

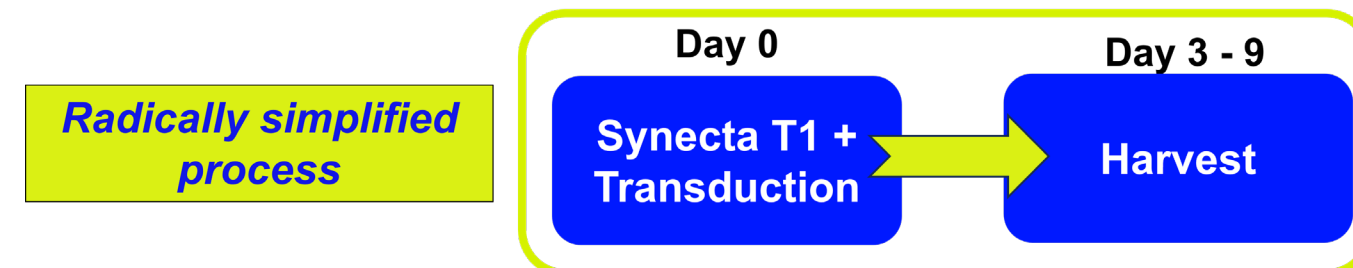
Synecta™ T1 Cell-Derived Nanoparticles Enable Accelerated, Potent T Cell Expansion For Scalable Adoptive Immunotherapy Manufacturing #4291



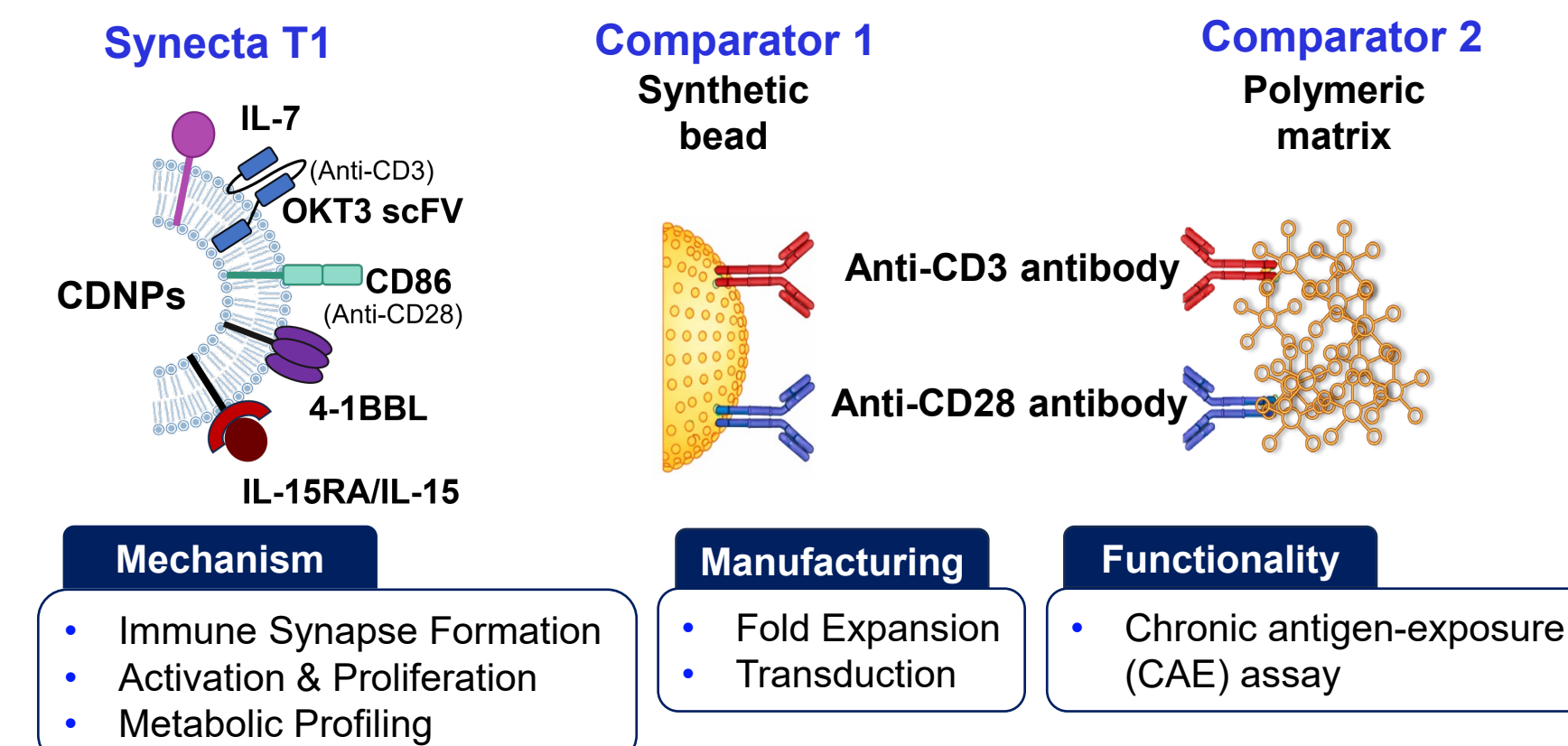
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Background

