



Robbie Majzner

Assistant Professor of Pediatrics (Hematology/Oncology)

Pediatrics - Hematology & Oncology

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Bio

BIO

Robbie Majzner is an Assistant Professor of Pediatrics in the Division of Hematology and Oncology. After graduating with a BA from Columbia University, Dr. Majzner attended Harvard Medical School, where he developed an interest in pediatric oncology. He completed his residency training in pediatrics at New York Presbyterian-Columbia and fellowship training in pediatric hematology-oncology at Johns Hopkins and the National Cancer Institute. During his fellowship, he cared for some of the first pediatric patients to receive CD19 chimeric antigen receptor (CAR) T cells, children with B cell acute lymphoblastic leukemia (B-ALL) who often had no other therapeutic option. Witnessing the success of CAR T cells in these patients drove Dr. Majzner to the laboratory, where he focuses on extending the use of CAR T cells to solid tumors. He has generated and optimized novel receptors to recognize antigens over-expressed on pediatric solid tumors such as GD2 (Mount/Majzner et al., Nature Medicine, 2018) B7-H3 (Majzner et al., Clinical Cancer Research, 2019), and ALK (Walker/Majzner et al., Molecular Therapy, 2017). Current work focuses on imparting multi-specificity to CAR T cells and optimizing these receptors to enhance their efficacy when the amount of target (antigen density) is limiting (Majzner et al., Cancer Discovery, 2020). By drawing on state of the art bioengineering techniques, the Majzner Laboratory focuses on enhancing the potency and specificity of CAR T cells for children with cancer.

Clinically, Dr. Majzner cares for all patients with neuroblastoma at the Lucile Packard Children's Hospital and has a specific interest in bringing novel immunotherapies to clinical trials for these patients and those with other solid tumors. He is board certified in pediatrics and pediatric hematology-oncology.

CLINICAL FOCUS

- Cancer immunotherapy
- Neuroblastoma

- Cell therapy
- Pediatric sarcomas
- Solid tumors of childhood and adolescence
- Pediatric oncology
- Pediatric Hematology-Oncology

ACADEMIC APPOINTMENTS

- Assistant Professor - University Medical Line, Pediatrics - Hematology & Oncology
- Member, Bio-X
- Member, Stanford Cancer Institute

HONORS AND AWARDS

- 'A' Award, Alex's Lemonade Stand (02/2020-02/2024)
- Be Brave Brooks Fund St. Baldrick's Scholar Award, St. Baldrick's Foundation (07/2018-07/2021)
- Young Investigator Award, American Society of Pediatric Hematology/Oncology (05/2018)
- SARC Career Development Award, Sarcoma Alliance for Research through Collaboration (07/2017-07/2018)
- Young Investigator Award, Hyundai Hope on Wheels (07/2018-07/2020)
- AACR-AbbVie Scholar-in-Training Award, American Association for Cancer Research (04/2016)
- Fellows Award for Research Excellence, National Institutes of Health - National Cancer Institute (06/2016)

PROFESSIONAL EDUCATION

- Fellowship: Johns Hopkins and National Cancer Institute Ped Hematology and Oncology Training (2016) MD
- Medical Education: Harvard Medical School (2009) MA
- Residency: NY Presbyterian Hospital Columbia Pediatric Residency (2012) NY
- Board Certification: Pediatric Hematology-Oncology, American Board of Pediatrics (2017)
- Board Certification: Pediatrics, American Board of Pediatrics (2013)

PATENTS

- Robbie Majzner. "United States Patent WO2019014456A1 Compositions and methods for treatment of cancers harboring an h3k27m mutation (pending)", The Board Of Trustees Of The Leland Stanford Junior University, Jan 17, 2019

Research & Scholarship

CLINICAL TRIALS

- GD2 CAR T Cells in Diffuse Intrinsic Pontine Gliomas(DIPG) & Spinal Diffuse Midline Glioma(DMG), Recruiting
- Phase I Dose Escalation Study of CD19/CD22 Chimeric Antigen Receptor (CAR) T Cells in Children and Young Adults With Recurrent or Refractory B Cell Malignancies, Recruiting
- Testing the Combination of Two Immunotherapy Drugs (Magrolimab and Dinutuximab) in Patients With Relapsed or Refractory Neuroblastoma or Relapsed Osteosarcoma, Recruiting

