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Reference list

T Cell TransAct™ – Next-generation T cell activation and expansion reagent

What is T Cell TransAct?

T Cell TransAct is a ready-to-use reagent for physiological activation and expansion of human T cells.

- The colloidal polymeric nanomatrix conjugated to humanized recombinant CD3 and CD28 agonists mimics *in vivo* T cell activation.
- Ensures robust activation of resting T cells from haematological cell populations (e.g. PBMCs or enriched T cell populations) without the involvement of CD4 or CD8.
- Easy protocol with no need for cell counting, plate coating, or bead removal steps. The reagent is simply washed off.
- Available as research use only (RUO) product and in MACS® GMP Quality.
- MACS GMP T Cell TransAct is compatible with the CliniMACS Prodigy® Platform for automated cell manufacturing in a closed system.

Selected references

T Cell TransAct Reagent is successfully applied in various application fields worldwide. In the following, we have compiled a selection of recent high-impact publications using the RUO product.

Cell and gene therapy research

Autologous T cell immunotherapy model produced in a stirred tank bioreactor system using T Cell TransAct.
Baradez, M. O. *et al.* (2018) Application of Raman spectroscopy and univariate modelling as a process analytical technology for cell therapy bioprocessing. Front. Med. 5: 47. doi: 10.3389/fmed.2018.00047.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5844923/

T cell activation to increase transduction efficiency during the production of lentiviral vectors.
Bauler, M. *et al.* (2020) Production of lentiviral vectors using suspension cells grown in serum-free media. Mol. Ther. Methods Clin. Dev. 17: 58–68. doi: 10.1016/j.omtm.2019.11.011.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6931067/

Transduction of T Cell TransAct–activated CD8⁺ T cells with TCR_{MART-1} lentivirus.
Ding, R. *et al.* (2021) Single-cell transcriptome analysis of the heterogeneous effects of differential expression of tumor PD-L1 on responding TCR-T cells. Theranostics 11: 4957–4974. doi: 10.7150/thno.5507.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7978322/

Establishment of a novel humanized artificial receptor platform termed RevCARs for CAR T cell optimization. Pan T cell activation using TransAct.
Feldmann, A. *et al.* (2020) Versatile chimeric antigen receptor platform for controllable and combinatorial T cell therapy. Oncoimmunology 9: 1785608. doi: 10.1080/2162402X.2020.1785608.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7458653/

Generation and functional validation of NKG2DIL7-CAR T cells.
He, C. *et al.* (2020) Co-expression of IL-7 improves NKG2D-based CAR T cell therapy on prostate cancer by enhancing the expansion and inhibiting the apoptosis and exhaustion. Cancers 12: 1969. doi: 10.3390/cancers12071969.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7409228/

T cell isolation and generation of adapter CAR T cells for ovarian carcinoma using T Cell TransAct, TexMACS™ Medium, and MACS Cytokines.
Kinkhabwala A. *et al.* (2022) MACSima imaging cyclic staining (MICS) technology reveals combinatorial target pairs for CAR T cell treatment of solid tumors. Sci. Rep. 12: 1911. doi: 10.1038/s41598-022-05841-4.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8813936/

Optimized delivery of mRNA into primary human T cells by an innovative microfluidic continuous-flow electrotransfection device designed for precise, consistent, and high-throughput genetic modification of target cells in cellular therapy manufacturing applications.
Lissandrello, C. A. *et al.* (2020) High-throughput continuous-flow microfluidic electroporation of mRNA into primary human T cells for applications in cellular therapy manufacturing. Sci. Rep. 10: 18045. doi: 10.1038/s41598-020-73755-0.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7582186/

T Cell TransAct–induced pan T cell activation for the generation of CAR T cells.
Niño, J. L. G. *et al.* (2020) Cytotoxic T cells swarm by homotypic chemokine signalling. eLife 9: e56554. doi: 10.7554/eLife.56554.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7669268/

Lentiviral transduction of PBMCs previously activated with T Cell TransAct.
Oh, J. *et al.* (2019) Single variable domains from the T cell receptor β chain function as mono- and bifunctional CARs and TCRs. Sci. Rep. 9: 17291. doi: 10.1038/s41598-019-53756-4.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6872726/

Generation and validation of CD123-CAR^{CD20} T cells.
Riberdy, J. M. *et al.* (2020) The art and science of selecting a CD123-specific chimeric antigen receptor for clinical testing. Mol. Ther. Methods Clin. Dev. 18: 571–581. doi: 10.1016/j.omtm.2020.06.024.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7393323/

CRISPR-Cas9-based genome editing of human primary pan T cells isolation with the Pan T Cell Isolation Kit and activated using T Cell TransAct, TexMACS Medium, and MACS Cytokines.
Robert, P. *et al.* (2021) Functional mapping of adhesiveness on live cells reveals how guidance phenotypes can emerge from complex spatiotemporal integrin regulation. Front. Bioeng. Biotechnol. 9: 625366. doi: 10.3389/fbioe.2021.625366.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8058417/

