財團法人生物技術開發中心
Development Center for Biotechnology

Process Development of T Cells and Chimeric Antigen Receptor (CAR)-T Cells

Development Center for Biotechnology

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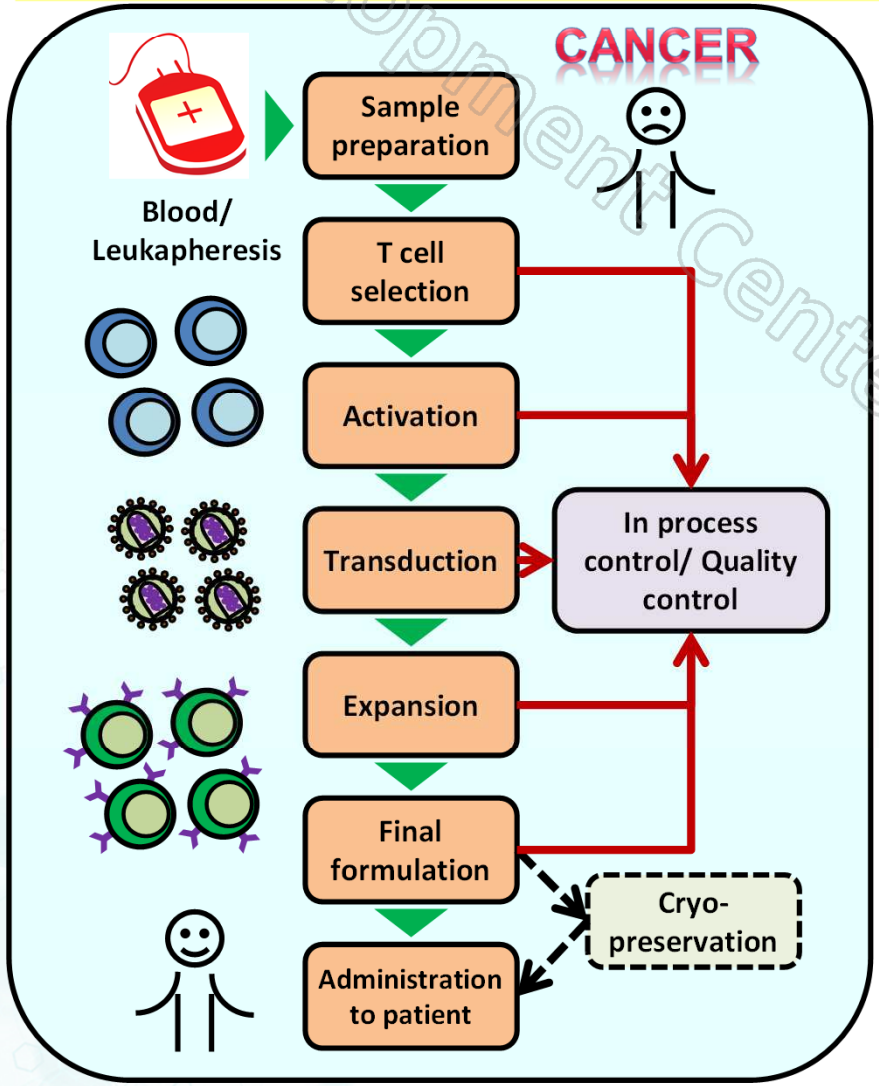
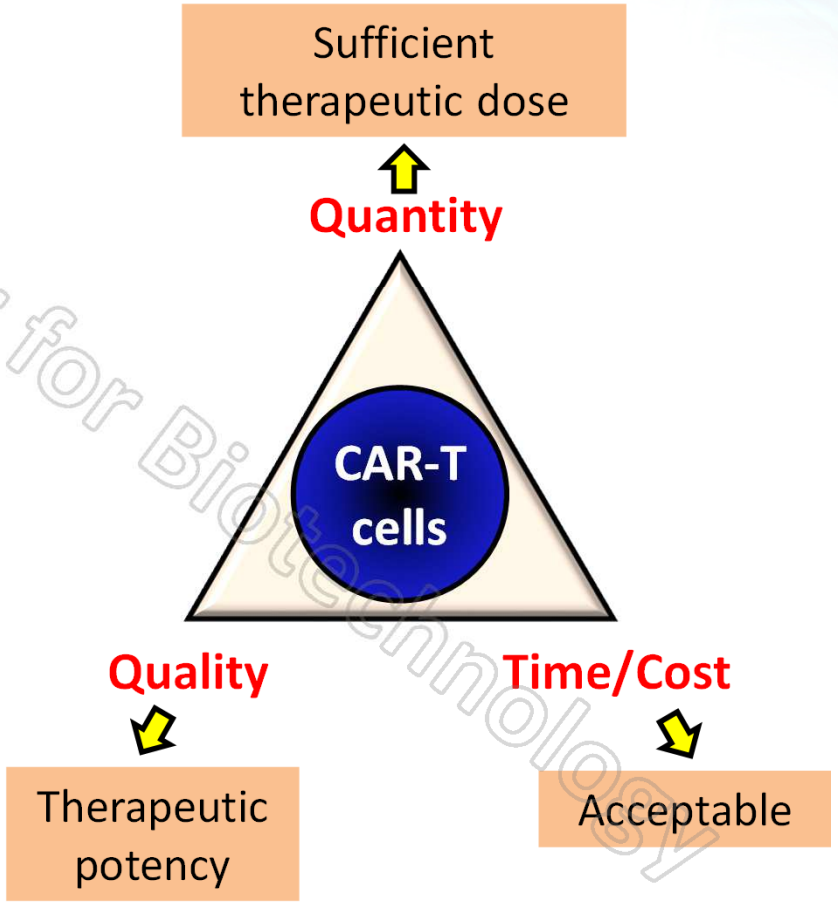
Bioprocess Development of CAR-T Cells

