 17:6448
ELIANA: Study Design

- International, multicenter, open-label, single-arm phase 2 study

- Primary endpoint:
  ORR (CR + CRi) within 3 mos; 4-wk maintenance of remission required

- Secondary endpoints
  MRD status, DoR, OS, cellular kinetics, safety

Pts aged 3-23 yrs
≥ 5% BM lymphoblasts;
no isolated extramedullary
disease,
no prior CD19-directed
therapy,
no prior gene therapy

Fludarabine
30 mg/m²/d IV QD x 4
Cyclophosphamide
500 mg/m²/d IV x 2

CTL019
2.0-5.0 x 10⁶/kg IV ≤ 50 kg
1.0-2.5 x 10⁸ IV if > 50 kg
(n = 62†)

†14 pts discontinued before infusion:
deaths (n = 6),
manufacturing failures (n = 5), AEs (n = 3).

# ELIANA: Baseline Characteristics at Enrollment

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>CTL019 (N = 107)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age, yrs (range)</td>
<td>11 (3-23)</td>
</tr>
<tr>
<td>Male, %</td>
<td>55</td>
</tr>
<tr>
<td>Prior alloHCT, n (%)</td>
<td>46 (61%)</td>
</tr>
<tr>
<td>Median previous lines of therapy, n (range)</td>
<td>3 (1-8)</td>
</tr>
<tr>
<td>Median marrow blast, %</td>
<td>74% (5% to 99%)</td>
</tr>
<tr>
<td>Current disease status, %</td>
<td></td>
</tr>
<tr>
<td>‣ Primary refractory</td>
<td>10</td>
</tr>
<tr>
<td>‣ Chemotherapy refractory</td>
<td>11</td>
</tr>
<tr>
<td>‣ Relapsed</td>
<td>79</td>
</tr>
</tbody>
</table>

## CD19CAR T Induced High CR Rates in B-ALL Trials

<table>
<thead>
<tr>
<th>Study N (txd)</th>
<th>Age, yrs HSCT</th>
<th>T cell Dose</th>
<th>Lympho depletion</th>
<th>CR% MRD-%</th>
<th>Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHCRC 30</td>
<td>40 (20-73)</td>
<td>0.2-20M/kg</td>
<td>Cy, Flu/Cy, Cy/E</td>
<td>93(F)</td>
<td>Flu/Cy group superior</td>
</tr>
<tr>
<td></td>
<td>37%</td>
<td></td>
<td></td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>SCH 45 (45)</td>
<td>12 (1-27)</td>
<td>0.5-10M/kg</td>
<td>Cy/Flu</td>
<td>NA</td>
<td>EFS 51% at 12 mos</td>
</tr>
<tr>
<td></td>
<td>62%</td>
<td></td>
<td></td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>CHOP 59</td>
<td>12 (1.7-24)</td>
<td>1M-20M/kg</td>
<td>Any</td>
<td>93</td>
<td>RFS 55% at 12 mos OS 79%</td>
</tr>
<tr>
<td></td>
<td>66%</td>
<td></td>
<td></td>
<td>88(F)</td>
<td></td>
</tr>
<tr>
<td>NCIped 55</td>
<td>13 (4-30)</td>
<td>1-3M/kg</td>
<td>Cy, Cy/Flu</td>
<td>62</td>
<td>LFS 56% for MRD-CR* median f/u -2.2 yrs</td>
</tr>
<tr>
<td>52 (52)</td>
<td>19%</td>
<td></td>
<td></td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>MSKCC 83</td>
<td>40 (22-74)</td>
<td>1-3M/kg</td>
<td>Cy, Cy/Flu</td>
<td>82</td>
<td>DFS 27% MRD-CR# ≥12 mos</td>
</tr>
<tr>
<td>53 (53)</td>
<td>35%</td>
<td></td>
<td></td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>ELIANA 107</td>
<td>11 (3-23)</td>
<td>2-5M/kg or 100-250M if &gt;50kg</td>
<td>Cy/Flu</td>
<td>81</td>
<td>RFS 59% at 12 mos OS 76% at 12 mos</td>
</tr>
<tr>
<td>75 (75)</td>
<td>56%</td>
<td></td>
<td></td>
<td>77</td>
<td></td>
</tr>
</tbody>
</table>

N: number at enrollment; Txd: treated with CAR T; F: flow cytometry
ELIANA: Safety

Table 3. Adverse Events of Special Interest within 8 Weeks after Infusion, Regardless of Relationship to Tisagenlecleucel.*