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Nico Dalton, Marco Herrera, Won Ju Kim, Maria Caterina Rotiroti

Doctoral Dissertation Reader (NonAC)

Katie Freitas, Victor Tieu, Eva de la Serna

Publications

PUBLICATIONS

- **GD2-CAR T cell therapy for H3K27M-mutated diffuse midline gliomas.** *Nature*
Majzner, R. G., Ramakrishna, S., Yeom, K. W., Patel, S., Chinnasamy, H., Schultz, L. M., Richards, R. M., Jiang, L., Barsan, V., Mancusi, R., Geraghty, A. C., Good, Z., Mochizuki, et al
2022
- **Anti-GD2 synergizes with CD47 blockade to mediate tumor eradication.** *Nature medicine*
Theruvath, J., Menard, M., Smith, B. A., Linde, M. H., Coles, G. L., Dalton, G. N., Wu, W., Kiru, L., Delaidelli, A., Sotillo, E., Silberstein, J. L., Geraghty, A. C., Banuelos, et al
1800
- **Tuning the Antigen Density Requirement for CAR T Cell Activity.** *Cancer discovery*
Majzner, R. G., Rietberg, S. P., Sotillo, E. n., Dong, R. n., Vachharajani, V. T., Labanieh, L. n., Myklebust, J. H., Kadapakkam, M. n., Weber, E. W., Tousley, A. M., Richards, R. M., Heitzeneder, S. n., Nguyen, et al
2020
- **Clinical lessons learned from the first leg of the CAR T cell journey.** *Nature medicine*
Majzner, R. G., Mackall, C. L.
2019; 25 (9): 1341–55
- **CAR T Cells Targeting B7-H3, a Pan-Cancer Antigen, Demonstrate Potent Preclinical Activity Against Pediatric Solid Tumors and Brain Tumors** *CLINICAL CANCER RESEARCH*
Majzner, R. G., Theruvath, J. L., Nellan, A., Heitzeneder, S., Cui, Y., Mount, C. W., Rietberg, S. P., Linde, M. H., Xu, P., Rota, C., Sotillo, E., Labanieh, L., Lee, et al
2019; 25 (8): 2560–74
- **Potent antitumor efficacy of anti-GD2 CAR T cells in H3-K27M+ diffuse midline gliomas.** *Nature medicine*
Mount, C. W., Majzner, R. G., Sundares, S. n., Arnold, E. P., Kadapakkam, M. n., Haile, S. n., Labanieh, L. n., Hulleman, E. n., Woo, P. J., Rietberg, S. P., Vogel, H. n., Monje, M. n., Mackall, et al
2018
- **Tumor Antigen and Receptor Densities Regulate Efficacy of a Chimeric Antigen Receptor Targeting Anaplastic Lymphoma Kinase.** *Molecular therapy : the journal of the American Society of Gene Therapy*
Walker, A. J., Majzner, R. G., Zhang, L. n., Wanhainen, K. n., Long, A. H., Nguyen, S. M., Lopomo, P. n., Vigny, M. n., Fry, T. J., Orentas, R. J., Mackall, C. L.
2017
- **CD22-targeted CAR T cells induce remission in B-ALL that is naive or resistant to CD19-targeted CAR immunotherapy.** *Nature medicine*
Fry, T. J., Shah, N. N., Orentas, R. J., Stetler-Stevenson, M. n., Yuan, C. M., Ramakrishna, S. n., Wolters, P. n., Martin, S. n., Delbrook, C. n., Yates, B. n., Shalabi, H. n., Fountaine, T. J., Shern, et al
2017
- **In vivo imaging of nanoparticle-labeled CAR T cells.** *Proceedings of the National Academy of Sciences of the United States of America*
Kiru, L., Zlitni, A., Tousley, A. M., Dalton, G. N., Wu, W., Lafortune, F., Liu, A., Cunanan, K. M., Nejadnik, H., Sulchek, T., Moseley, M. E., Majzner, R. G., Daldrop-Link, et al
1800; 119 (6)
- **GPC2-CAR T cells tuned for low antigen density mediate potent activity against neuroblastoma without toxicity** *CANCER CELL*
Heitzeneder, S., Bosse, K. R., Zhu, Z., Zhelev, D., Majzner, R. G., Radosevich, M. T., Dhingra, S., Sotillo, E., Buongervino, S., Pascual-Pasto, G., Garrigan, E., Xu, P., Huang, et al
2022; 40 (1): 53–+
- **GPC2-CAR T cells tuned for low antigen density mediate potent activity against neuroblastoma without toxicity.** *Cancer cell*
Heitzeneder, S., Bosse, K. R., Zhu, Z., Zhelev, D., Majzner, R. G., Radosevich, M. T., Dhingra, S., Sotillo, E., Buongervino, S., Pascual-Pasto, G., Garrigan, E., Xu, P., Huang, et al