Complex Process of CAR-T Cells



Challenges of Process for Preparing CAR-T Cells



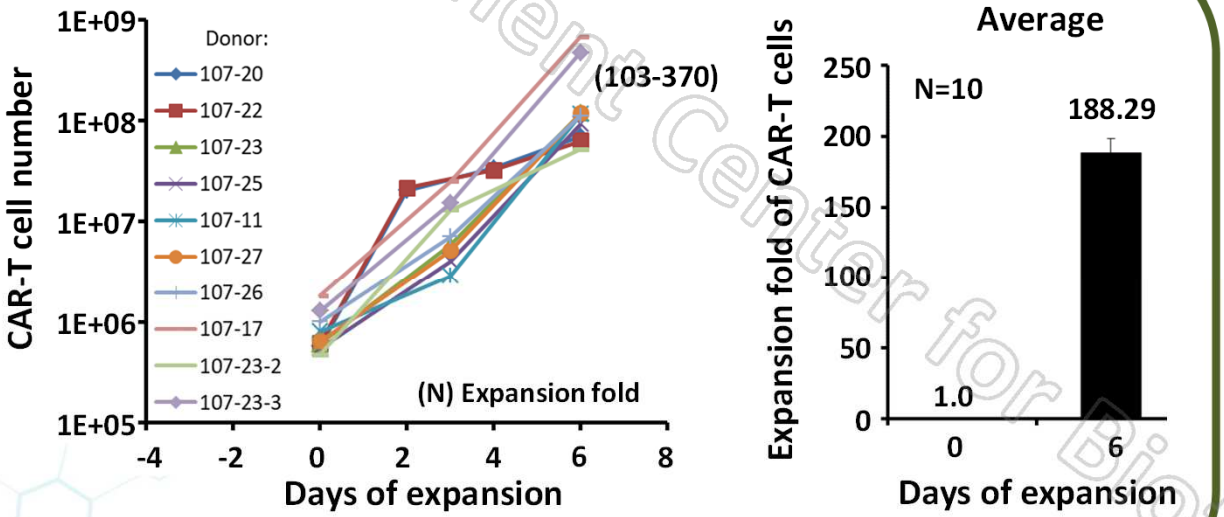
The Growth and Population of anti-CD19 CAR-T Cells were Consistent in DCB's Condition

Quantity

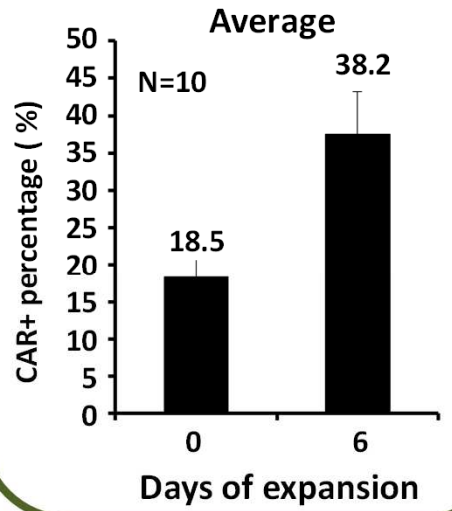
CD19 CAR-T cells (N=10)