<table>
<thead>
<tr>
<th>Type of Event</th>
<th>Any Grade (N = 75)</th>
<th>Grade 3 (N = 75)</th>
<th>Grade 4 (N = 75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any adverse event of special interest</td>
<td>67 (89)</td>
<td>26 (35)</td>
<td>30 (40)</td>
</tr>
<tr>
<td>Cytokine release syndrome</td>
<td>58 (77)</td>
<td>16 (21)</td>
<td>19 (25)</td>
</tr>
<tr>
<td>Neurologic event</td>
<td>30 (40)</td>
<td>10 (13)</td>
<td>0</td>
</tr>
<tr>
<td>Infection</td>
<td>32 (43)</td>
<td>16 (21)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Febrile neutropenia</td>
<td>26 (35)</td>
<td>24 (32)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Cytopenia not resolved by day 28</td>
<td>28 (37)</td>
<td>12 (16)</td>
<td>12 (16)</td>
</tr>
<tr>
<td>Tumor lysis syndrome</td>
<td>3 (4)</td>
<td>3 (4)</td>
<td>0</td>
</tr>
</tbody>
</table>

ICU admission 47% (35 of 75) with median stay of 7 days (range, 1-34)
10% mechanical ventilation
25% high dose vasopressors
ELIANA: DOR, OS and EFS

Median follow-up: 13.1 months
DOR: not reached (n = 61)
8 CR patients: alloHCT
  - 2 w/ MRD+
  - 2 w/ B cell recovery w/i 6 mos

Relapse
CD19 expression
  + 1 pt
  - 15 pts
unknown 4 pts

Acute Lymphoblastic Leukemia

FDA approval 8/30/2017

**Indication**

- patients up to 25 years of age with ALL that is refractory or in second or later relapse.

$475,000 per product
NHL

• ZUMA-1 (NCT02348216): Multicenter Phase II Trial of Axicabtagene Ciloleucel (Axi-cel. sponsor: KITE Pharma/Gilead)

• JULIET (NCT02445248): Multicenter Phase II trial of Tisagenlecleucel (sponsor: Novartis)

• TRANSCEND NHL001 (NCT02631044): Multicenter Phase I/II trial of Liso-cel (Sponsor: Juno Therapeutics/Celgene)
<table>
<thead>
<tr>
<th></th>
<th>ZUMA-1 N = 111</th>
<th>JULIET N = 149</th>
<th>TRANSCEND N = 140</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Costim domain</strong></td>
<td>CD28</td>
<td>4-1BB</td>
<td>4-1BB</td>
</tr>
<tr>
<td><strong>T cell type</strong></td>
<td>PBMC</td>
<td>PBMC</td>
<td>CD4: CD8 (1:1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11 non-comforming</td>
</tr>
<tr>
<td><strong>ALC</strong></td>
<td>≥100 /ul</td>
<td>≥300 /ul</td>
<td>No requirement</td>
</tr>
<tr>
<td><strong>Cell dose</strong></td>
<td>1-2M/kg</td>
<td>100-500M</td>
<td>100M (DL2S)</td>
</tr>
<tr>
<td><strong>Product success</strong></td>
<td>99%</td>
<td>94%</td>
<td>98% (126/128)</td>
</tr>
<tr>
<td><strong>Product not given</strong></td>
<td>10</td>
<td>43</td>
<td>20</td>
</tr>
<tr>
<td><strong>Patients</strong></td>
<td>Ref DLBCL, tFL, PMBCL</td>
<td>R/R DLBCL tFL</td>
<td>R/R DLBCL NOS tFL, FLgr3b high grade BCL</td>
</tr>
<tr>
<td><strong>Prior auto</strong></td>
<td>allowed</td>
<td>allowed</td>
<td>allowed</td>
</tr>
<tr>
<td><strong>CNS</strong></td>
<td>no</td>
<td>no</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; CNS, allowed</td>
</tr>
<tr>
<td><strong>ECOG PS</strong></td>
<td>0 - 1</td>
<td>0 - 1</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>
NHL: Potential Best in Profile