While adoptive immunotherapies are expanding clinically, their translation is limited by the lack of scalable, standardized manufacturing. Critical attributes, including T-cell activation and expansion, directly impact yield and product quality. Synecta is a cell-derived nanoparticle (CDNP) technology designed to drive rapid T-cell expansion while streamlining manufacturing. Synecta T1 incorporates membrane-bound stimulatory signals (OKT3-scFv, CD86, 4-1BBL) and cytokines (IL-7, IL-15Ra/IL-15), enabling potent activation and accelerated expansion.



Methods



Results

Synecta T1 Drives Organized Immune Synapse Features in T Cells

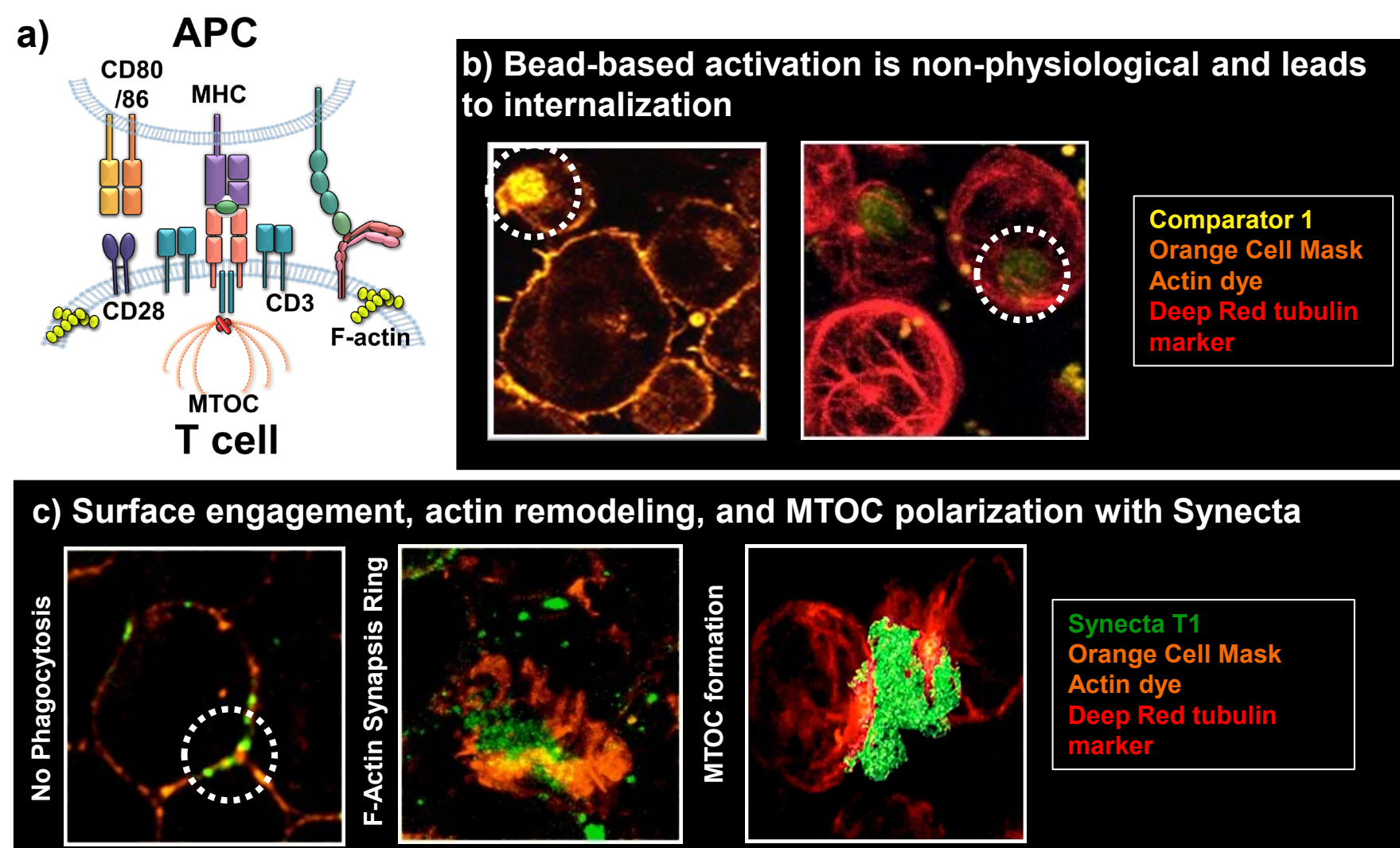


Figure 1. Cytoskeletal Reorganization in T Cells Activated with Synecta T1 vs Comparator 1 (a) Schematic depicting a physiological immune synapse. (b-c) Interaction of Jurkat T cells with (b) Comparator 1 (c) Synecta T1. Panels (b-c) were imaged using a Zeiss LSM980 Airyscan2 super-resolution microscope. Channels: CellMask Orange-actin; Tubulin Tracker Deep Red-microtubules/MTOC; CellBrite Fix 488-Synecta T1.