CAR-T cell number

Initial total T cell number: ~1 x10^6 total T cells



CAR+ percentage

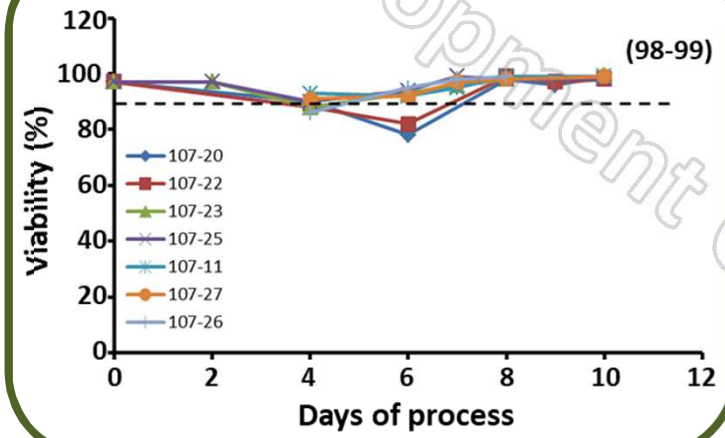


- Anti-CD19 CAR-T cells expanded to averagely about 188 fold in a 6 day-culture.
- CAR+ population was increased averagely 20% as compared to initial population.

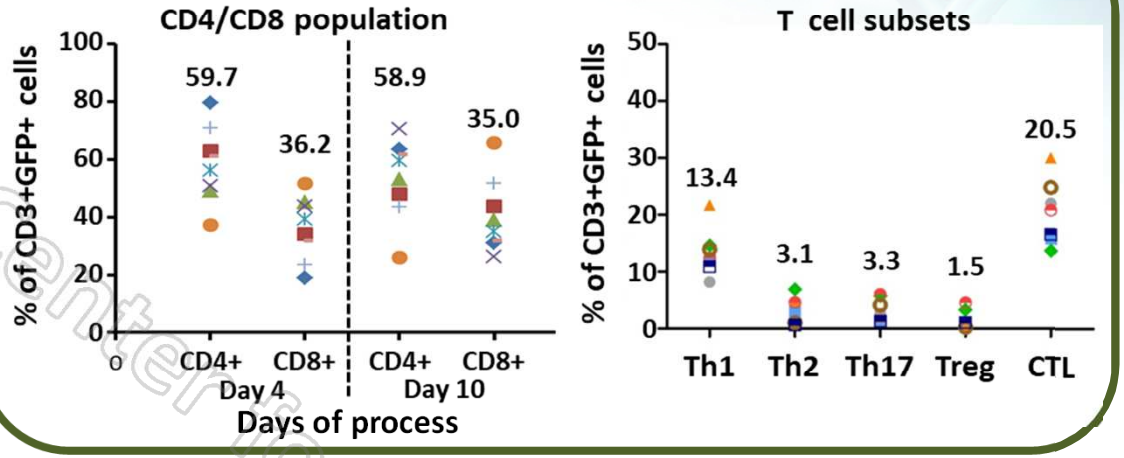
Maintained CD4+ and CD8+ T Cells at High Viability and with Stem Cell Memory T Cell stage

