XIX Congresso della Società GITMO

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TORINO, CENTRO CONGRESSI LINGOTTO, 5 - 6 MAGGIO 2025

Aspetti qualitativi e quantitativi nella raccolta di linfociti per ATMP

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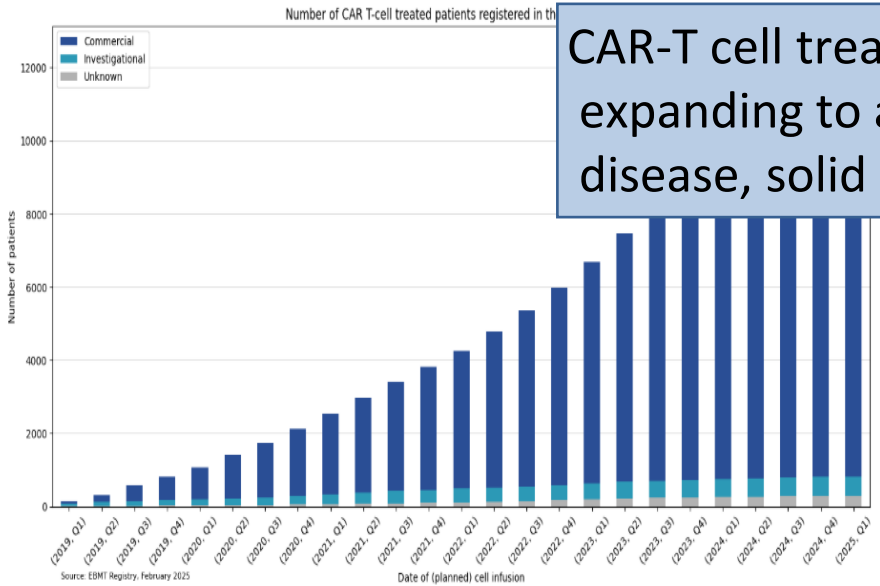
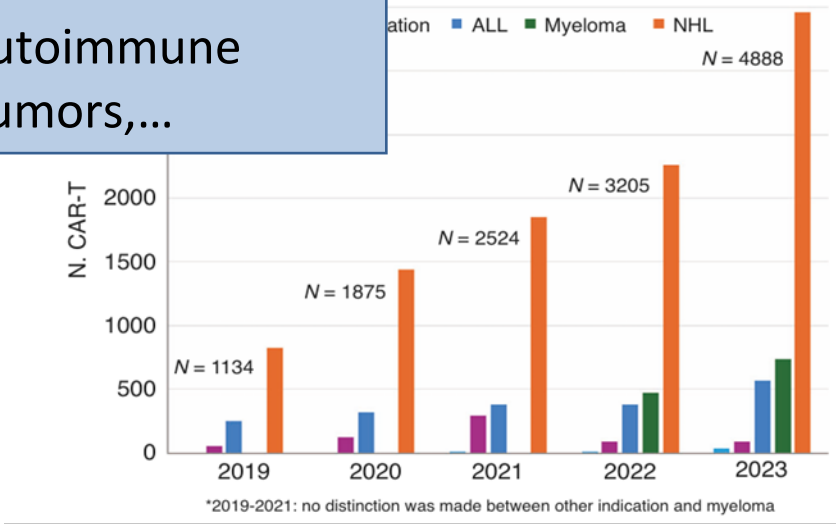
Disclosures of Name Surname

Company name	Research support	Employee	Consultant	Stockholder	Speakers bureau	Advisory board	Other
Vertex					x		

The number of patients treated with CAR-T cells is increasing



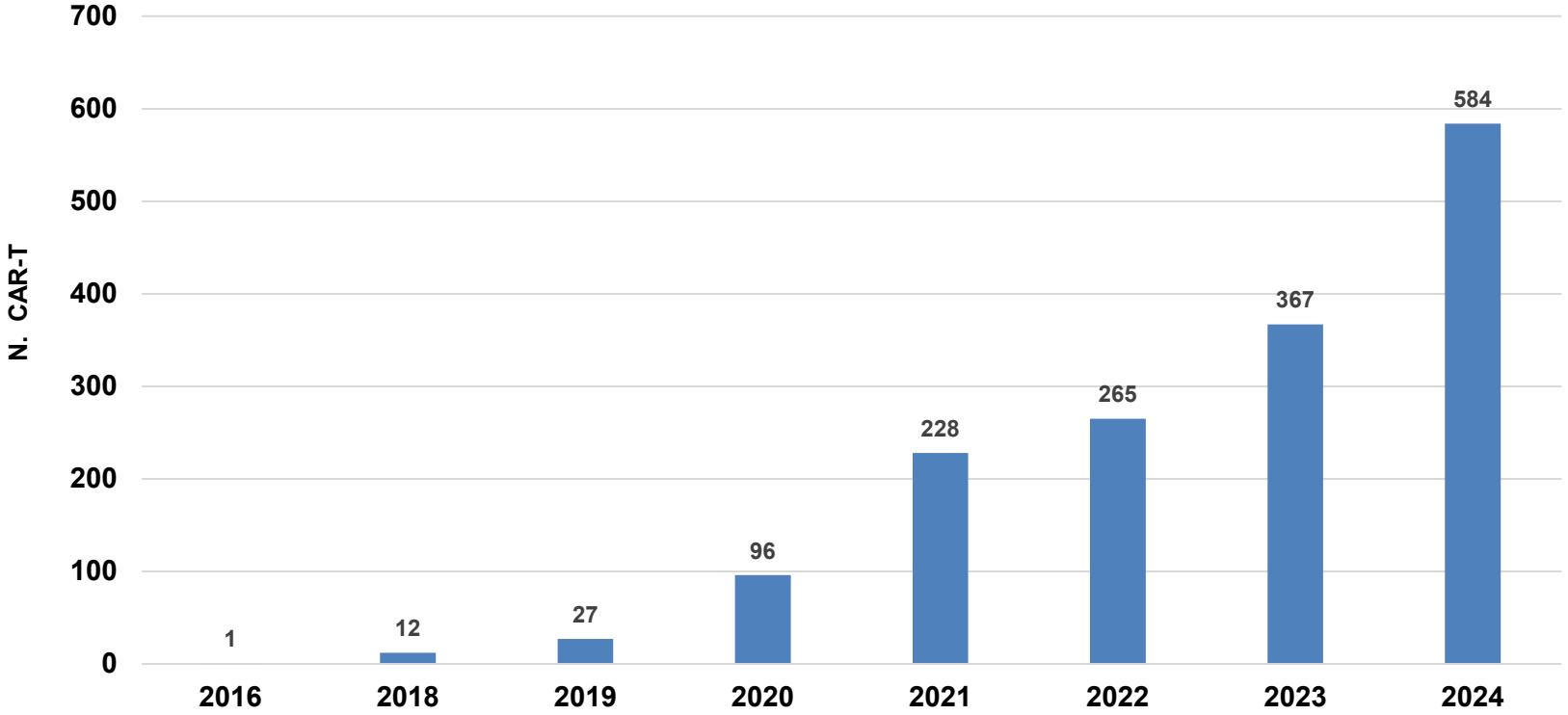
CAR-T cell treatment is expanding to autoimmune disease, solid tumors,…