Small-scale CAR T cell generation using T Cell TransAct, TexMACS Medium, and IL-2.
Schäfer, D. *et al.* (2020) A novel siglec-4 derived spacer improves the functionality of CAR T cells against membrane-proximal epitopes. Front. Immunol. 11: 1704. doi: 10.3389/fimmu.2020.01704.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7426717/

CAR T cell generation and functional validation of newly identified CAR T cell targets.
Schäfer, D. *et al.* (2021) Identification of CD318, TSPAN8, and CD66c as target candidates for CAR T cell–based immunotherapy of pancreatic adenocarcinoma. Nat. Commun. 12: 1453. doi: 10.1038/s41467-021-21774-4.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7935963/

Novel system to simplify application of TRUCK ("T cells redirected for universal cytokine-mediated killing")-modified T cells in solid tumor therapy.
Zimmermann, K. *et al.* (2020) Design and characterization of an "all-in-one" lentiviral vector system combining constitutive anti-G_{D2} CAR expression and inducible cytokines. Cancers 12: 375. doi: 10.3390/cancers12020375.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7072617/

Cancer research and tumor immunology

Engineering of an affinity-matured human antibody that mediates antibody dependent cellular cytotoxicity of mutant p53 expressing cells *in vitro*.
Low, L. *et al.* (2019) Targeting mutant p53-expressing tumours with a T cell receptor–like antibody specific for a wild-type antigen. Nat. Commun. 10: 5382. doi: 10.1038/s41467-019-13305-z10.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6879612/

Antigen-specific CD8$^+$ T cell expansion using T Cell TransAct.
Melacarne, A. *et al.* (2021) Identification of a class of non-conventional ER-stress-response-derived immunogenic peptides. Cell Rep. 36: 109312. doi: 10.1016/j.celrep.2021.109312.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8278487/

TCRγ/δ$^+$ T cells were assessed for their proliferative capacity and cytokine production in the presence or absence of rHMGB1, anti-HMGB1 blocking antibody, acellular MPE fluid, and T Cell TransAct.
Soloff, A. C. *et al.* (2020) HMGB1 promotes myeloid egress and limits lymphatic clearance of malignant pleural effusions. Front. Immunol. 11: 2027. doi: 10.3389/fimmu.2020.02027.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7498625/

T cell immunology

Induction of follicular helper-like (Tfh-like) differentiation program in naive human Treg cells *in vitro* using T Cell TransAct, MACS Cytokines, and TexMACS Medium.
Delacher, M. *et al.* (2021) Single-cell chromatin accessibility landscape identifies tissue repair program in human regulatory T cells. Immunity 54: 702–720.e17. doi: 10.1016/j.immuni.2021.03.007.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8050210/

T Cell TransAct reagent used to study Treg cell differentiation and T helper cell subset differentiation under very-low-carbohydrate diet.
Hirschberger, S. *et al.* (2021) Very-low-carbohydrate diet enhances human T cell immunity through immunometabolic reprogramming. EMBO Mol. Med. 13: e14323. doi: 10.15252/emmm.202114323.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8350890/

Co-culture of T Cell TransAct–activated CD4$^+$ T cells and CD4$^+$CD25$^+$CD127$^{dim/-}$ Treg cells conditioned with extracellular vesicles (EVs).
Martire, S. *et al.* (2021) A first phenotypic and functional characterization of placental extracellular vesicles from women with multiple sclerosis. Int. J. Mol. Sci. 22: 2875. doi: 10.3390/ijms22062875.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8001892/

Investigation of previously unrecognized feedback mechanism that regulates T cell activation including expansion of primary T cells using T Cell TransAct.
Yi, J. *et al.* (2019) TCR microclusters form spatially segregated domains and sequentially assemble in calcium-dependent kinetic steps. Nat. Commun. 10: 277. doi: 10.1038/s41467-018-08064-2. *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6336795/*

Infectious disease research

Development of an antiviral assay system that directly measures anti-HCMV cell-mediated immunity. T Cell TransAct–activated T cells served as positive control.
Houldcroft, C. J. *et al.* (2020) Assessing anti-HCMV cell-mediated immune responses in transplant recipients and healthy controls using a novel functional assay. Front. Cell. Infect. Microbiol. 10: 275. doi: 10.3389/fcimb.2020.00275. *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7332694/*

iPSC-derived T cells

Investigation of iPSC-derived T cell functionality (cell proliferation and expression of activation markers) in responce to T Cell TransAct–mediated TCR activation.
Netsrithong, R. *et al.* (2020) Multilineage differentiation potential of hematoendothelial progenitors derived from human induced pluripotent stem cells. Stem Cell Res. Ther. 11: 481. doi: 10.1186/s13287-020-01997-w. *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7659123/*

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