Quality

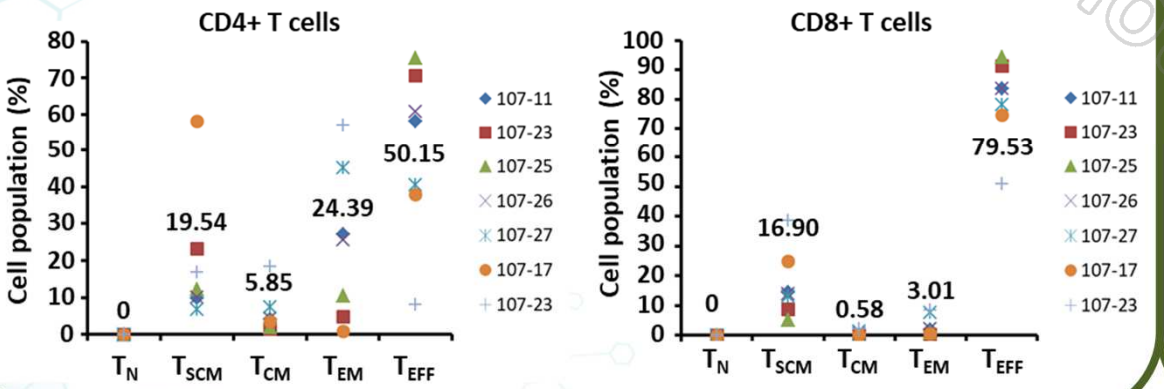
Cell viability



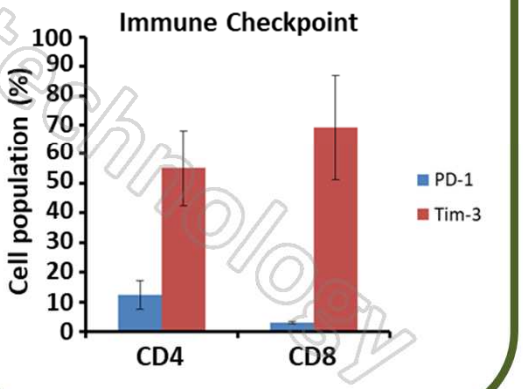
T cell population



T cell differentiation stage



Immune checkpoint

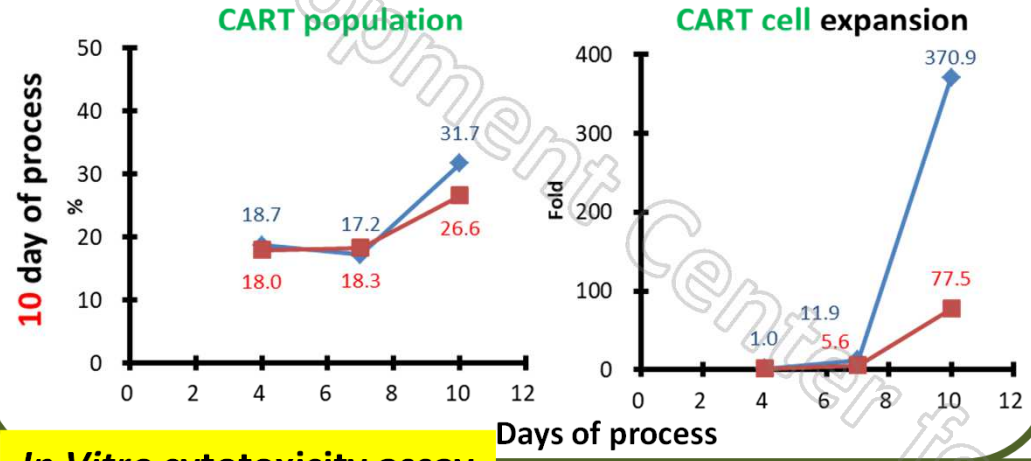


T_N: Naive T cells; T_{SCM}: Stem cell memory; T_{CM}: Central memory; T_{EM}: Effector memory; T_{EFF}: Effector T cells

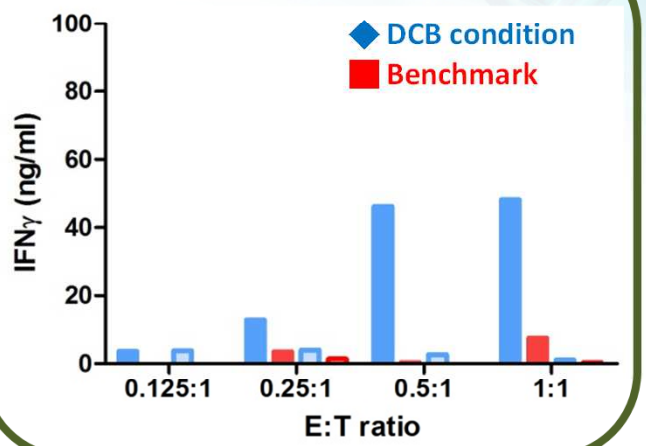
The Expansion and Response of CAR-T Cells in DCB Condition were Higher than Benchmark