https://www.ebmt.org/registry/data-collection-car-t-cells

Passweg JR BMT 2025

CAR-T procedures by year (n=1580) in Italian centres



Export date 18/04/2025

Courtesy of E. Oldani

Market authorization for CAR-T cells in EU

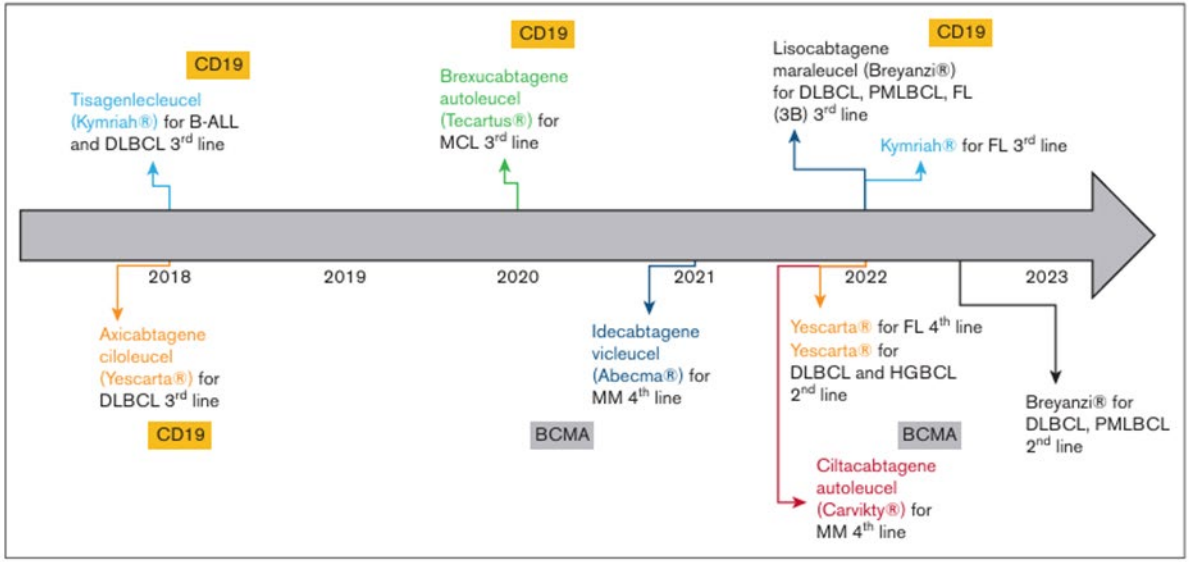


Figure 1. Overview of CAR T cells granted with marketing authorizations (MA) in the European Union by January 2023, including extensions of their MA. BCMA, B-cell maturation antigen; FL, follicular lymphoma; HGBCL, high-grade B-cell lymphoma; MCL, mantle cell lymphoma; MM, multiple myeloma; PMBCL, primary mediastinal B-cell lymphoma.

Different protoc g among companies

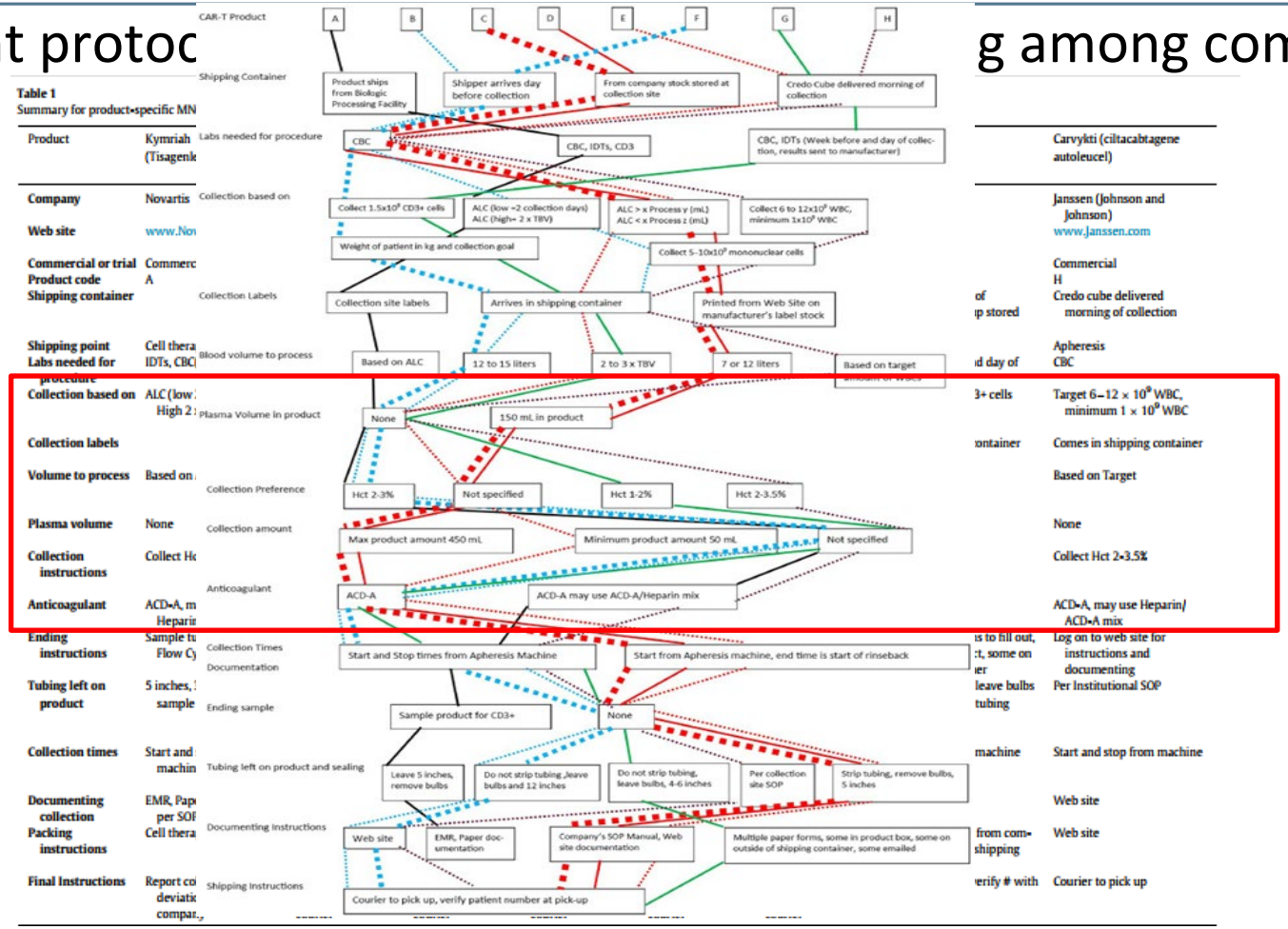
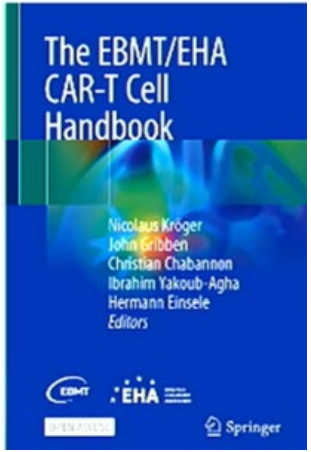