CR + durability + Safety

<table>
<thead>
<tr>
<th></th>
<th>ZUMA-1 KTE-019</th>
<th>JULIET CTL-019</th>
<th>TRANSCEND JCAR17 core group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphodepletion</td>
<td>Flu/Cy</td>
<td>Flu/Cy, Benda</td>
<td>Flu/Cy</td>
</tr>
<tr>
<td>Best CR</td>
<td>54% (n=101)</td>
<td>40% (n = 81)</td>
<td>63% (n = 27)</td>
</tr>
<tr>
<td>CR at 3 mos months</td>
<td>52%</td>
<td>32%</td>
<td>68%</td>
</tr>
<tr>
<td>CR at 6 mos</td>
<td>36%</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td>Transplant</td>
<td>2 -&gt; alloHCT</td>
<td>0% responders</td>
<td>n/a</td>
</tr>
<tr>
<td>CRS grade ≥ 3</td>
<td>12%</td>
<td>23%</td>
<td>0% (n=29)</td>
</tr>
<tr>
<td>Grading Median TTO</td>
<td>Lee’s 2d (1 - 12)</td>
<td>Penn scale 3d (1 - 9)</td>
<td>Lee’s 5d (1 - 14)</td>
</tr>
<tr>
<td>NT grade ≥ 3</td>
<td>31%</td>
<td>12%</td>
<td>7%</td>
</tr>
<tr>
<td>Grading Median TTO</td>
<td>CTCAE4.03 5d (1 - 17)</td>
<td>CTCAE4.03 n/a</td>
<td>CTCAE4.03 10d (3 - 23)</td>
</tr>
<tr>
<td>Outpatient</td>
<td>0%</td>
<td>26%</td>
<td>20% (4/20)</td>
</tr>
</tbody>
</table>
Duration of Response

**ZUMA-1**
- Median PFS 5.9 Mo
- Most pts with CR at Mo 6 remained in CR

**JULIET**
- 74% RFS at Mo 6
- No responders moved to HCT
- Most pts achieving CR at Mo 3 remained in CR

**TRANSCEEND (CORE)**
- 80% CR at Mo 3 remain in CR at Mo 6
- 92% CR at Mo 6 remains in CR at a longer term

ASH 2017
### Other CAR T for lymphoma and ALL

<table>
<thead>
<tr>
<th>CAR</th>
<th>No. of Sites</th>
<th>Malignancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD22 CAR</td>
<td>at least 10 sites</td>
<td>B-NHL, ALL</td>
</tr>
<tr>
<td>CD30 CAR</td>
<td>at least 7 sites</td>
<td>HL, ALCL</td>
</tr>
<tr>
<td>IgK CAR</td>
<td>1 (Baylor)</td>
<td>B-NHL</td>
</tr>
<tr>
<td>CD20 CAR</td>
<td>at least 10 sites</td>
<td>B-NHL</td>
</tr>
<tr>
<td>CD7 CAR</td>
<td>1</td>
<td>TCL and T-ALL</td>
</tr>
<tr>
<td>CD5 CAR</td>
<td>1 (Baylor)</td>
<td>TCL</td>
</tr>
<tr>
<td>CD4 CAR</td>
<td>Being planned</td>
<td>TCL</td>
</tr>
<tr>
<td>CCR4 CAR</td>
<td>Being planned</td>
<td>TCL</td>
</tr>
</tbody>
</table>
Trials using CAR T Cells targeting both CD19 & CD22

- Duotargeting approach
  T cells transduced with CD19CAR and CD22CAR at Seattle Children’s (PLAT-05 trial)

- Sequential approach
  CD22CAR T (day 1) + CD19CAR T (day 14/15) at Tongji Hospital, China

- Bivalent approach
  CD19/CD22 CAR T at Stanford and NCI
**CAR T for Acute Myeloid Leukemia**

**Targets:** CD123, CD33, NKG2D, Lewis Y…

**Ideal target:** only on leukemic stem cells (yet to be identified)

High risk for on-target, off tumor effects

---

**HSC**

Normal growth & Differentiation

**LSC**

Mutation(s)

Anti-leukemic therapy

Developmental arrest

Leukemia blast cells

Normal blood cells
A Phase 1 First-in-Human Clinical Trial Using CD123 CAR T for Patients with Rel/Ref AML and BPDCN (PI: Budde, COH)

Manufacturing time: 13 to 16 day process
Turnaround time ~ 21 days
Success rate: 93% (13/14 products)
AML cohort: 7 patients treated
BPDCN cohort: 2 patient treated
UPN 167: ref AML, 47 F, 4 prior lines of treatment and prior MRD AlloSCT (sister),

- Tocilizumab: D5, D6, D7
- Dex: D6, D8
- IVIG: D7

200M Donor-CAR
T cell infusion

Cy/Flu
D-5 to -3

D0

D1

D5 D6 hypoxia, intubation, BAL→ adenovirus

D8

D10 extubation

CRP (mg/L)