Quality

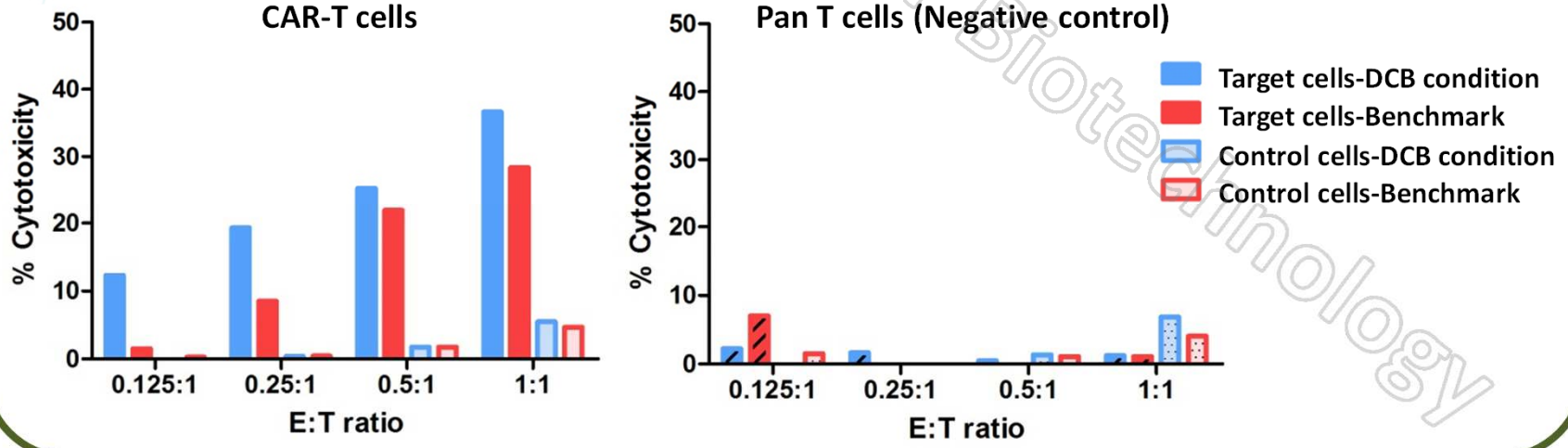
CAR-T Cell population and Expansion



Cytokine production assay

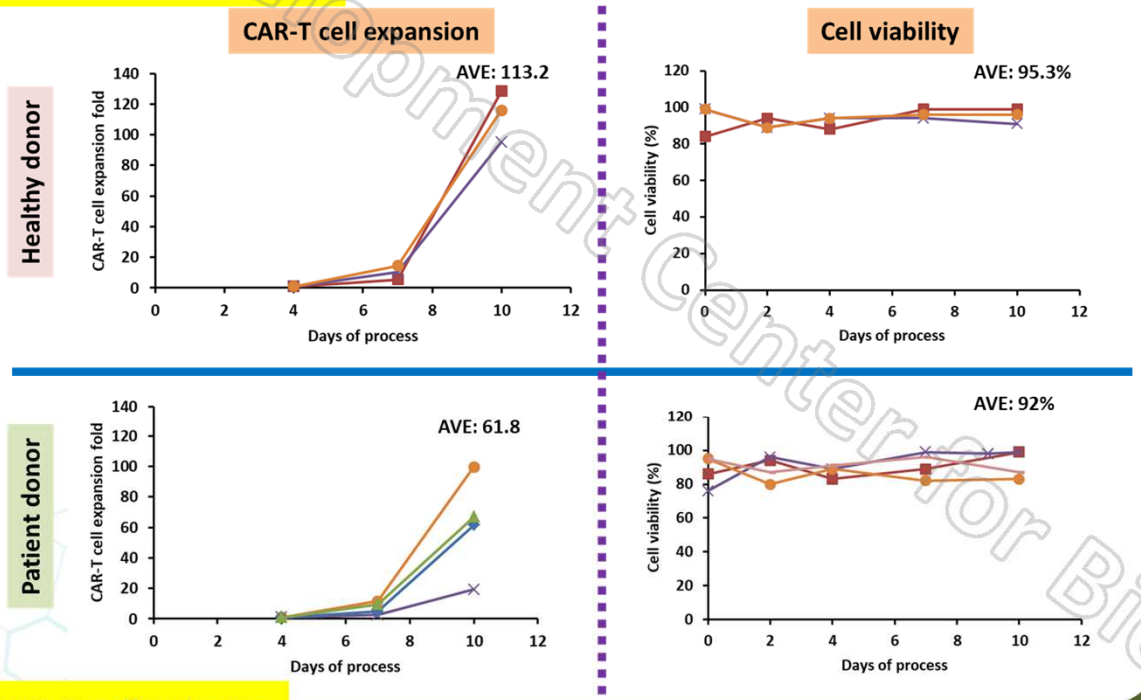