Table 1
Summary for product-specific MN

Product	Kymriah (Tisagenl		Carvykti (ciltacabtagene autoleucel)
Company	Novartis	Collection based on	Janssen (Johnson and Johnson)
Web site	www.No		www.janssen.com
Commercial or trial	Commerc		Commercial
Product code	A		H
Shipping container		Collection Labels	Credo cube delivered morning of collection
Shipping point	Cell thera		Apheresis
Labs needed for procedure	IDTs, CBC	Blood volume to process	CBC
Collection based on	ALC (low High 2	Plasma Volume in product	Target 6–12 × 10^9 WBC, minimum 1 × 10^9 WBC
Collection labels			Comes in shipping container
Volume to process	Based on	Collection Preference	Based on Target
Plasma volume	None	Collection amount	None
Collection instructions	Collect He		Collect Hct 2-3.5%
Anticoagulant	ACD-A, m Heparir	Anticoagulant	ACD-A, may use Heparin/ ACD-A mix
Ending instructions	Sample tu Flow Cy	Collection Times Documentation	Log on to web site for instructions and documenting
Tubing left on product	5 inches, sample	Ending sample	Per Institutional SOP
Collection times	Start and machin	Tubing left on product and sealing	Start and stop from machine
Documenting collection	EMR, Pap per SOI	Documenting Instructions	Web site
Packing instructions	Cell thera		Web site
Final Instructions	Report co deviati compar	Shipping Instructions	Courier to pick up



from August 2027

Official Journal of the European Union

EN
L series

2024/1938

17.7.2024

REGULATION (EU) 2024/1938 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 13 June 2024

on standards of quality and safety for substances of human origin intended for human application and repealing Directives 2002/98/EC and 2004/23/EC

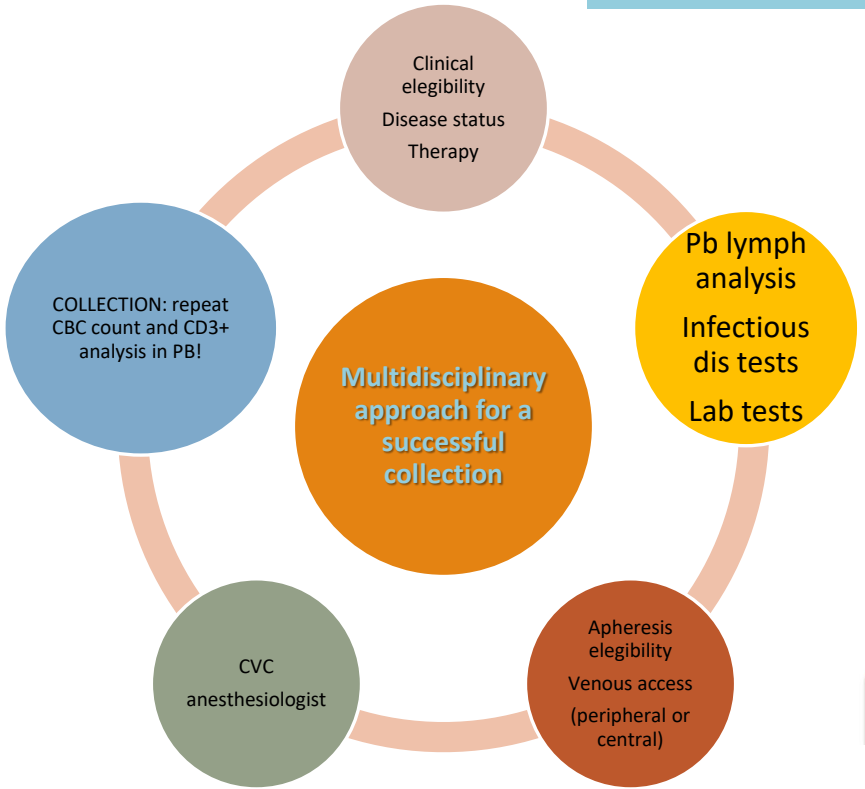
The right start is the foundation of successful therapy

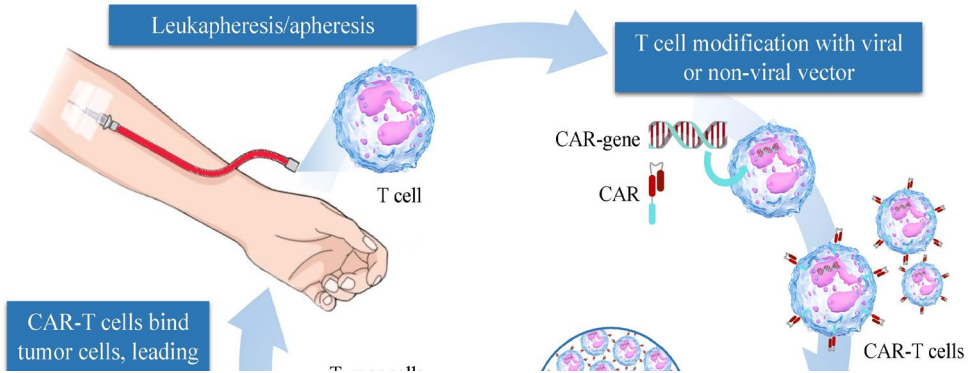
- **Quantity** of cells collected (CE)
- **Quality** of sta… …nposition)

Despite technical advances in methodology, CAR T-cell manufacture **failure** is reported in **1- 13%** of patients in clinical trials and is frequently attributed to the poor quality and poor yield of autologous T-cell harvest.

Bersenev A, Cell and Gene Therapy Insights 2018

The collection is critical to permit the manufacturing of CAR-T cells





HEMATOPOIETIC STEM CELL TRANSPLANTATION AND CORD BLOOD BANKING
Recommendation

Managing leukapheresis in adult and pediatric patients eligible for chimeric antigen receptor T-cell therapy: suggestions from an Italian Expert Panel

Table II - *Phase II: the work-up to be completed on the day of blood collection, with the panel's suggestions*

Work-up	Panel's suggestions
• Informed consent for leukapheresis	• To be obtained before every collection
• Pre-collection blood test	• Peripheral blood hemocytometric parameters with differential MNC count, ANC and CD3+ counts; coagulation tests, electrolytes (Ca/K/Mg)
• Biological qualification of the product	• Check the validity of the infectious disease tests and additional tests required by local regulations
• Calculation of the volume to be processed	• Product sampling during collection
• Possibility of using different cell separators and validated software	• Protocol with low extracorporeal volume preferred in smaller children
• Management of anticoagulation and citrate toxicity	• ACD-A+ heparin (if there is no contraindication) in pediatric population; use of activated clotting time device (for real-time monitoring)
• Management of interruption/CVC in emergency situations	• CVC team immediately available in an emergency
• Possibility of a second collection	• Check cell factory slot availability

MNC: continuous mononuclear cells; ANC: absolute neutrophil count; ACD-A: acid citrate dextrose solution A; CVC: central venous catheter.

