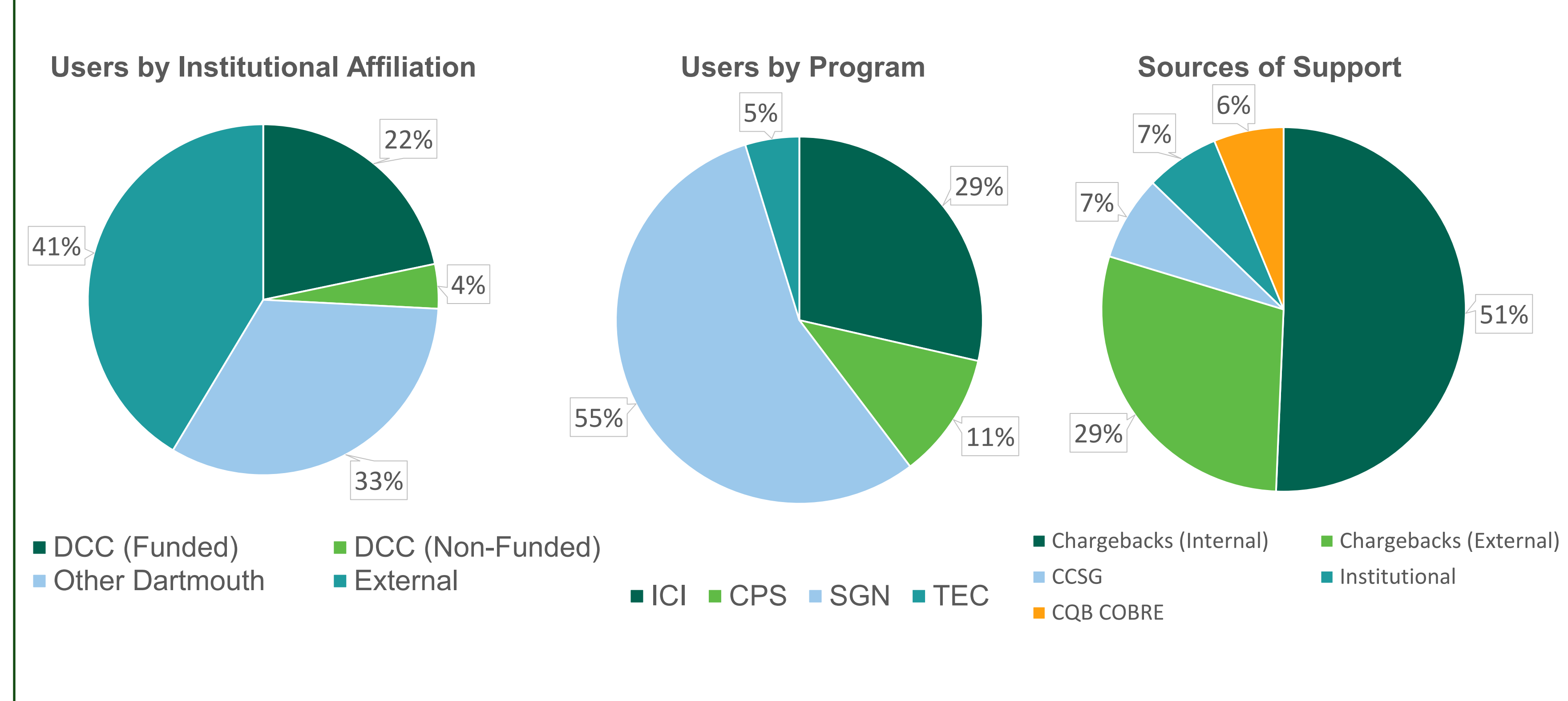




DESCRIPTION

The Genomics and Molecular Biology (GMB) Shared Resource provides a range of services for the analysis of DNA and RNA from cells and tissues, at the bulk, single cell and tissue level, using next generation sequencing and other genomics technologies. End-to-end services are provided for experimental design consultation, tissue processing, library preparation and sequencing within a rigorous, quality controlled, laboratory environment.