Early Upregulation of Activation and Proliferation Markers

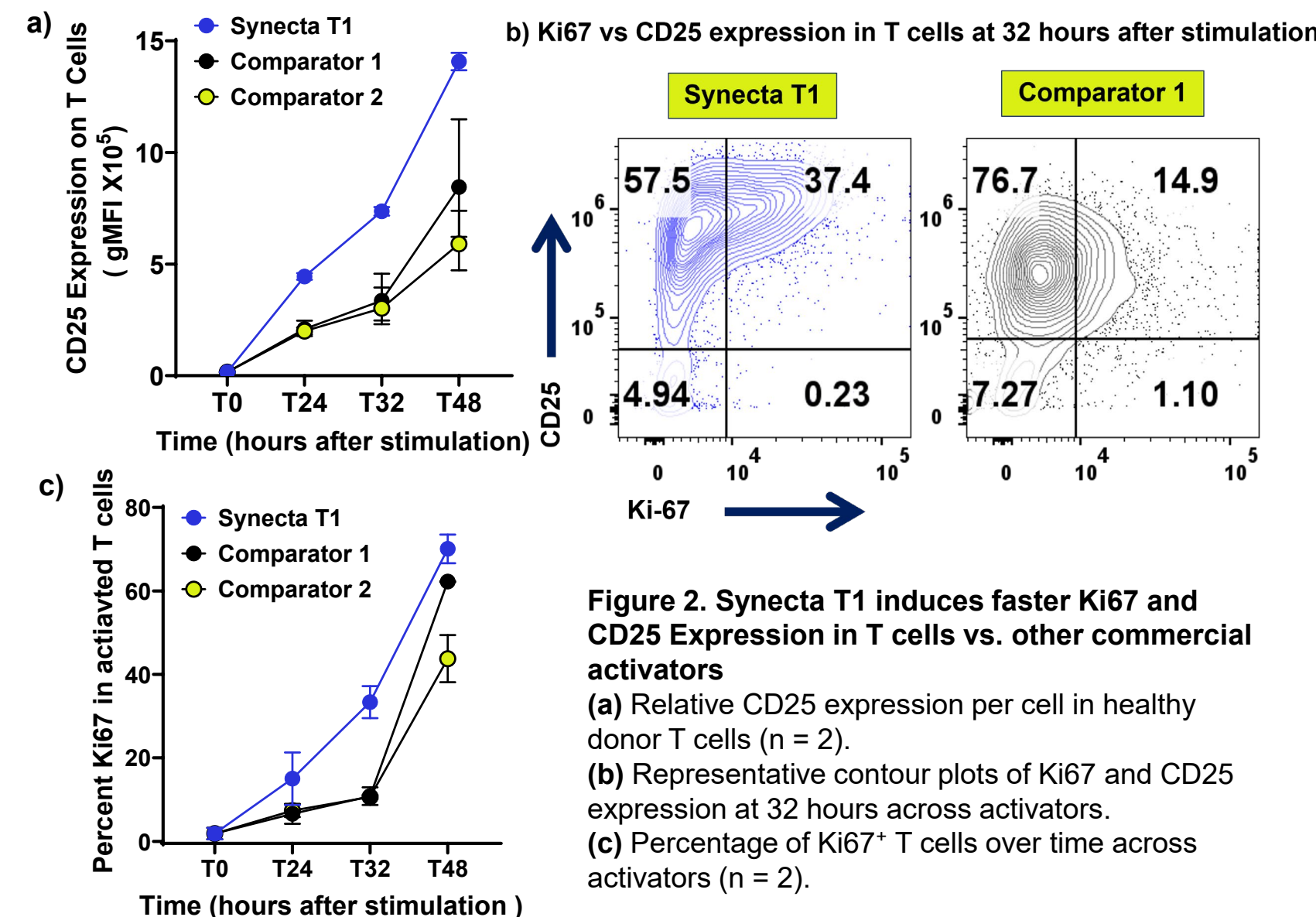


Figure 2. Synecta T1 induces faster Ki67 and CD25 Expression in T cells vs. other commercial activators (a) Relative CD25 expression per cell in healthy donor T cells (n = 2). (b) Representative contour plots of Ki67 and CD25 expression at 32 hours across activators. (c) Percentage of Ki67⁺ T cells over time across activators (n = 2).