Table III - *Panel's suggestions for the management of special case*

Special case	Panel's suggestions
Low lymphocyte count	• Postpone leukapheresis by >7 days • Transfusion of concentrated RBCs or PLTs if needed • Plan a large volume apheresis • Perform multiple harvests to be cryopreserved
Peripheral blastosis	• Assess the immunophenotype before cell harvesting besides blood tests • Adjust the number of volumes to be processed
Pediatric population <25 kg	• Availability of trained staff • Central venous access preferred • Blood priming (mandatory for patients weighting <25 kg) • Anticoagulation with ACD-A + heparin • Sedation in the case of lengthy procedure
COVID-19 outbreak	• In line with EBMT recommendations[56], and local and institutional requirements • Possible cell factory risk assessment request

RBCs: red blood cells; PLTs: platelets; ACD-A: acid citrate dextrose solution A; EBMT: European Society for Blood and Marrow Transplantation.

Set of leukapheresis collection influences lymphocyte yield and product manufacturing

- ✓ Collection efficiency (CE): collecting enough T cells

Patient's safety

CE is used to estimate the volume to be processed to achieve the target dose of T-cells

Equation 1. Calculating Estimated Minimum Total Blood Volume to be Processed[a]

$$\text{Estimated minimum blood volume to be processed (L)} = \frac{1\times10^{9}\ \text{(cells)}^{b}}{\text{Collection efficiency}^{c} \times \text{Peripheral CD3}^{+}\ \text{lymphocyte count (cells/µL)} \times 10^{6}\ \mu\text{L/L}}$$

40% CE is reported as accepted value

Collection efficiency 1 (CE1)	$\frac{\text{Total product target cells}}{\frac{(\text{pre-PB target cells}/\mu\text{L} + \text{post-PB target cells}/\mu\text{L})}{2}} \times \text{Blood volume processed (in mL)}$
Collection efficiency 2 (CE2)	$\frac{\text{Total product target cells}}{\text{Pre-PB target cells}/\mu\text{L}} \times \text{Blood volume processed (in mL)}$

1 x10*9 T-cells is usually sufficient to start CAR T-cell manufacturing

A guide to the collection of T-cells by apheresis for ATMP manufacturing—recommendations of the GoCART coalition

N. Worel et al.

Table 1. Shows the characteristics of the most commonly used apheresis platforms for collection of unstimulated leukocytes as starting material further CAR-T cell manufacturing.

Apheresis device Apheresis platform	Amicus™ MNC	Spectra Optia® cMNC	Spectra Optia® MNC
Collection technique	In cycles with continuous blood flow. Volume of cycles determined by the peripheral blood WBC count. MNCs are isolated and concentrated by an elutriation process, and periodically transfered to the external collection bag while platelets are returned to the patient.	Continuously After establishment of the interface target cells are continuously collected in the collection bag. Interface can be adapted by changing the collection preference.	In cycles with continuous blood flow. Target cells are concentrated in a collection chamber until a RBC sensor recognizes a spill over of cells. The chamber is then flushed with plasma into the collection bag. A completely filled chamber can hold approximately 3×10^9

Table 1. continued

Apheresis device Apheresis platform	Amicus™ MNC	Spectra Optia® cMNC	Spectra Optia® MNC
Special considerations in patients with ALL/blastoid MCL	Indifferent to WBC within typical range (however not best suited for patients with >15.000–20.000 leukocytes/µl).	In patients with high leukocyte counts: Collect with the leukodepletion platform Risk: high blast-contamination in apheresis material can impair further manufacturing.	Not best suited for patients with >15.000–20.000 leukocytes/µl.
Special considerations blood counts	Haemoglobin ≥8 g/dl recommended, platelets ≥20.000/µl in adults (≥50.000/µl in children) (≥150–200/µl T-cell recommended for CAR-T apheresis according to EHA/EBMT guidelines [17]		
Advantage	Easy to use, low collection volume	Easy to use, large process volumes possible.	Low extracorporeal volume (paediatric patients), low collection volume.
Disadvantage	Maximum blood flow rate limited	Relatively high extracorporeal volume compared to other platforms Potentially high collection volume (depending on collection pump speed).	less total volume processed per time where frequent chamber flushes are indicated.

+ MCV

Apheresis device Apheresis platform	Amicus™ MNC	Spectra Optia® cMNC	Spectra Optia® MNC
Product volume	Depends on number of cycles and plasma volume used for flushing the collection line.	Depends on procedure time and collection flow rate.	Depends on number of cycles and volume used for chamber flush (total product volume should be ≥20 ml).
Procedure specific settings	Default settings of offset volumes for MNC 2.3 ml and RBC 6.5 ml during MNC transfer. Possible optimization: • Platelets $<300 \times 10^9$/L: Offset for MNC 1.5 ml; RBC 6.5 ml • Platelets $\geq 300 \times 10^9$/l Offset for MNC 2.3 ml; RBC 6.5 ml Product volume dependent on number of cycles.	Collection preference (CP): CP is set and adjusted by the operator to achieve a light salmon colour in the collect line (start with CP 40) Cologram: estimate a Hct <2% (between 1st and 2nd colour from the right).	Chamber flush and chase settings: Default volume 6 ml. Number of flushes depends on target cell count and blood volume processed
Anticoagulation	ACD-A 1:12 CAVE Heparin: only possible if accepted by the CAR-T manufacturer.	ACD-A initially 1:12 (in case of aggregates temporarily <1:12 possible) CAVE Heparin: only possible if accepted by the CAR-T manufacturer.	ACD-A initially 1:12 (in case of aggregates temporarily <1:12 possible) CAVE Heparin: only possible if accepted by the CAR-T manufacturer.
Additional plasma	In general, yes, to dilute the collected MNCs and reach at minimum 100 ml of product.	Depends on CAR-T manufacturer's requirements.	Depends on CAR-T manufacturer's requirements.
Procedure related specific considerations for centres with all three platforms	Lower platelet loss and lower platelet contamination of the collected product	Centres with both collection platforms of Spectra Optia®: Consider patient variables (TBV, target cell count, clinical situation) and experience of the operator.	Centres with both collection platforms Spectra Optia®: The MNC platform could be preferred in small (paediatric) patients, in patients with target cell population <1.000 cells/µl, and in patients where mathematically no more than 1 flush cycle/hour is expected.

Optimizing cell collection is recommended to obtain enough T cells for manufacturing

Optimizing CD3+ CE

ONE SIZE FITS ALL

- ✓ **Set aphere… basi… dual**
- ✓ Accurate Hct
- ✓ Steady blood flow (vascular access and anticoagulation)

Retrospective study 249 pts

Older … TNC, …

effici…

No in…

Pre-procedure CBC associated eithe… or decrease of CE1

CVC associated with lower CE1 of c…

Cid…

Transplantation and Cellular Therapy 28 (2022) 365.e1–365.e7

Transplantation and Cellular Therapy

journal homepage: www.tctjournal.org

Full Length Article
Cellular Therapy

A Clinically Applicable Prediction Model to Improve T Cell Collection in Chimeric Antigen Receptor T Cell Therapy

Tomoyasu Jo[a,b,c], Satoshi Yoshihara[d,e], Asuka Hada[f], Yasuyuki Arai[a,b,c,*], Toshio Kitawaki[c], Junko Ikemoto[d], Hitomi Onomoto[d], Hiroki Sugiyama[d], Kyoko Yoshihara[d,e], Natsuno Obi[f], Keiko Matsui[a], Norimi Niwa[a], Yoko Nakagawa[a], Junya Kanda[a], Tadakazu Kondo[c], Satoshi Sai[a], Itaru Kato[a], Hidefumi Hiramatsu[a], Souichi Adachi[a], Junko Takita[a,b], Akifumi Takaori-Kondo[a,c], Miki Nagao[a,b]

