



Julia Belk

Postdoctoral Scholar, Pathology

Bio

HONORS AND AWARDS

- Hanna Gray Fellow, Howard Hughes Medical Institute (2023 - present)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Computer Science (2022)
- M.S., Stanford University , Computer Science (2019)
- S.B., MIT , Electrical Engineering (2017)

STANFORD ADVISORS

- Sidd Jaiswal, Postdoctoral Faculty Sponsor

Publications

PUBLICATIONS

- **Unified molecular approach for spatial epigenome, transcriptome, and cell lineages.** *Proceedings of the National Academy of Sciences of the United States of America*
Huang, Y. H., Belk, J. A., Zhang, R., Weiser, N. E., Chiang, Z., Jones, M. G., Mischel, P. S., Buenrostro, J. D., Chang, H. Y.
2025; 122 (16): e2424070122
- **Clonal hematopoiesis is associated with protection from Alzheimer's disease.** *Nature medicine*
Bouzd, H., Belk, J. A., Jan, M., Qi, Y., Sarnowski, C., Wirth, S., Ma, L., Chrostek, M. R., Ahmad, H., Nachun, D., Yao, W., Beiser, A., Bick, et al
2023
- **A Cre-deleter specific for embryo-derived brain macrophages reveals distinct features of microglia and border macrophages.** *Immunity*
Brioschi, S., Belk, J. A., Peng, V., Molgora, M., Rodrigues, P. F., Nguyen, K. M., Wang, S., Du, S., Wang, W. L., Grajales-Reyes, G. E., Ponce, J. M., Yuede, C. M., Li, et al
2023
- **Enhanced T cell effector activity by targeting the Mediator kinase module.** *Science (New York, N.Y.)*
Freitas, K. A., Belk, J. A., Sotillo, E., Quinn, P. J., Ramello, M. C., Malipatlolla, M., Daniel, B., Sandor, K., Klysz, D., Bjelajac, J., Xu, P., Burdsall, K. A., Tieu, et al
2022; 378 (6620): eabn5647
- **Genome-wide CRISPR screens of T cell exhaustion identify chromatin remodeling factors that limit T cell persistence.** *Cancer cell*
Belk, J. A., Yao, W., Ly, N., Freitas, K. A., Chen, Y. T., Shi, Q., Valencia, A. M., Shifrut, E., Kale, N., Yost, K. E., Duffy, C. V., Daniel, B., Hwee, et al
2022
- **Epigenetic regulation of T cell exhaustion.** *Nature immunology*
Belk, J. A., Daniel, B., Satpathy, A. T.

2022

- **Discovery and functional interrogation of SARS-CoV-2 RNA-host protein interactions.** *Cell*

Flynn, R. A., Belk, J. A., Qi, Y., Yasumoto, Y., Wei, J., Alfajaro, M. M., Shi, Q., Mumbach, M. R., Limaye, A., DeWeirdt, P. C., Schmitz, C. O., Parker, K. R., Woo, et al

2021

- **Somatic cancer variants enriched in Alzheimer's disease microglia-like cells drive inflammatory and proliferative states.** *Cell*

Huang, A. Y., Zhou, Z., Talukdar, M., Enyenihi, L., Miller, M. B., Chhouk, B., Rosen, I., Zheng, M., Zhou, M., Yang, A., Stronge, E., Durens, M., Nguyen, et al

2026

- **EcDNA-borne structural variants drive oncogenic fusion transcript amplification**

Yi, H., Zhang, S., Swinderman, J., Wang, Y., Kanakaveti, V., Hung, K. L., Wong, I., Srinivasan, S., Curtis, E. J., Bhargava-Shah, A., Li, R., Jones, M. G., Luebeck, et al

AMER ASSOC CANCER RESEARCH.2026

- **EcDNA-derived structural variants: A common pathway to oncogenic fusion transcript amplification in cancer**

Zhang, S., Yi, H., Swinderman, J., Wang, Y., Kanakaviti, V., Hung, K. L., Wong, I., Srinivasan, S., Curtis, E. J., Bhargava-Shah, A., Li, R., Jones, M. G., Luebeck, et al