1800

- **CAR T cells with dual targeting of CD19 and CD22 in adult patients with recurrent or refractory B cell malignancies: a phase 1 trial.** *Nature medicine*
Spiegel, J. Y., Patel, S., Muffly, L., Hossain, N. M., Oak, J., Baird, J. H., Frank, M. J., Shiraz, P., Sahaf, B., Craig, J., Iglesias, M., Younes, S., Natkunam, et al
2021
- **Charting a path for prioritization of novel agents for clinical trials in osteosarcoma: A report from the Children's Oncology Group New Agents for Osteosarcoma Task Force.** *Pediatric blood & cancer*
Whittle, S. B., Offer, K., Roberts, R. D., LeBlanc, A., London, C., Majzner, R. G., Huang, A. Y., Houghton, P., Alejandro Sweet Cordero, E., Grohar, P. J., Isakoff, M., Bishop, M. W., Stewart, et al
2021: e29188
- **Augmenting anti-CD19 and anti-CD22 CAR T-cell function using PD-1-CD28 checkpoint fusion proteins.** *Blood cancer journal*
Blaeschke, F., Stenger, D., Apfelbeck, A., Cadilha, B. L., Benmebarek, M., Mahdawi, J., Ortner, E., Lepenies, M., Habjan, N., Rataj, F., Willier, S., Kaeuferle, T., Majzner, et al
2021; 11 (6): 108
- **Transient rest restores functionality in exhausted CAR-T cells through epigenetic remodeling.** *Science (New York, N.Y.)*
Weber, E. W., Parker, K. R., Sotillo, E., Lynn, R. C., Anbunathan, H., Lattin, J., Good, Z., Belk, J. A., Daniel, B., Klysz, D., Malipatlolla, M., Xu, P., Bashti, et al
2021; 372 (6537)
- **How to stop using gadolinium chelates for magnetic resonance imaging: clinical-translational experiences with ferumoxytol.** *Pediatric radiology*
Daldrup-Link, H. E., Theruvath, A. J., Rashidi, A., Iv, M., Majzner, R. G., Spunt, S. L., Goodman, S., Moseley, M.
2021
- **NOT-Gated CD93 CAR T Cells Effectively Target AML with Minimized Endothelial Cross-Reactivity.** *Blood cancer discovery*
Richards, R. M., Zhao, F., Freitas, K. A., Parker, K. R., Xu, P., Fan, A., Sotillo, E., Daugaard, M., Oo, H. Z., Liu, J., Hong, W. J., Sorensen, P. H., Chang, et al
2021; 2 (6): 648-665
- **Breaking PD-1-mediated Resistance in anti-CD19 and anti-CD22 Car T Cells with PD-1/CD28 Fusion Receptors**
Blaeschke, F., Apfelbeck, A., Stenger, D., Mahdawi, J., Lepenies, M., Rataj, F., Willier, S., Kaeuferle, T., Gruenewald, T. P., Majzner, R. G., Busch, D. H., Kobold, S., Feuchtinger, et al
SPRINGERNATURE.2020: 258-59
- **PET reporter gene imaging and ganciclovir-mediated ablation of chimeric antigen receptor T-cells in solid tumors.** *Cancer research*
Murty, S., Labanieh, L., Murty, T., Gowrishankar, G., Haywood, T., Alam, I. S., Beinat, C., Robinson, E., Aalipour, A., Klysz, D. D., Cochran, J. R., Majzner, R. G., Mackall, et al
2020
- **Identification of dual positive CD19+/CD3+ T cells in a leukapheresis product undergoing CAR transduction: a case report.** *Journal for immunotherapy of cancer*
Schultz, L., Patel, S., Davis, K. L., Ramakrishna, S., Sahaf, B., Bhatia, N., Baggott, C., Erickson, C., Majzner, R. G., Oak, J., Bertaina, A., Mackall, C., Feldman, et al
2020; 8 (2)
- **Novel NanoLuc substrates enable bright two-population bioluminescence imaging in animals.** *Nature methods*
Su, Y., Walker, J. R., Park, Y., Smith, T. P., Liu, L. X., Hall, M. P., Labanieh, L., Hurst, R., Wang, D. C., Encell, L. P., Kim, N., Zhang, F., Kay, et al
2020
- **Immune-Based Approaches for the Treatment of Pediatric Malignancies.** *Annual review of cancer biology*
Bosse, K. R., Majzner, R. G., Mackall, C. L., Maris, J. M.
2020; 4: 353-370
- **Immune receptor inhibition through enforced phosphatase recruitment.** *Nature*
Fernandes, R. A., Su, L. n., Nishiga, Y. n., Ren, J. n., Bhuiyan, A. M., Cheng, N. n., Kuo, C. J., Picton, L. K., Ohtsuki, S. n., Majzner, R. G., Rietberg, S. P., Mackall, C. L., Yin, et al
2020
- **Locoregionally administered B7-H3-targeted CAR T cells for treatment of atypical teratoid/rhabdoid tumors.** *Nature medicine*
Theruvath, J. n., Sotillo, E. n., Mount, C. W., Graef, C. M., Delaidelli, A. n., Heitzeneder, S. n., Labanieh, L. n., Dhingra, S. n., Leruste, A. n., Majzner, R. G., Xu, P. n., Mueller, S. n., Yecies, et al