In Vitro cytotoxicity assay

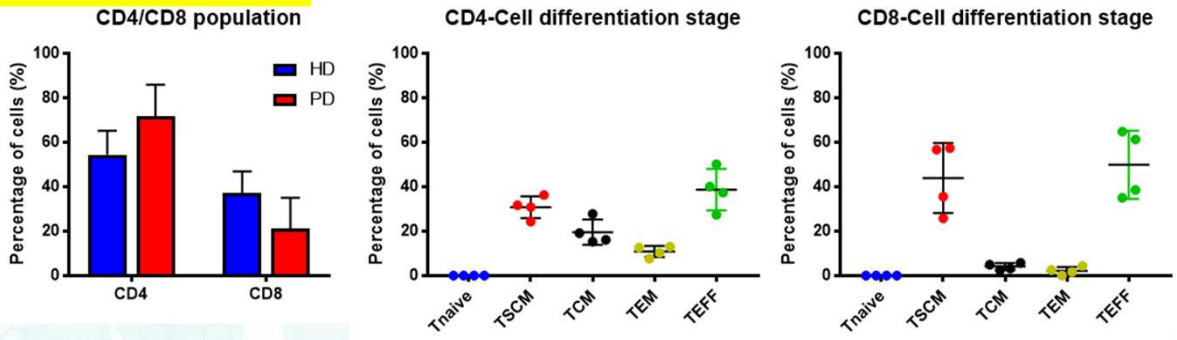


CAR-T Cells Derived from Cancer Patients and Healthy Donors Showed Comparable Potency