AMER ASSOC CANCER RESEARCH.2026: A007

- **EcDNA-borne structural variants drive oncogenic fusion transcript amplification.** *Cell*

Yi, H., Zhang, S., Swinderman, J., Wang, Y., Kanakaveti, V., Hung, K. L., Tsz-Lo Wong, I., Srinivasan, S., Curtis, E. J., Bhargava-Shah, A., Li, R., Jones, M. G., Luebeck, et al

2026

- **Genetic elements promote retention of extrachromosomal DNA in cancer cells.** *Nature*

Sankar, V., Hung, K. L., Gnanasekar, A., Wong, I. T., Shi, Q., Kraft, K., Jones, M. G., He, B. J., Yan, X., Belk, J. A., Liu, K. J., Agarwal, S., Wang, et al

2025

- **FOXP3 expression depends on cell-type-specific cis-regulatory elements and transcription factor circuitry.** *Immunity*

Umhoefer, J. M., Arce, M. M., Kasinathan, S., Whalen, S., Dajani, R., Subramanya, S., Goudy, L., Belk, J. A., Zhou, R., Pham, M. T., Zhang, W., Hernandez, R., Tran, et al

2025

- **Genetic and chromatin regulation of Pvt1 monoallelic expression.** *Cell reports*

Luong, C., Chen, M., Belk, J. A., Kraft, K., Gendrel, A. V., Heard, E., Wysocka, J., Chang, H. Y.

2025; 44 (11): 116554

- **The CD33 SNP rs3865444 modulates the association of clonal hematopoiesis with Alzheimer's disease**

Arends, C., Mitchell, S., Bynum, A., Bhattacharya, D., Belk, J., Nachun, D., Jaiswal, S.

ELSEVIER.2025: 1401-1402

- **Genetic elements promote retention of extrachromosomal DNA in cancer cells.** *bioRxiv : the preprint server for biology*

Sankar, V., Hung, K. L., Gnanasekar, A., Tsz-Lo Wong, I., Shi, Q., Kraft, K., Jones, M. G., He, B. J., Yan, X., Belk, J. A., Liu, K. J., Agarwal, S., Wang, et al

2025

- **Massively parallel immunopeptidome by DNA sequencing provides insights into cancer antigen presentation.** *Nature genetics*

Shi, Q., Simon, E. P., Cimen Bozkus, C., Kaminska, A., Velazquez, L., Saxena, M., Zhang, Z., Belk, J. A., Wang, S., Yang, N., Zhang, Y., Kwong, A., Che, et al

2025

- **TET2-mutant myeloid cells mitigate Alzheimer's disease progression via CNS infiltration and enhanced phagocytosis in mice.** *Cell stem cell*

Matatall, K. A., Wathan, T. K., Nguyen, M., Chen, H., McDonald, A., Qi, G., Belk, J. A., Florez, M. A., Le, D. T., Olarinde, T., Vlasschaert, C., Buttigieg, M. M., Fan, et al

2025

- **Optimized Workflow for Unbiased Massively Parallel Single Cell Profiling in Human Brain Samples from Autopsy**

Reilly, E., Belk, J., Eastman, A., Womack, N., Enciso, A., Kalluru, R., Raj, S., Weissman, I., Jaiswal, S., Hooper, J.