2020

- **Immune-Based Approaches for the Treatment of Pediatric Malignancies** *ANNUAL REVIEW OF CANCER BIOLOGY, VOL 4*
Bosse, K. R., Majzner, R. G., Mackall, C. L., Maris, J. M., Jacks, T., Sawyers, C. L.
2020; 4: 353–70
- **c-Jun overexpression in CAR T cells induces exhaustion resistance.** *Nature*
Lynn, R. C., Weber, E. W., Sotillo, E. n., Gennert, D. n., Xu, P. n., Good, Z. n., Anbunathan, H. n., Lattin, J. n., Jones, R. n., Tieu, V. n., Nagaraja, S. n., Granja, J. n., de Bourcy, et al
2019
- **Low CD19 Antigen Density Diminishes Efficacy of CD19 CAR T Cells and Can be Overcome By Rational Redesign of CAR Signaling Domains**
Majzner, R. G., Rietberg, S. P., Labanieh, L., Sotillo, E., Weber, E. W., Lynn, R. C., Theruvath, J. L., Yuan, C. M., Xu, P., Nguyen, S. M., Shah, N. N., Stetler-Stevenson, M., Fry, et al
AMER SOC HEMATOLOGY.2018
- **CAR T Cell Therapy for Neuroblastoma** *FRONTIERS IN IMMUNOLOGY*
Richards, R. M., Sotillo, E., Majzner, R. G.
2018; 9
- **CAR T Cell Therapy for Neuroblastoma.** *Frontiers in immunology*
Richards, R. M., Sotillo, E., Majzner, R. G.
2018; 9: 2380
- **Tumor Antigen Escape from CAR T-cell Therapy.** *Cancer discovery*
Majzner, R. G., Mackall, C. L.
2018
- **Anti-GD2 chimeric antigen receptor T cells as a potent immunotherapy regimen in xenograft models of histone 3 K27M mutant diffuse midline glioma**
Mount, C. W., Majzner, R., Sundaresh, S., Arnold, E. P., Kadapakkam, M., Haile, S., Labanieh, L., Woo, P., Rietberg, S. P., Vogel, H., Monje, M., Mackall, C. L.
AMER ASSOC CANCER RESEARCH.2018
- **ANTI-GD2 CHIMERIC ANTIGEN RECEPTOR T CELLS AS A POTENT IMMUNOTHERAPY REGIMEN IN XENOGRAFT MODELS OF HISTONE 3 K27M MUTANT DIFFUSE MIDLINE GLIOMA**
Mount, C., Majzner, R., Sundaresh, S., Arnold, E., Kadapakkam, M., Haile, S., Labanieh, L., Woo, P., Rietberg, S., Vogel, H., Monje, M., Mackall, C.
OXFORD UNIV PRESS INC.2018: 56
- **Programming CAR-T cells to kill cancer.** *Nature biomedical engineering*
Labanieh, L., Majzner, R. G., Mackall, C. L.
2018; 2 (6): 377-391
- **Programming CAR-T cells to kill cancer** *NATURE BIOMEDICAL ENGINEERING*
Labanieh, L., Majzner, R. G., Mackall, C. L.
2018; 2 (6): 377–91
- **CAR T CELLS TARGETING B7-H3, A PAN-CANCER ANTIGEN, DEMONSTRATE POTENT PRECLINICAL ACTIVITY AGAINST PEDIATRIC SOLID TUMORS AND BRAIN TUMORS**
Majzner, R., Nellan, A., Heitzeneder, S., Theruvath, J., Mackall, C.
WILEY.2018
- **B7-H3 CAR T CELLS MEDIATE IN VITRO AND IN VIVO ACTIVITY AGAINST NEUROBLASTOMA XENOGRAFTS**
Kadapakkam, M., Majzner, R., Xu, P., Mackall, C.
WILEY.2018
- **Durable regression of Medulloblastoma after regional and intravenous delivery of anti-HER2 chimeric antigen receptor T cells** *JOURNAL FOR IMMUNOTHERAPY OF CANCER*
Nellan, A., Rota, C., Majzner, R., Lester-McCully, C. M., Griesinger, A. M., Levy, J., Foreman, N. K., Warren, K. E., Lee, D. W.
2018; 6: 30
- **Neurotoxicity Associated with a High-Affinity GD2 CAR-Letter.** *Cancer immunology research*
Majzner, R. G., Weber, E. W., Lynn, R. C., Xu, P. n., Mackall, C. L.