Table 3
Univariate and Multivariate Analyses of CE2 for CD3⁺ Cells

Variable	Univariate			Multivariate		
	Coefficient	95% CI	*P* Value	Coefficient	95% CI	*P* Value
Age	.034	−.081 to .148	.56	−.097	−.346 to .153	.44
Sex (female vs male)*	.889	.732 to 1.079	.23	.989	.815 to 1.199	.91
Body weight	.159	−.076 to .394	.18	.326	−.061 to .713	.10
Disease (B-ALL vs DLBCL)*	1.006	.783 to 1.294	.96	.885	.584 to 1.340	.56
Hgb level	.272	−.408 to .952	.43	.923	.249 to 1.597	<.01†
CD3⁺ cell count	−.225	−.324 to −.126	<.01†	−.238	−.333 to −.143	<.01†
Platelet count	−.203	−.346 to −.060	<.01†	−.255	−.396 to −.114	<.01†
LDH level	−.111	−.267 to .045	.16	−.081	−.222 to .059	.25

* Binary variable.
† Significant *P* value (<.05).

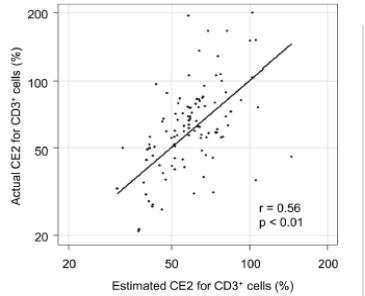


Figure 2. Correlation between actual CE2 and estimated CE2 of CD3⁺ cells. Axes are logarithmic.

Table 4
Predictive Value of Estimation of CE2 for CD3⁺ Cells

Actual CE2	Estimated CE2		Total
	<50%	≥50%	
<50%	21 (72.4)	13 (16.5)	34 (31.5)
≥50%	8 (27.6)	66 (83.5)	74 (68.5)
Total	29 (100.0)	79 (100.0)	108 (100.0)

Shi PA 2020

Leukapheresis and CE

- Continuous or two chamber programs demonstrated similar cell recovery after cryopreservation and thawing for manufacturing T cell and dendritic products
- Increased blood volume processed/flow rate may be associated with higher CE and granulocyte, platelet and red cell contamination
- Volume to process prediction algorithms minimize volume processed to reach the target cell product yield
- Older age, AML, lower Hb and high plt count are associated with low CE

Pfeiffer H Transfusion 2018

Constantinou VC Transfusion 2019

Chen J Transfusion 2019

Tuazon SA et al Transfusion 2019

Ceppi F Transfusion 2018

Importance of center effect

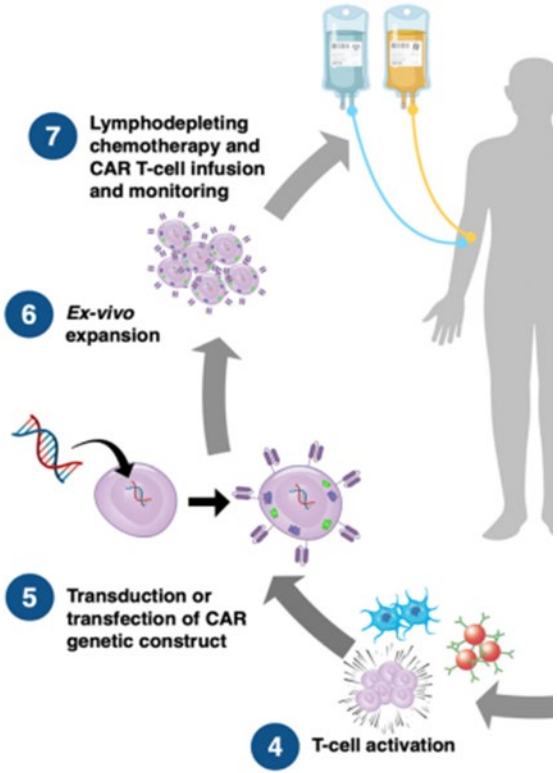
The right start is the foundation of successful therapy

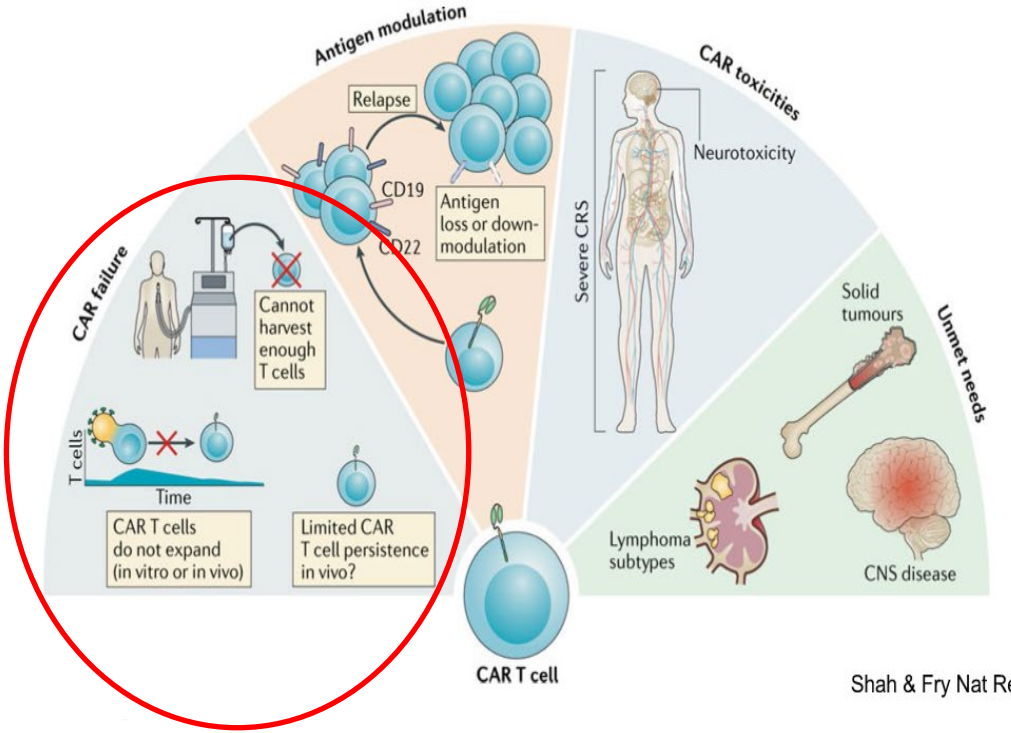
- **Quantity** of cells collected (CE)

- **Quality** of starting material (cell composition)

CAR-T cell therapy: failure and open questions

CAR-T failure in 15% to 40% ALL, > 50% of patients BCL





Shah & Fry Nat Rev Clin Oncol. 2019

Factors influencing clinical response: the importance of T-cell fitness

- ✓ Previous treatments
- ✓ Disease status
- ✓ Patient age
- ✓ Cell number (CD3+)
- ✓ Populations/phenotypes
- ✓ Intestinal microbiota
- ✓ high-burden disease
- ✓ T-lymphopenia
- ✓ chemotherapy
- ✓ systemic inflammation