ELSEVIER SCIENCE INC.2025

- **Dual Fresh/Fixed Tissue Workflow for Novel Cell Type Validation in Human Brains Donated for Rapid Research Autopsy**
Reilly, E., Eastman, A., Womack, N., Belk, J., Liu, D., Raj, S., Jaiswal, S., Weissman, I., Hooper, J.
ELSEVIER SCIENCE INC.2025
- **A STAG2-PAXIP1/PAGR1 axis suppresses lung tumorigenesis.** *The Journal of experimental medicine*
Ashkin, E. L., Tang, Y. J., Xu, H., Hung, K. L., Belk, J. A., Cai, H., Lopez, S. S., Dolcen, D. N., Hebert, J. D., Li, R., Ruiz, P. A., Keal, T., Andrejka, et al
2025; 222 (1)
- **Coordinated inheritance of extrachromosomal DNAs in cancer cells.** *Nature*
Hung, K. L., Jones, M. G., Wong, I. T., Curtis, E. J., Lange, J. T., He, B. J., Luebeck, J., Schmargon, R., Scanu, E., Bruckner, L., Yan, X., Li, R., Gnanasekar, et al
2024; 635 (8037): 201-209
- **Deciphering regulation of FOXP3 expression in human conventional T cells.** *bioRxiv : the preprint server for biology*
Umhoefer, J. M., Arce, M. M., Dajani, R., Belk, J. A., Mowery, C. T., Nguyen, V., Gowen, B. G., Simeonov, D. R., Curie, G. L., Corn, J. E., Chang, H. Y., Marson, A.
2024
- **Disparate pathways for extrachromosomal DNA biogenesis and genomic DNA repair.** *Cancer discovery*
Rose, J. C., Belk, J. A., Wong, I. T., Luebeck, J., Horn, H. T., Daniel, B., Jones, M. G., Yost, K. E., Hung, K. L., Kolahi, K. S., Curtis, E. J., Kuo, C. J., Bafna, et al
2024
- **Clonal inactivation of TERT impairs stem cell competition.** *Nature*
Hasegawa, K., Zhao, Y., Garbuzov, A., Corces, M. R., Neuhöfer, P., Gillespie, V. M., Cheung, P., Belk, J. A., Huang, Y. H., Wei, Y., Chen, L., Chang, H. Y., Artandi, et al
2024
- **Distinct epigenomic landscapes underlie tissue-specific memory T cell differentiation.** *Immunity*
Buquicchio, F. A., Fonseca, R., Yan, P. K., Wang, F., Evrard, M., Obers, A., Gutierrez, J. C., Raposo, C. J., Belk, J. A., Daniel, B., Zareie, P., Yost, K. E., Qi, et al
2024
- **Bidirectional epigenetic editing reveals hierarchies in gene regulation.** *Nature biotechnology*
Pacalin, N. M., Steinhart, Z., Shi, Q., Belk, J. A., Dorovskiy, D., Kraft, K., Parker, K. R., Shy, B. R., Marson, A., Chang, H. Y.
2024
- **Xist ribonucleoproteins promote female sex-biased autoimmunity.** *Cell*
Dou, D. R., Zhao, Y., Belk, J. A., Zhao, Y., Casey, K. M., Chen, D. C., Li, R., Yu, B., Srinivasan, S., Abe, B. T., Kraft, K., Hellström, C., Sjöberg, et al
2024; 187 (3): 733-749.e16
- **Chromatin Accessibility Landscapes of CD4+T cells in Monozygotic Discordant Twin pairs for Asthma.**
Zhou, X., Sindher, S., Chinthrajah, R., Belk, J., Chang, H., Nadeau, K.
MOSBY-ELSEVIER.2024: AB379
- **Xist Ribonucleoproteins Promote Female Sex-biased Autoimmunity**
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WILEY.2023: 25-26
- **Coordinated inheritance of extrachromosomal DNA species in human cancer cells.** *bioRxiv : the preprint server for biology*
Hung, K. L., Jones, M. G., Wong, I. T., Lange, J. T., Luebeck, J., Scanu, E., He, B. J., Brückner, L., Li, R., González, R. C., Schmargon, R., Dörr, J. R., Belk, et al
2023
- **Aberrant activation of TCL1A promotes stem cell expansion in clonal haematopoiesis.** *Nature*
Weinstock, J. S., Gopakumar, J., Burugula, B. B., Uddin, M. M., Jahn, N., Belk, J. A., Bouzid, H., Daniel, B., Miao, Z., Ly, N., Mack, T. M., Luna, S. E., Prothro, et al
2023