Ferritin (ng/ml)
UPN 167: Recovery of Hematopoiesis

ANC
>500
on d 22

last RBC transfusion on d17

last PLT transfusion on d10

Bone marrow examination

Budde et al. ASH 2017
BPDCN Cohort: UPN 203

72 y.o. man with BPDCN with disease progression after 5 cycles of SL-401
- Lymphodepletion
D -5 to -3
Flu 25mg/m2/d
Cy 300 mg/m2/d
- Autologous CD123 CAR T
D0, 100 x 10^6
D14: skin biopsy -> NED
D28: skin biopsy -> NED
D28: bone marrow biopsy-> NED

Budde et al. ASH 2017
CAR T Therapy for Lymphoma/leukemia at COH

Therapies in the following diseases
- DLBCL, tFL, (3 sponsored trials, 1 COH trial, Yescarta and Kymriah)
- PMBCL (2 sponsored trials, Yescarta)
- MCL (1 active sponsored trial, 1 COH trial pending)
- FL (1 sponsored trial pending)
- CLL (1 active sponsored trial)
- ALL (1 COH trial, 1 pending)
- AML (1 COH trial)
Chapter 3. CAR Repair
Toxicity Management
CAR T Cell Therapy: Complications

Commonly reported important adverse events

- On target off tumor effects, i.e. B cell aplasia (CD19CAR)
- Lymphodepletion chemo-related toxicity
- Tumor lysis syndrome
- Macrophage activation syndrome (HLH/MAS)
- Coagulopathy
- Cytokine release syndrome
- Neurotoxicity
- Infection
Cytokine Release Syndrome

- A constellation of inflammatory symptoms from cytokine elevations.
- Association with T cell activation and proliferation
- Association with clinical benefit and toxicity
# CRS Grading

<table>
<thead>
<tr>
<th>Grade</th>
<th>Clinical Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fever ± symptoms such as rigors, malaise, fatigue, anorexia, myalgias, arthalgias, nausea, vomiting, headache</td>
</tr>
<tr>
<td>2</td>
<td>Hypotension responding to fluid resuscitation or one low dose pressor, or Hypoxia responding to ≤ 40% FiO2, or Grade 3 transaminitis, other grade 2 organ toxicity according to CTCAE v4.03</td>
</tr>
<tr>
<td>3</td>
<td>Hypotension requiring &gt;3 hours of two pressors, or one pressor at high dose, or Hypoxia requiring &gt;40% FiO2, or Grade 4 transaminitis, other grade 3 organ toxicity according to CTCAE v4.03</td>
</tr>
<tr>
<td>4</td>
<td>Requirement of mechanical ventilator support, or Grade 4 organ toxicity excluding grade 4 transaminitis</td>
</tr>
<tr>
<td>5</td>
<td>Death</td>
</tr>
</tbody>
</table>

Lee DW et al. Blood 2014
Goal: reduce serious CRS symptoms and signs, and prevent life-threatening complications

- Tocilizumab is the first choice for CRS mitigation (selective grade 2, all grade 3 and 4 cases).
  humanized IgG1 anti-hIL-6R mAb, FDA approved in 8/2017
  8 mg/kg iv over 1 hour x1, can repeat in 24 to 48 hours

Would prophylactic tocilizumab increase safety without compromising efficacy?  (likely not)

What to do in tocilizumab refractory cases (no improvement after 2 doses of Tocilizumab)?
- Steroids, Methylpred 2mg/kg/d or Dex 0.5mg/kg max 10mg/dose, quick taper.
- Siltuximab, Etenercept, Roxilitinib, ibrutinib
Neurologic Toxicity

- Presentation: headaches, encephalopathy, delirium, aphasia, ataxia, confusion, hallucinations, tremor, seizure, obtundation. Last days to months

- Can occur independently from CRS or presence of CAR T cells in CSF.

- No correlation with CNS disease

- Can result in patient death
  - ROCKET trial: 5 cerebral edema
  - FHCRC: 1 irreversible neurotoxicity (d10 to d122)
  - MSKCC: 1 seizure
  - ZUMA-1: 1 cerebral edema
Neurologic Toxicity Management

• Prophylaxis is common but efficacy is unknown
• Workup generally includes neurology consult, blood and cerebrospinal fluid analyses, neuro-imaging, and electroencephalography
• Gold standard of treatment is steroids
• Cytokine blockade can be given but its unknown if these are effective or detrimental (be cautious)
• Intervention is based on neurologic toxicity severity
Infection: Dancing with the devil

Incidence: 23% FHCRC trials; 27% JULIET trial; 38% ZUMA-1; 41% ELIANA

Pretreatment factors
- impaired immune function
- tissue damage from prior chemoregimens

Treatment factors
- cytopenia from lymphodepletion,
- immunosuppressive drugs such as toci/dex
- ICU stay
- hypogammaglobulinemia