LKF quality ⟺ T- cell fitness

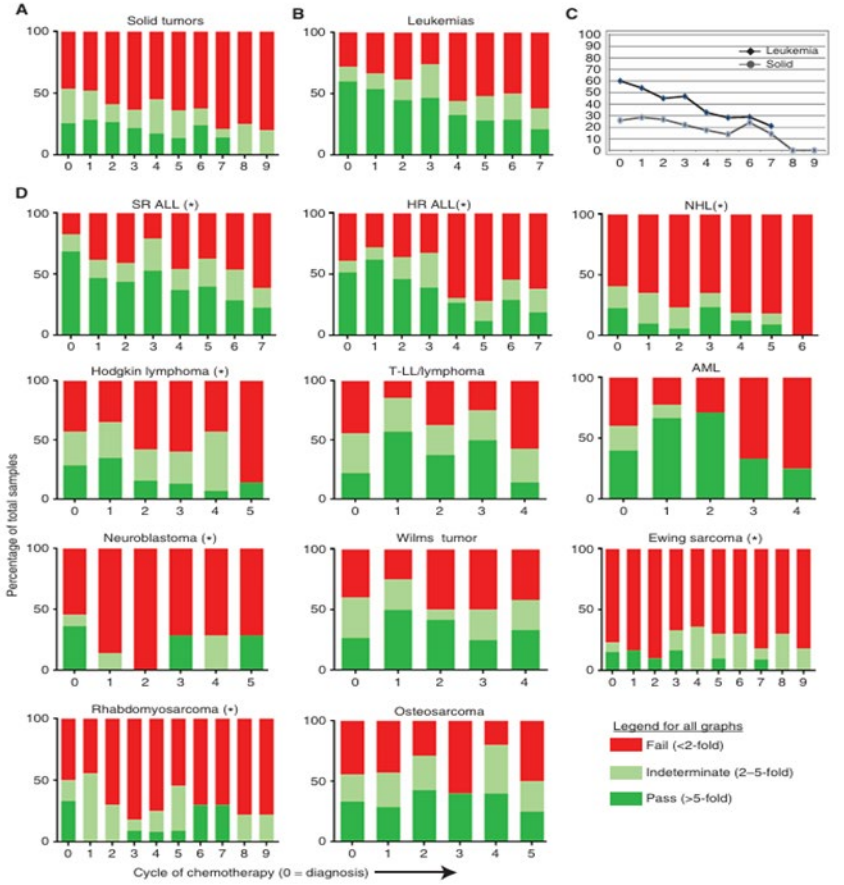
Timing of collection is critical in most patients

HEMATOPOIETIC STEM CELL TRANSPLANTATION AND CORD BLOOD BANKING
Recommendation

Managing leukapheresis in adult and pediatric patients eligible for chimeric antigen receptor T-cell therapy: suggestions from an Italian Expert Panel

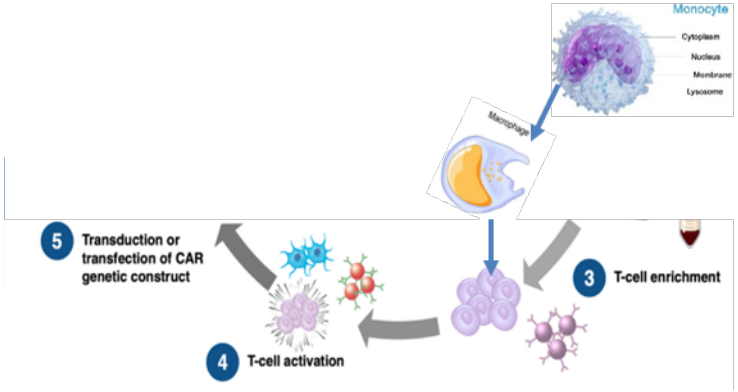
Giovanna Leone[1], Valentina Baldini[2], Stefania Bramanti[3], Roberto Crocchiolo[4], Salvatore Gattillo[5], Stefano Ermini[6], Valeria Giudice[7], Ivana Ferrero[8], Tiziana Moscato[9], Raffaella Milani[10], Maria Gozzer[11], Nicola Piccirillo[12], Cristina Tassi[8], Valter Tassi[13], Paola Coluccia[14]

Work-up	Reference facility	Expert Panel's suggestions
Eligibility for CAR T-cell therapy • Medical history and performance status • Underlying hematological disease	• Hematology/oncology within the CAR T-cell unit	• Refer to EBMT-JACIE recommendations[31] • Refer to AIFA eligibility criteria[34,35]
Patient suitability for leukapheresis • Timing for patient evaluation (consider organizational/logistic issues for patients from different centers) • Previous therapies causing lymphocytopenia or interfering with lymphocyte fitness; consider wash-out from chemotherapy and corticosteroid treatment • Blood and coagulation tests; lymphocyte count and immunophenotype • Infectious status and timing for reassessment before the procedure • Concomitant therapies (e.g., ACE inhibitors) • Venous access assessment	• Authorized apheresis collection center in cooperation with authorized laboratories • Anesthesiologists/CVC team	• Refer to EBMT-JACIE recommendations[31] • Preliminary patient evaluation • Establish protocols at each site, defining the timeline for sharing information between clinicians and apheresis specialists (≤30 days) • Hub-spoke network • Identify a coordinator • Adopt less stringent cut-off values for blood tests, with alerts • Distinguish the different trends in blood parameters by age and disease • Obtain pre-apheresis values of MNC, lymphocyte and possibly CD3+ cell counts • Check if HTLV testing is requested for anamnestic criteria and/or cell factory request
Timely apheresis		*Only in selected cases* • In the context of a hub-spoke model, the reference site should indicate the future regimens affecting lymphocyte quantity and quality • Patients with lymphoma: before commencing a salvage therapy • Patients with ALL: in high- risk patients based on age (18-25 years) and with unfavorable prognostic characteristics at baseline; after an unsatisfactory result following minimal residual desease assesstement, at the end of the first consolidation therapy, and as a bridge before transplantation



Leukapheresis cell composition and CAR-T manufacturing

Mo in LKF interfere CAR-T cell manufacturing by engulfing and digesting cellular constituents and reduce viable CAR-T cell



✓ Product quality:

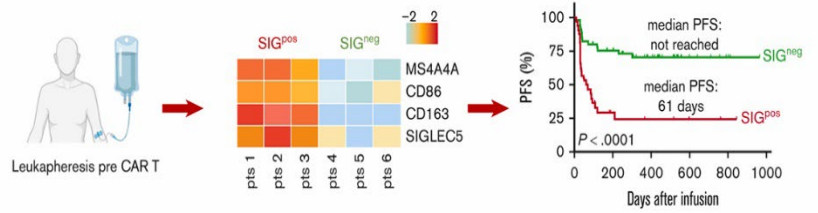
- high lymphocyte purity
- low RBC content
- Low PLT content
- Low Mo content

Unsuccessful manufacturing ≈7% ALL, ≈25% NHL

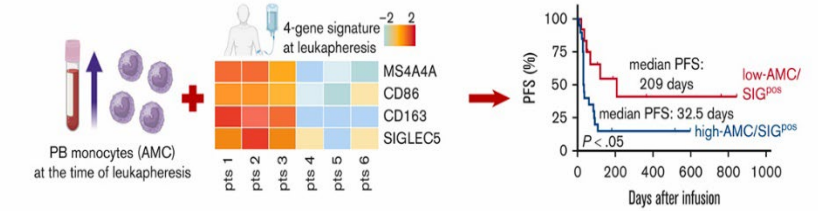
High monocyte in LKF products negatively impact response and PFS of CD19–targeted CAR T-cell therapy in patients with lymphoma

Monocyte counts and transcriptional features at leukapheresis predict survival of patients with lymphoma receiving CAR T cells

- **A 4-gene transcriptional signature in leukapheresis products of patients with LBCL treated with anti-CD19 CAR T cells predicts PFS and is the result of increased monocytes**



- **The combination of high circulating absolute monocyte counts and the 4-gene signature identifies patients at very high risk of progression**



Conclusion: This study proposes a new predictive model valuable in prognosticating durable responses of patients with LBCL before CAR T manufacturing, and suggests the important role of the myeloid compartment in shaping immune responses prior to CAR T infusion.