- **Cis interactions in the Irf8 locus regulate stage-dependent enhancer activation.** *Genes & development*
Liu, T. T., Ou, F., Belk, J. A., Bagadia, P., Anderson, D. A., Durai, V., Yao, W., Satpathy, A. T., Murphy, T. L., Murphy, K. M.
2023
- **TCR-BERT: learning the grammar of T-cell receptors for flexible antigen-binding analyses**
Wu, K., Yost, K. E., Daniel, B., Belk, J. A., Xia, Y., Egawa, T., Satpathy, A., Chang, H. Y., Zou, J.
edited by Knowles, D. A., Mostafavi, S.
JMLR-JOURNAL MACHINE LEARNING RESEARCH.2023
- **Macrophage inflammatory and regenerative response periodicity is programmed by cell cycle and chromatin state.** *Molecular cell*
Daniel, B., Belk, J. A., Meier, S. L., Chen, A. Y., Sandor, K., Czimmerer, Z., Varga, Z., Bene, K., Buquicchio, F. A., Qi, Y., Kitano, H., Wheeler, J. R., Foster, et al
2022
- **Engineered cell entry links receptor biology with single-cell genomics.** *Cell*
Yu, B., Shi, Q., Belk, J. A., Yost, K. E., Parker, K. R., Li, R., Liu, B. B., Huang, H., Lingwood, D., Greenleaf, W. J., Davis, M. M., Satpathy, A. T., Chang, et al
2022
- **Divergent clonal differentiation trajectories of T cell exhaustion.** *Nature immunology*
Daniel, B., Yost, K. E., Hsiung, S., Sandor, K., Xia, Y., Qi, Y., Hiam-Galvez, K. J., Black, M., J Raposo, C., Shi, Q., Meier, S. L., Belk, J. A., Giles, et al
2022
- **RASA2 ablation in T cells boosts antigen sensitivity and long-term function.** *Nature*
Carnevale, J., Shifrut, E., Kale, N., Nyberg, W. A., Blaeschke, F., Chen, Y. Y., Li, Z., Bapat, S. P., Diolaiti, M. E., O'Leary, P., Vedova, S., Belk, J., Daniel, et al
2022
- **Author Correction: Engineering circular RNA for enhanced protein production.** *Nature biotechnology*
Chen, R., Wang, S. K., Belk, J. A., Amaya, L., Li, Z., Cardenas, A., Abe, B. T., Chen, C., Wender, P. A., Chang, H. Y.
2022
- **Genome-wide bidirectional CRISPR screens identify mucins as host factors modulating SARS-CoV-2 infection.** *Nature genetics*
Biering, S. B., Sarnik, S. A., Wang, E., Zengel, J. R., Leist, S. R., Schafer, A., Sathyan, V., Hawkins, P., Okuda, K., Tau, C., Jangid, A. R., Duffy, C. V., Wei, et al
2022
- **Engineering circular RNA for enhanced protein production.** *Nature biotechnology*
Chen, R., Wang, S. K., Belk, J. A., Amaya, L., Li, Z., Cardenas, A., Abe, B. T., Chen, C., Wender, P. A., Chang, H. Y.
2022
- **Transition to a mesenchymal state in neuroblastoma confers resistance to anti-GD2 antibody via reduced expression of ST8SIA1.** *Nature cancer*
Mabe, N. W., Huang, M., Dalton, G. N., Alexe, G., Schaefer, D. A., Geraghty, A. C., Robichaud, A. L., Conway, A. S., Khalid, D., Mader, M. M., Belk, J. A., Ross, K. N., Sheffer, et al
2022
- **Enhanced effector activity of mediator CDK8 kinase module deficient CAR-T Cells**
Freitas, K. A., Belk, J. A., Sotillo, E., Daniel, B., Sandor, K., Klysz, D., Duong, V. T., Xu, P., Malipatlolla, M., Weber, E. W., Majzner, R. G., Chang, H. Y., Satpathy, et al
AMER ASSOC CANCER RESEARCH.2022
- **Dissecting the role of Stag2 in lung adenocarcinoma**
Ashkin, E. L., Cai, H., Tang, Y. J., Li, C., Chew, S., Hung, K., Belk, J., Karmakar, S., Hebert, J., Yousefi, M., Swanton, C., Petrov, D. A., Winslow, et al
AMER ASSOC CANCER RESEARCH.2022
- **Spatiotemporal co-dependency between macrophages and exhausted CD8+ T cells in cancer.** *Cancer cell*
Kersten, K., Hu, K. H., Combes, A. J., Samad, B., Harwin, T., Ray, A., Rao, A. A., Cai, E., Marchuk, K., Artchoker, J., Courau, T., Shi, Q., Belk, et al
2022