Synecta T1 Accelerates Early T Cell Proliferation

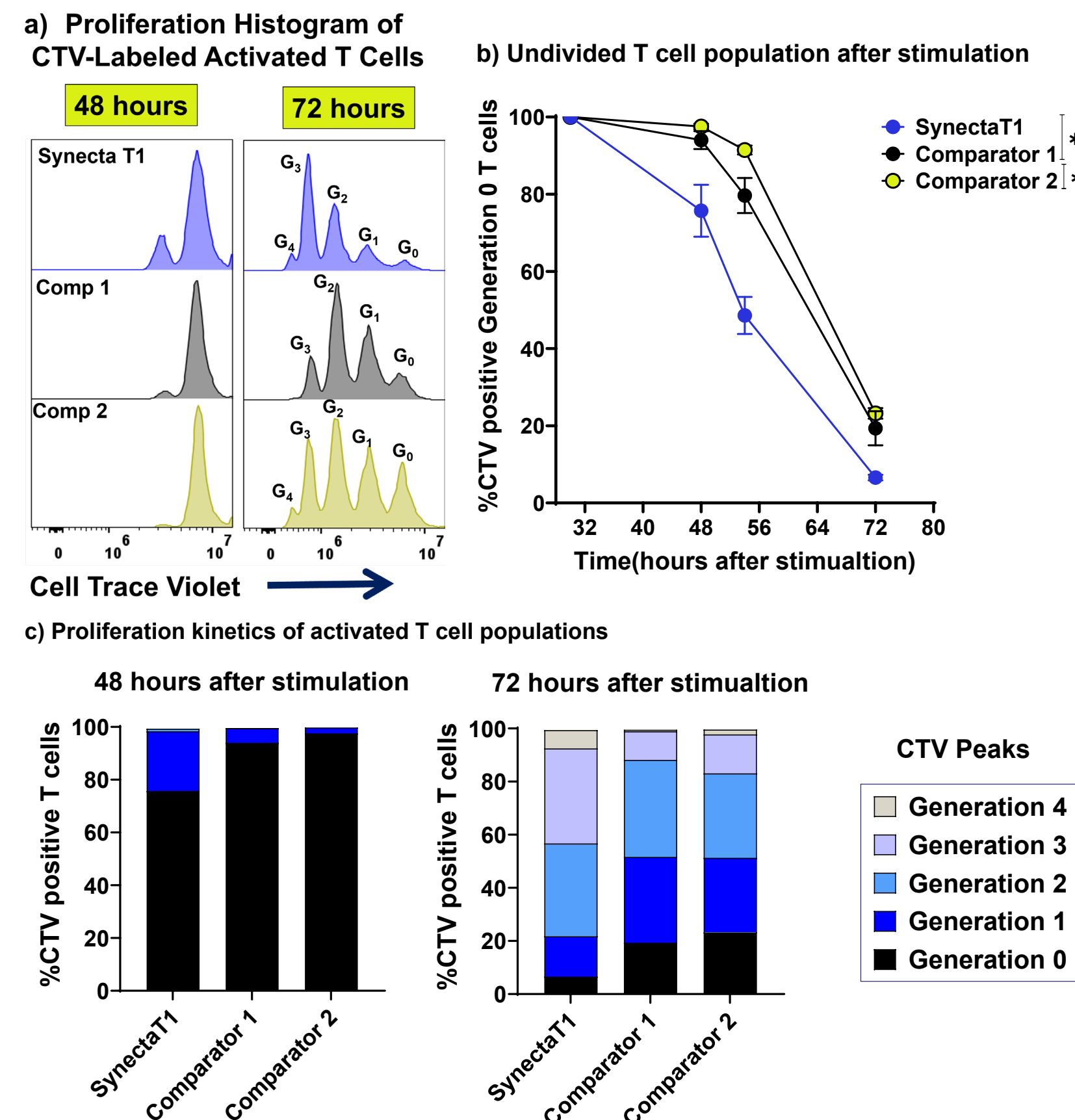


Figure 3. Early T Cell proliferation kinetics: Synecta T1 vs other commercial activators (a) Representative CTV histogram of a healthy donor. (b) Percentage of undivided healthy T cells (n = 3). (c) Generation kinetics of CTV-labeled healthy T cells (n = 3). Stats: mean ± SD. (b) mixed-effects model (REML) with Tukey's test at 54 hours.