2018; 6 (4): 494-95

- **Harnessing the Immunotherapy Revolution for the Treatment of Childhood Cancers** *CANCER CELL*
Majzner, R. G., Heitzeneder, S., Mackall, C. L.
2017; 31 (4): 476-485
- **Post-Transplantation Cyclophosphamide after Bone Marrow Transplantation Is Not Associated with an Increased Risk of Donor-Derived Malignancy** *BIOLOGY OF BLOOD AND MARROW TRANSPLANTATION*
Majzner, R. G., Mogri, H., Varadhan, R., Brown, P., Cooke, K. R., Bolanos-Meade, J., Swinnen, L., Kanakry, J., Luznik, L., Jones, R. J., Fuchs, E., Ambinder, R., Kasamon, et al
2017; 23 (4): 612-617
- **Assessment of programmed death-ligand 1 expression and tumor-associated immune cells in pediatric cancer tissues.** *Cancer*
Majzner, R. G., Simon, J. S., Grosso, J. F., Martinez, D. n., Pawel, B. R., Santi, M. n., Merchant, M. S., Geoerger, B. n., Hezam, I. n., Marty, V. n., Vielh, P. n., Daugaard, M. n., Sorensen, et al
2017
- **New developments in immunotherapy for pediatric solid tumors.** *Current opinion in pediatrics*
Schultz, L. M., Majzner, R. n., Davis, K. L., Mackall, C. n.
2017
- **Pulmonary function after hematopoietic stem cell transplantation is significantly better in pediatric recipients following reduced toxicity compared with myeloablative conditioning** *BONE MARROW TRANSPLANTATION*
Majzner, R., Sandoval, C., Dozor, A. J., Jin, Z., Van de Ven, C., Dalal, R., Morris, E., Harrison, L., Wolownik, K., Fabricatore, S., Baxter-Lowe, L. A., Cairo, M. S.
2016; 51 (11): 1530-1532
- **T cell depletion utilizing CD34(+) stem cell selection and CD3(+) addback from unrelated adult donors in paediatric allogeneic stem cell transplantation recipients** *BRITISH JOURNAL OF HAEMATOLOGY*
Geyer, M. B., Ricci, A. M., Jacobson, J. S., Majzner, R., Duffy, D., van de Ven, C., Ayello, J., Bhatia, M., Garvin, J. H., George, D., Satwani, P., Harrison, L., Morris, et al
2012; 157 (2): 205-219