- **Lymph node colonization induces tumor-immune tolerance to promote distant metastasis.** *Cell*
Reticker-Flynn, N. E., Zhang, W., Belk, J. A., Basto, P. A., Escalante, N. K., Pilarowski, G. O., Bejnood, A., Martins, M. M., Kenkel, J. A., Linde, I. L., Bagchi, S., Yuan, R., Chang, et al
2022
- **Loquacious modulates flaviviral RNA replication in mosquito cells.** *PLoS pathogens*
Shivaprasad, S., Weng, K. F., Ooi, Y. S., Belk, J., Carette, J. E., Flynn, R., Sarnow, P.
2022; 18 (4): e1010163
- **Leveraging nonstructural data to predict structures and affinities of protein-ligand complexes.** *Proceedings of the National Academy of Sciences of the United States of America*
Paggi, J. M., Belk, J. A., Hollingsworth, S. A., Villanueva, N., Powers, A. S., Clark, M. J., Chemparathy, A. G., Tynan, J. E., Lau, T. K., Sunahara, R. K., Dror, R. O.
1800; 118 (51)
- **ecDNA hubs drive cooperative intermolecular oncogene expression.** *Nature*
Hung, K. L., Yost, K. E., Xie, L., Shi, Q., Helmsauer, K., Luebeck, J., Schopflin, R., Lange, J. T., Chamorro Gonzalez, R., Weiser, N. E., Chen, C., Valieva, M. E., Wong, et al
2021
- **Clonal Hematopoiesis is Associated with Reduced Risk of Alzheimer's Disease**
Bouزيد, H., Belk, J., Jan, M., Qi, Y., Sarnowski, C., Wirth, S., Ma, L., Chrostek, M., Ahmad, H., Nachun, D., Yao, W., Beiser, A., Bick, et al
AMER SOC HEMATOLOGY.2021
- **A human mutation in STAT3 promotes type 1 diabetes through a defect in CD8+ T cell tolerance.** *The Journal of experimental medicine*
Warshauer, J. T., Belk, J. A., Chan, A. Y., Wang, J., Gupta, A. R., Shi, Q., Skartsis, N., Peng, Y., Phipps, J. D., Acenas, D., Smith, J. A., Tamaki, S. J., Tang, et al
2021; 218 (8)
- **Differential usage of transcriptional repressor Zeb2 enhancers distinguishes adult and embryonic hematopoiesis.** *Immunity*
Huang, X., Ferris, S. T., Kim, S., Choudhary, M. N., Belk, J. A., Fan, C., Qi, Y., Sudan, R., Xia, Y., Desai, P., Chen, J., Ly, N., Shi, et al
2021
- **The Role of Aire in the selection of Regulatory T cells in Type 1 Diabetes**
Bridge, J., Balolong, J., Belk, J., Dong, S., Cramer, N., Mowery, C., Crawford, F., Ye, J., Satpathy, A., Kappler, J. W., Bluestone, J. A., Anderson, M. S.
AMER ASSOC IMMUNOLOGISTS.2021
- **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)
- **Affinity-Restricted Memory B Cells Dominate Recall Responses to Heterologous Flaviviruses.** *Immunity*
Wong, R., Belk, J. A., Govero, J., Uhrlaub, J. L., Reinartz, D., Zhao, H., Errico, J. M., D'Souza, L., Ripperger, T. J., Nikolich-Zugich, J., Shlomchik, M. J., Satpathy, A. T., Fremont, et al
2020
- **Systematic discovery and functional interrogation of SARS-CoV-2 viral RNA-host protein interactions during infection.** *bioRxiv : the preprint server for biology*
Flynn, R. A., Belk, J. A., Qi, Y. n., Yasumoto, Y. n., Schmitz, C. O., Mumbach, M. R., Limaye, A. n., Wei, J. n., Alfajaro, M. M., Parker, K. R., Chang, H. Y., Horvath, T. L., Carette, et al
2020