Synecta T1-Activated T Cells Rely Less on Glycolysis

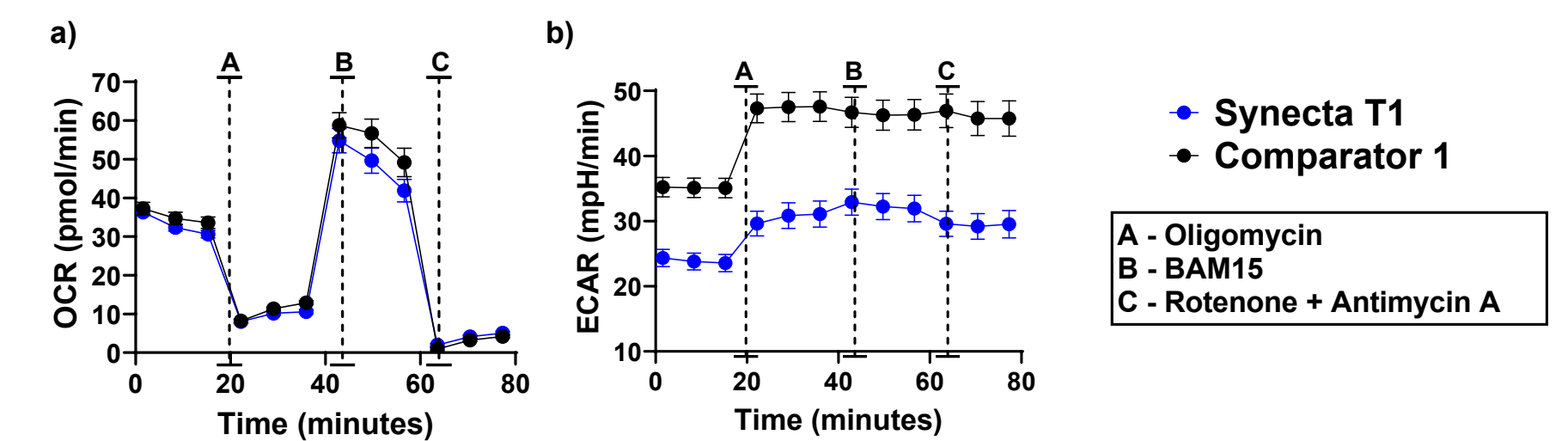


Figure 4. Metabolic Reprogramming in Synecta T1-activated T Cells (a) Oxygen consumption rate (OCR) over time on Day 7 in healthy donor T cells (n = 4). (b) Extracellular acidification rate (ECAR) over time in healthy donor T cells activated with Synecta T1 or comparator activators on Day 7 (n = 4). Stats: mean ± SEM

Synecta T1 Promotes Robust Expansion of CAR-T Cells