Key Points

- Combining circulating absolute monocyte count and a 4-gene monocyte signature at leukapheresis predicts PFS of LBCL receiving CAR T cells.
- Monocytes depletion from apheresis products could result in improved outcome of patients with R/R LBCL receiving CD19–directed CAR T cells.

Carniti C et al. Blood Adv, 2024

Cytotherapy 24 (2022) 869–878

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journal homepage: www.isct-cytotherapy.org

International Society ISCT Cell & Gene Therapy®

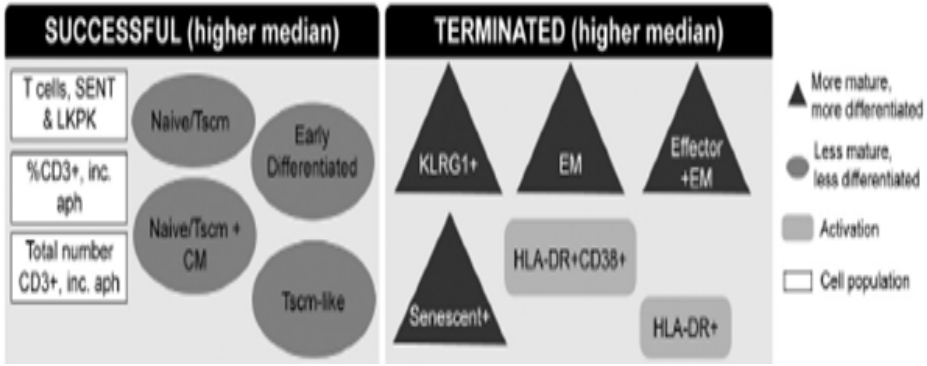
ELSEVIER

Review article

Leukapheresis guidance and best practices for optimal chimeric antigen receptor T-cell manufacturing

Muna Qayed[1,*], Joseph P. McGuirk[2], G. Doug Myers[3], Vinod Parameswaran[4], Edmund K. Waller[5], Peter Holman[6], Margarida Rodrigues[7], Lee F. Clough[6], Jennifer Willert[6]

Less differentiated LKF product shows more durable engraftment than highly differentiated product after CAR-T infusion



Response to CD19 CAR-T is associated with % T naïve/early memory cells in the LKF

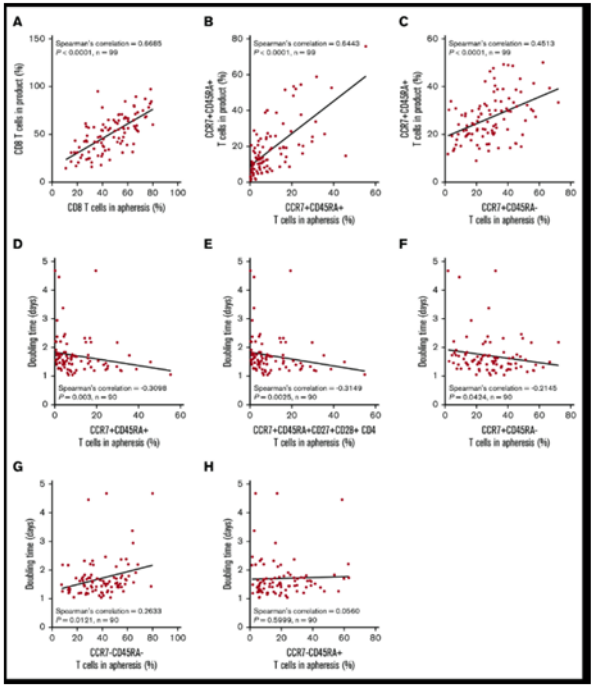


Figure 4. The proportion of T cells with a more juvenile phenotype in the apheresis material directly associates with a lower product doubling time. Association between T-cell phenotypes in apheresis material pre-gated on live CD45⁺ cells and product phenotype (A-C) or product doubling time (D-H). Spearman's correlation was used to calculate *R* and *P* values.

Locke FL Blood Adv 2020

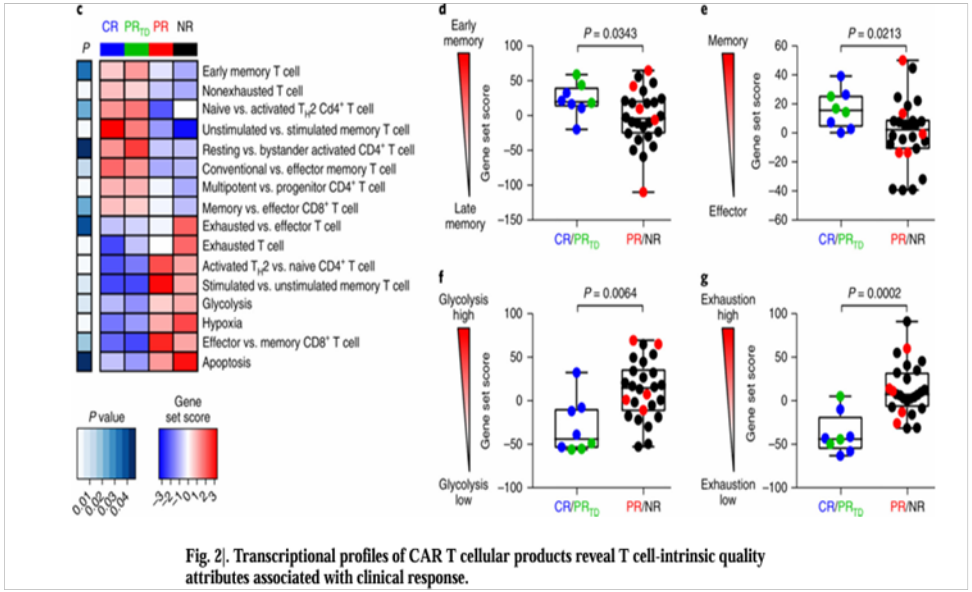
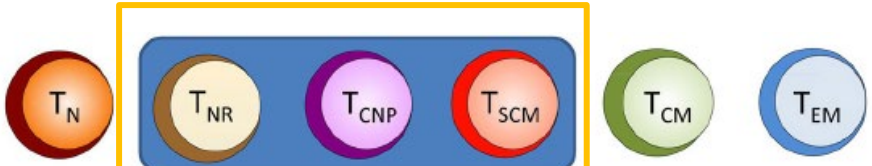


Fig. 2|. Transcriptional profiles of CAR T cellular products reveal T cell-intrinsic quality attributes associated with clinical response.