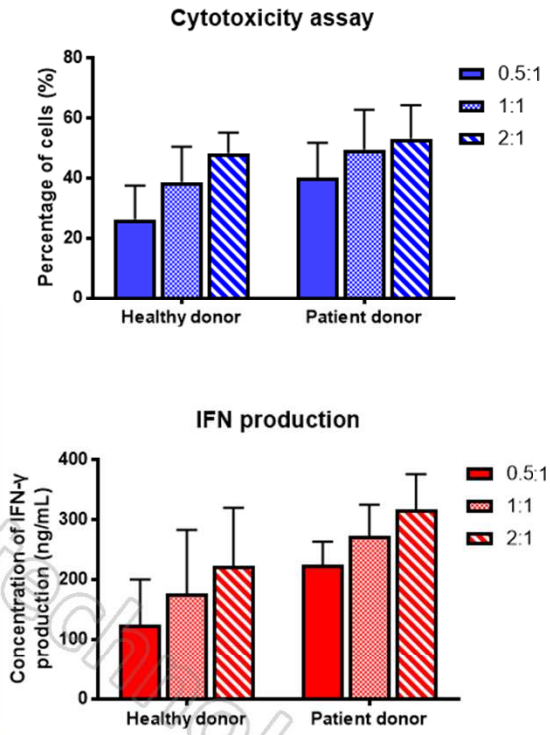
Growth of CAR-T cells



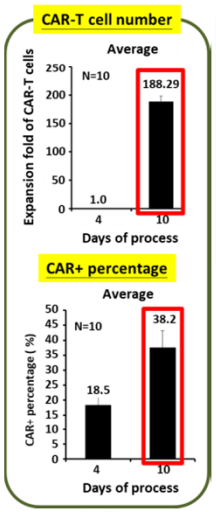
CAR-T cell subsets



In Vitro CAR-T cell activity

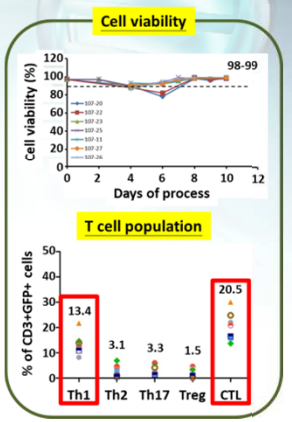


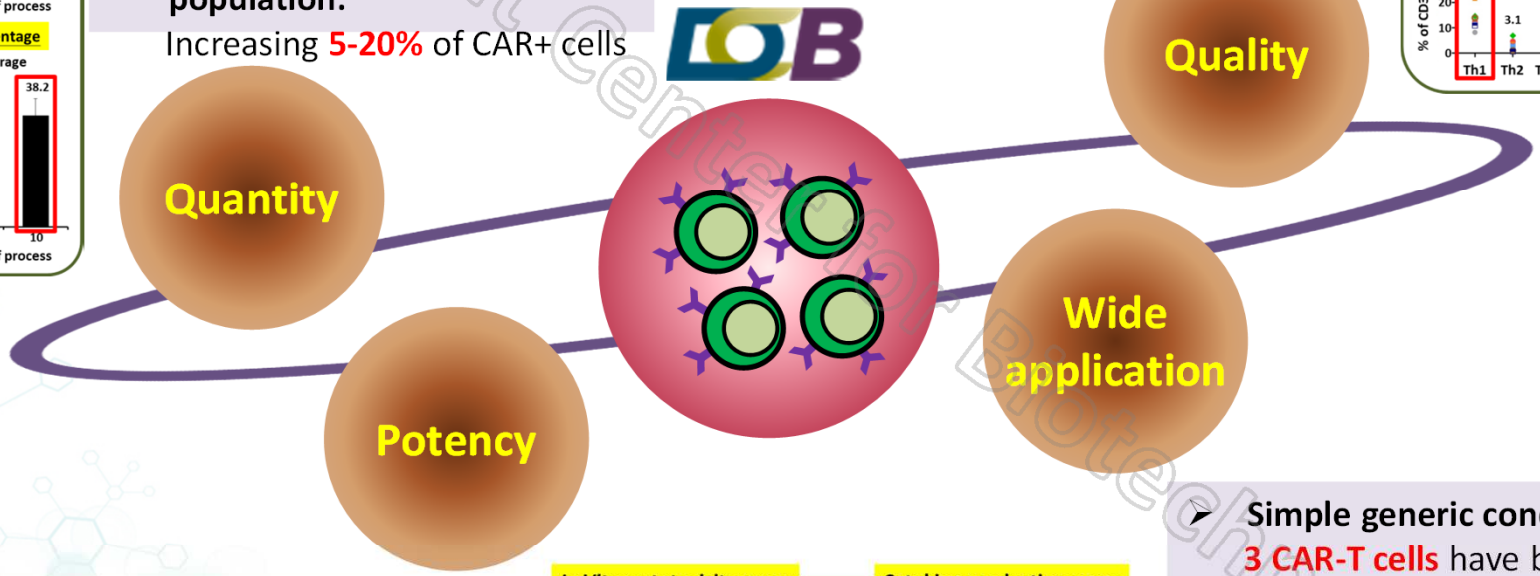
Summary of CAR-T Cell Bioprocess in DCB



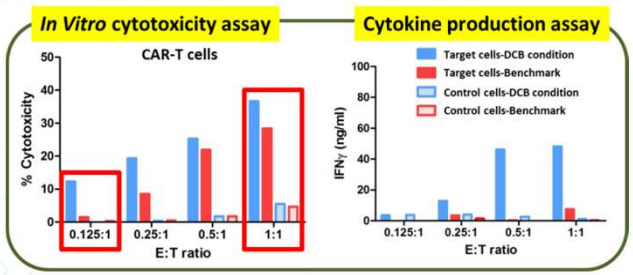
- **High cell expansion fold:** Expanding averagely **93-188 fold** in **6 day**-expansion.
- **Increase CAR+ cell population:** Increasing **5-20%** of CAR+ cells

- **High cell viability:** Above **98%** at the endpoint
- **Cellular immunity populations:** **Th1** and **CTL** were major subsets





- **Higher cytotoxicity activity:** Increasing **5-10%** of target cell killing
- **Higher cytokine production:** Increasing **5-30 ng/mL** of IFN-γ production *in vitro*



- **Simple generic conditions;** **3 CAR-T cells** have been applied in the optimized conditions.