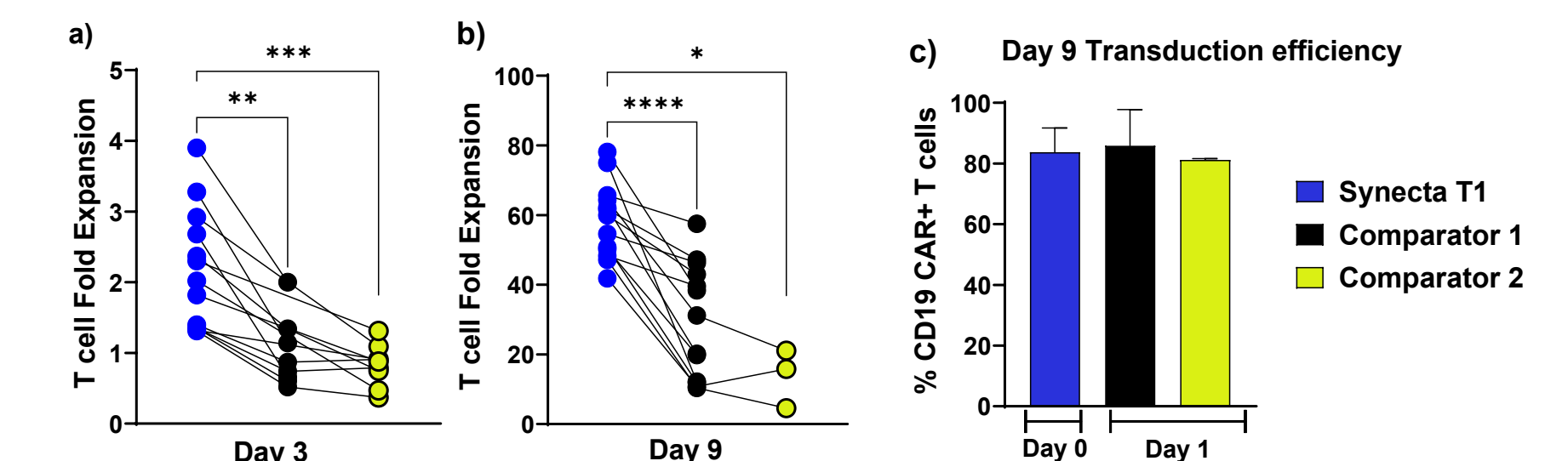


Figure 5. T-Cell Fold Expansion and Transduction efficiency after activation with Synecta T1 or other commercial activators (a) Healthy donors on Day 3 (Synecta, n = 13; Comparator 1, n = 8; Comparator 2, n = 9) and (b) on Day 9 (Synecta, n = 13; Comparator 1, n = 13; Comparator 2, n = 3). (c) Transduction efficiency of patient donor T cells (n = 2). Stats: mean ± SD. (a-b) paired t-test.