Fraietta JA Nat Med 2018

Sommermeyer D, et al. Leukemia 2015
Singh N, et al. Science Trasl Med 2016

Early memory



	T_N	T_{NR}	T_{CNP}	T_{SCM}	T_{CM}	T_{EM}
CD45RO	-	-	-	-	+	+
CD45RA	+	+	+	+	-	-
CCR7	+	+	+	+	+	-
CD62L	+	+	+	+	+	-
CD27	+	+	+	+	+	+/-
CD28	+	?	+	+	+	+/-
CD31	+/-	-	+/-	+	-	-
CD95	-	?	+/-	+	+	+
CD49d	-	?	+	?	+/-	+
CXCR3	-	+/-	+/-	+	+	+
CD11a	-	+/-	?	+	+	+
CD122	-	?	?	+	+	+/-
CD127	+	?	+	+	+	-
TCR diversity	+	+/-	+	+/-	+/-	+/-
Effector functions	-	+	+	+	+	+
Proliferation potential	+/-	+/-	?	+	+/-	-

Caccamo *Front Immunol 2018*

TSCM are stable during ageing

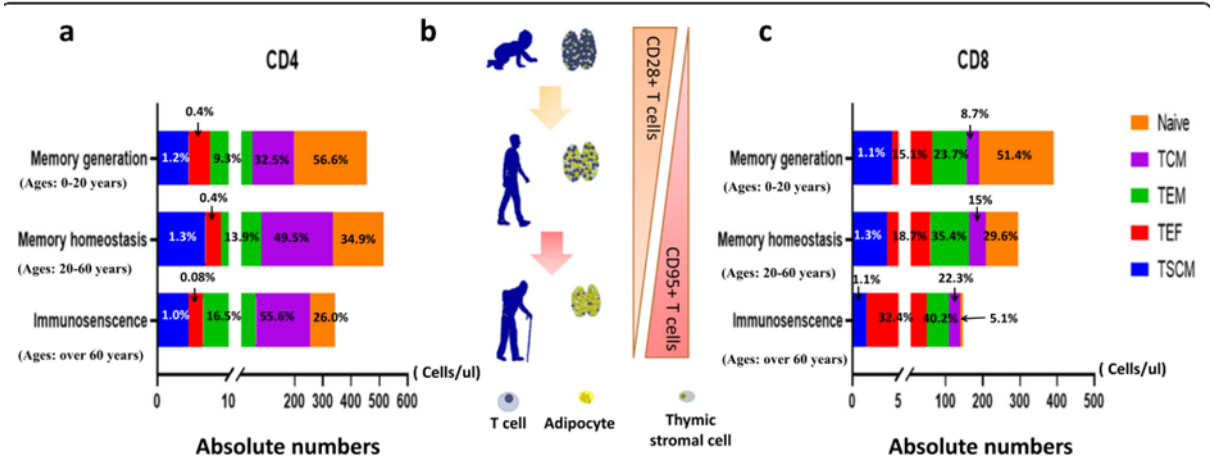
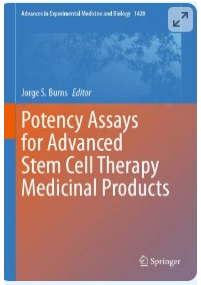


Fig. 3 The number and percentage of T cell subsets change with ageing. **a**; **c** Subjects were divided into 3 groups according to three distinct T cell phases: memory generation (ages: 0–20 years, $n = 19$), memory homeostasis (ages: 20–60 years, $n = 41$), and immunosenescence (ages:over 60 years, $n = 32$). **a** The overall lengths of the bars indicate the absolute median count of the CD4 populations in the three phases according to our data. The different parts of each bar represent different T cell subsets, and the median percentage of each population is written in their respective position. **b** Schematic diagram of the ageing contribution to the decrease in T cells and thymic stromal cells and increase in adipocyte in the thymus. This process was accompanied by the accumulation of CD28- and CD95+ T cells in the peripheral blood. **c** The overall lengths of the bars indicate the absolute median count of CD8 populations in three phases according to our data. The different parts of each bar represent different T cell subsets, and the median percentage of each population is shown in their respective positions

Typical release criteria for CAR-T cell products

Release assay	Target	Test
Viability (measured before cryopreservation)	Usually >70% viable	Vital dye (trypan blue) Flow cytometry/7-Aminoactinomycin stain
Identity (ensure correct labelling of product)	CAR expression	Flow cytometry for CAR protein and/or marker gene/protein Confirmation by assessment of Viral Copy Number using PCR
	CD3 expression	Flow cytometry/CD45+/CD3+ stain Extended phenotyping for other cells (B cells/ monocytes/NK cells/ CD34+ cells
Purity (free from exogenous materials)	Endotoxin	Endosafe rapid testing device External accredited laboratory endotoxin test
	Dynabeads	Validated morphology assay to <100 beads per 3×10^6 cells
	Other relevant contaminants including cytokines, TransAct, serum	Quantitative assay where necessary Demonstration of effective depletion by washing steps/dilution where necessary
Microbiological sterility	Bacterial sterility (to include aerobic, anaerobic and fungal tests over minimum incubation of 10 d) Mycoplasma testing	Bactec (Becton Dickinson) BacT/ALERT 3D (BioMerieux) Culture assay PCR assay Commercial MycoAlert assay (Lonza)
Stability (integrity and functional activity during storage and after thawing)	Preserved transgene expression, viability and functionality demonstrated after a period of cryostorage (required for regulatory approval of manufacture process; prospective collection through the study)	Vital dye (trypan blue) Flow cytometry/7-Aminoactinomycin stain Flow cytometry for CAR protein and/or marker gene/protein Cytotoxicity toward target + cell lines Cytokine release on exposure to target + cell lines
Potency (phase 3)	Immune functionality	Cytotoxicity toward target + cell lines Cytokine release on exposure to target + cell lines

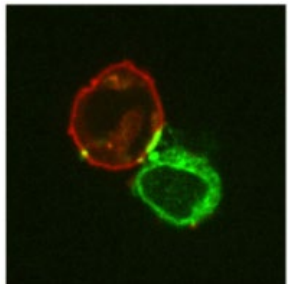
Potency assay for CAR-T is essential to understand product biology and effectiveness



- CAR-T cell exhaustion
- differences in T cell proliferation
- phenotypic alterations post stimulation
- high tumor burden

There are no *univocal* quality tests to predict CAR-T cell function

Wang D, JCI Insight 2018
Lee D, Lancet 2015
Malandro N, Immunity 2016



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Imaging CAR-T synapse as a quality control for CAR engineering

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Conclusion

- The characteristics of leukapheresis product can predict CAR-T cell efficacy therefore standardization based on patients characteristics should be implemented
- CAR-T centers must implement apheresis capacity to ensure sufficient slots for patients' access: apheresis capacity must grow in synchrony with CAR-T expansion
- T-cell subsets with high proliferative capacities (early lineage phenotypes), survival, functionality, and specificity to antigenic target will help improving the development of more efficient CAR T cells.
- Need for defining different potency assays to infuse the best CAR-T cells in different diseases (biological activity)