Other risk factors
- ALL patients
- >= 4 lines of prior therapies
- Higher CAR dose
- Severe CRS

Hill et al. Blood 2017;
Yescarta.com
Budde and Zaia, Blood 2017
ID prophylaxis is recommended
- lack of standard approach
- autoHCT guideline
- anti-fungal prophylaxis in pts with prior HCT

Hill et al. Blood 2017;
Yescarta.com
Budde and Zaia, Blood 2017
Chapter 4. CAR Service

Patient Consultation
## Patient Eligibility Considerations

| Timing of referral | Early referral is strongly encouraged  
- Product ready time 3 - 4 weeks unless off the shelf  
- Discussion of treatment strategies |
|-------------------|----------------------------------------------------------------------------------|
| H/o AI, CVA, seizure | Might at higher risks for toxicity  
Excluded in trials |
| Performance status | ECOG 0-2 (?) |
| Organ function | physically able to deal with CAR T toxicities |
## Patient Eligibility Considerations

| Requirement of ALC   | cut off of 100 ALC/ul in ZUMA-1  
<table>
<thead>
<tr>
<th></th>
<th>300 ALC/ul in JULIET trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior CD19 treatment</td>
<td>No impact on CD19CAR activity as long as tumor cells remain CD19+</td>
</tr>
</tbody>
</table>
| Prior Allogeneic HCT? | No impact on efficacy  
|                      | Might increase infection risk (esp. aspergillus and viral infection) |
| Prior CAR T         | Might still respond to a different CAR T treatment  
|                     | CD19CAR -> CD22CAR or CTL119 |
What Is the Role of AlloHSCT if CR after CAR T Cell Therapy?

- HSCT consolidation after CAR correlates with decreased relapsed rate in some studies but not others.

<table>
<thead>
<tr>
<th>Post CAR Allo</th>
<th>Relapse (N, %)</th>
<th>Transplant related Mortality</th>
<th>Median LFS</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, N = 21</td>
<td>2, 9%</td>
<td>5 (24%)</td>
<td>Not reached</td>
<td>65% at 18 mos</td>
</tr>
<tr>
<td>No, N=7</td>
<td>6, 86%</td>
<td>N/A</td>
<td>4.9 months</td>
<td>14% at 9.8 mos</td>
</tr>
</tbody>
</table>

NCI-ped B-ALL CD19CAR study

MSKCC ALL trial,
- subsequent alloHCT did not improve OS (p = 0.8).
(Park et al. JCO 2017)
Chapter 5. Future CARs
Future Directions

Bring CAR T therapy earlier in the disease treatment course
- First salvage
- Upfront?

Can CAR T replace autologous transplant?
  ZUMA-7: phase 3 randomized trial, chemo-based vs CD19CAR

Roles of CAR T as Maintenance?
- High risk patients
  DH-DLBCL in CR1
  high risk ALL in CR1 with no donor

Other indications
- Follicular lymphoma, MCL, etc.
Future Directions

Increase the cost effectiveness

- Need more outcome based studies
  - long term outcomes of CAR T vs other therapies

- Reduce the cost of manufacturing
  - off the shelf CAR products (allo CAR, NKCAR, iPSC-CAR)

- Improve potency/response
  - understand resistance mechanism
  - combinational therapy
    - i.e. duotargeting
    - armored CAR
    - checkpoint blockade
    - more
Clinical Development of CAR T Cell Trials

8.17.2018 (n=660)
US: 265
China: 206
Europe: 101
Questions

• Elizabeth Budde, MD, PhD
  Tel: 626-218-0612
  Email: ebudde@coh.org
Quiz 1. Which of the following B-ALL patients is the best candidate to receive CD19CAR T therapy?

A. 70 yo man with newly diagnosed CD19+ B-ALL, and COPD on 2L O2 at baseline, ECOG 3
B. 40 yo woman with refractory B-ALL, with CD19-ve disease after blinatumumab, ECOG 0, no comorbidities
C. 30 yo man with newly diagnosed B-ALL, ECOG 0, no comorbidities
D. 35 yo woman with refractory CD19+ B-ALL following a prior alloHCT, ECOG 1, no cormorbidities

Answer: D
Quiz 2. Which of the following intervention is appropriate during CD19 CAR T therapy?

A. Daily dexamethasone up to 4 mg per day

B. Steroids should only be used in a patient with grade 4 encephalopathy if tocilizumab does not work.

C. Patients can be followed on a weekly basis once they receive CAR T infusion.

D. Tocilizumab is indicated if a patient develops persistent hypotension refractory to iv fluid.

Answer: D