Sustained Functionality of Synecta T1-expanded CAR-T Cells

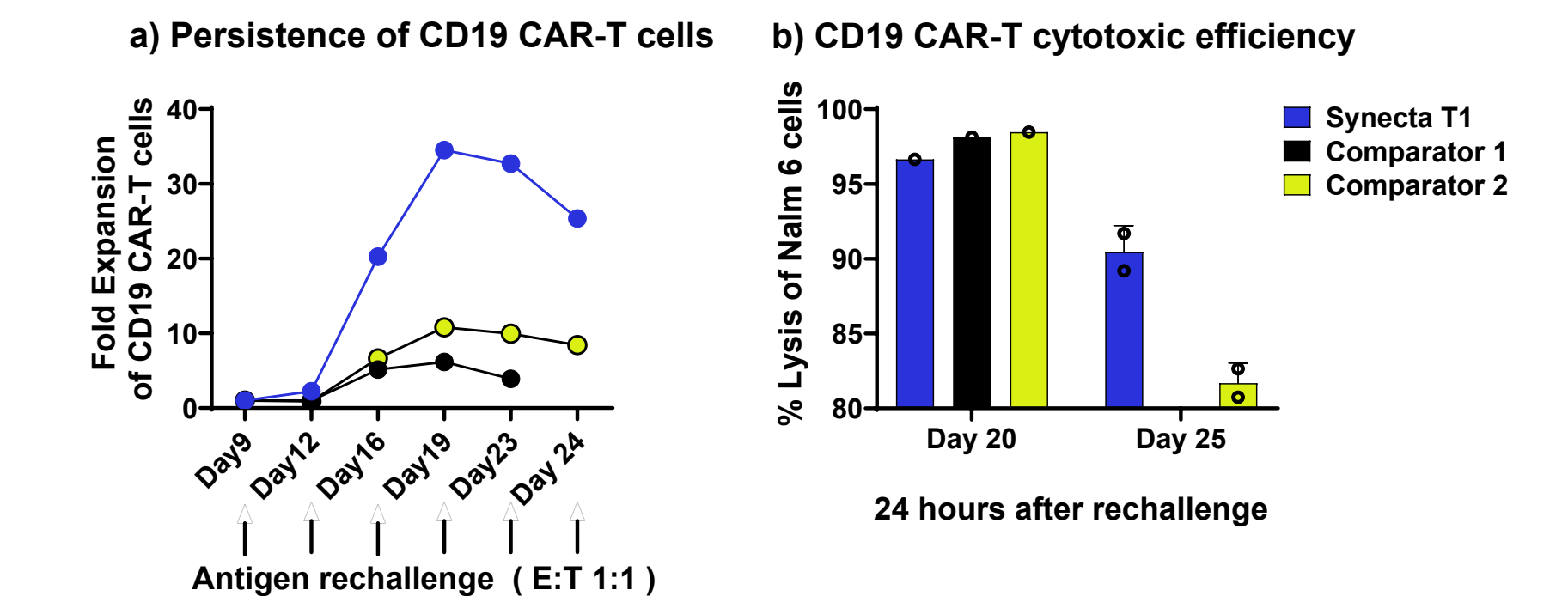


Figure 6. Patient-derived Day 9 Expanded CD19 CAR-T Cells under repeated antigen exposure. (a) Comparison of CAR-T cell expansion. (b) CAR-T cytotoxicity was measured at an effector-to-target ratio of 1:1 (Day 20) and 1:3 (Day 25). Stats: mean ± SD;

Conclusions

- ❖ Synecta T1 activates T cells through a physiologically relevant, immune synapse-like mechanism.
- ❖ Synecta T1 drives early upregulation of Ki67 and CD25, leading to rapid T cell proliferation.
- ❖ Synecta T1-expanded T cells maintain robust functionality under repeated antigen exposure.
- ❖ Synecta T1 facilitates a shorter and accelerated CAR-T manufacturing process.

Key Takeaways : • Synapse-like T cell activation • Rapid proliferation and activation • Enhanced functional persistence • Accelerated CAR-T manufacturing

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