USAGE AND COST RECOVERY



SERVICES AND INSTRUMENTATION

Service	Instrument(s)	Applications Supported
DNA-seq (WGS, WES) RNA-seq (3', Ribo(-), PolyA) TCR/BCR-seq*	EpMotion 5075t Liquid Handler Fragment Analyzer Qubit	SNV Detection Differential Gene Expression Immune Repertoire Profiling
Single Cell RNA / V(D)J / Protein / ATAC	10x Genomics Chromium X* K2 Automated Cell Counter	Metagenomics Cell phenotyping T/B-cell clonality Single Cell Lineage Tracing
Next Generation Sequencing	Illumina NextSeq2000* Illumina MiniSeq Oxford Nanopore MinION* Illumina NovaSeq6000 (via PSR)*	Whole Genome/Exome Sequencing Single Cell / Spatial Omics Epigenomics Metagenomics
Spatial Transcriptomics* (FFPE and Frozen)	10x Genomics CytAssist* 10x Genomics Xenium*	Whole transcriptome (55um res.) Targeted <i>in situ</i> (50nM res., 500 genes)
Illumina Infinium Arrays	Illumina iScan	Methylation (Human/Mouse) Mouse Speed Congenics Consortium SNP Panels
Bioinformatics	Discovery/Andes/Polaris High Performance Computing Clusters	DNA/RNA/ATAC-seq Single Cell / Spatial Omics

*New since 2019

CLONE TRACKING AND PHENOTYPING OF TRMS IN MELANOMA USING scRNA-SEQ

PIs: Turk^{ICI}, Shirai^{ICI}, Huang^{ICI}, Curiel^{ICI}, Phillips^{ICI}, Usherwood^{ICI}, Wong^{CPS}

Funding Source: R01 CA225028

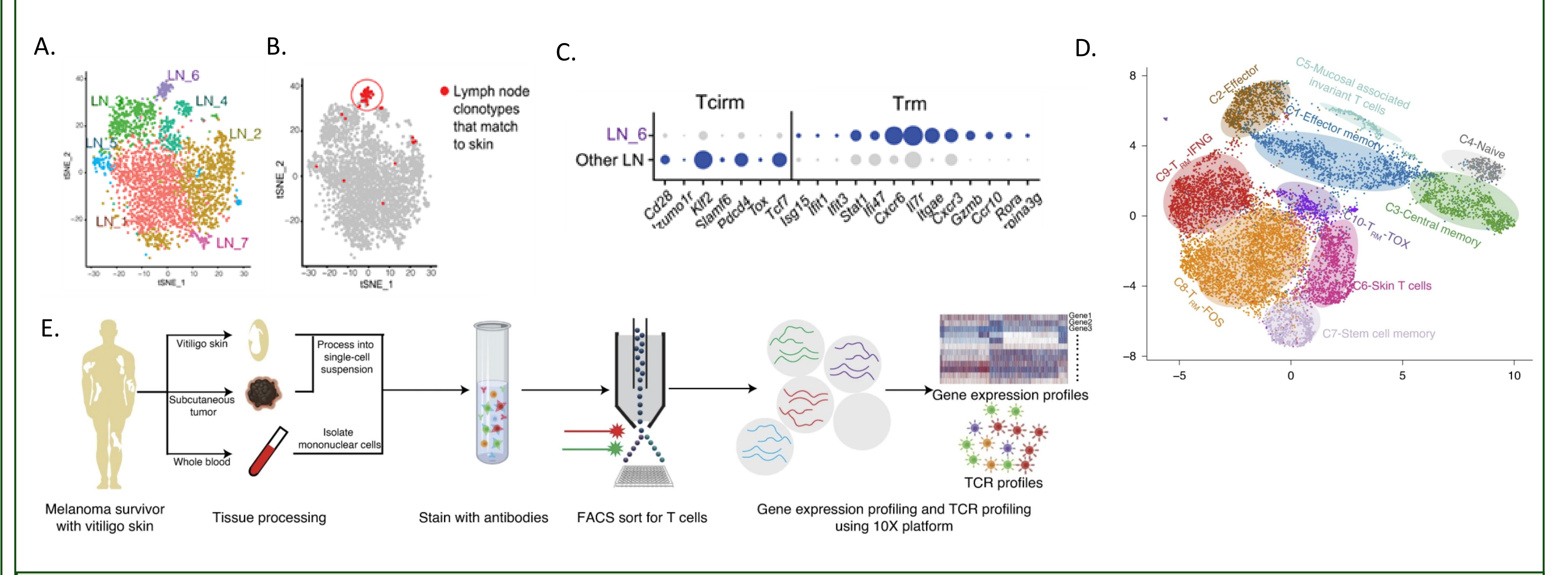
Publication: Han, *Nature Cancer*, 2021

Services Used: scRNA-seq; Illumina

Resources Involved: GMB, PSR, IMFC, I2M-ACM

Key Findings:

- Single cell sequencing by GMB reveals that T cells recognizing melanoma antigens in the skin of mice establish resident memory populations in the draining lymph node (LN) (A-C).
- Turk et. al. used GMB to establish pipeline for processing of melanoma patient specimens for single cell RNA and TCR sequencing (D,E).



PREDICTING PDAC RECURRENCE WITH ATAC-SEQ

PI: Leach^{SGN}

Funding Sources: NCI R01CA204228; U01CA224175

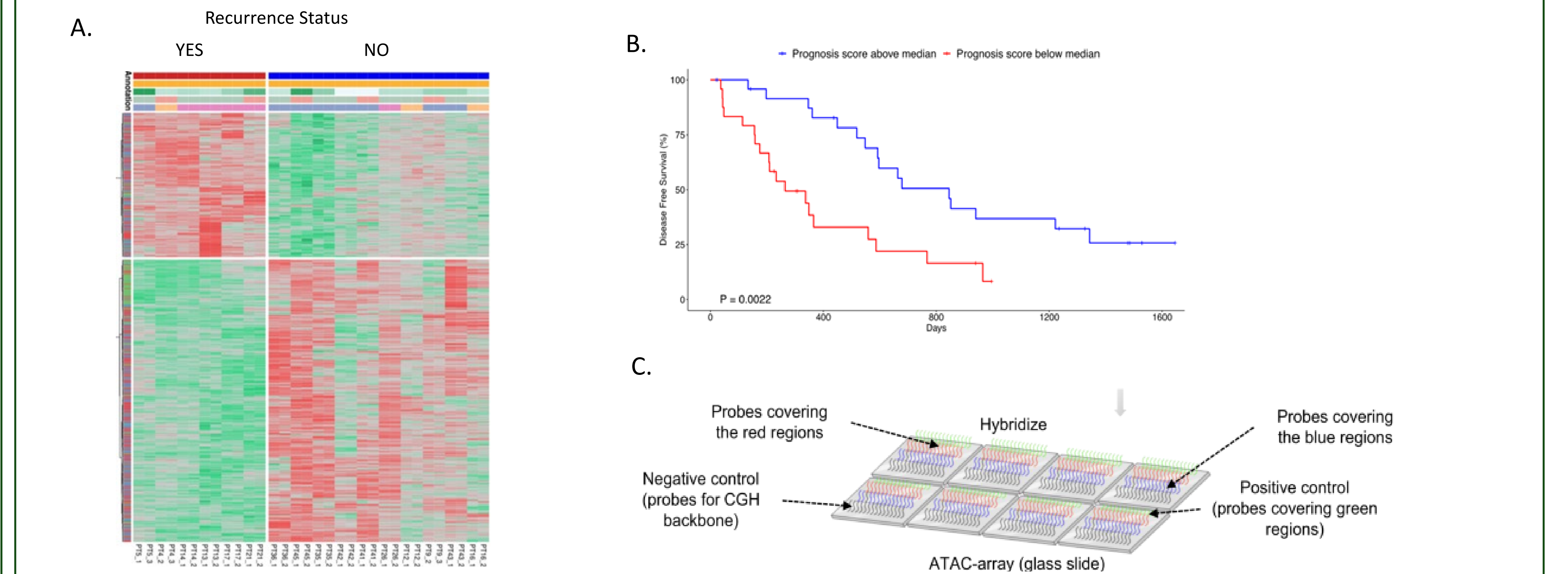
Publication: Dharia, *Nature Communications* 2021

Patent: PCT/US2019/046301

Services Used: Amplicon sequencing; ATAC-seq; Illumina

Key Findings:

- PDAC patients with or without recurrence cluster into distinct groups based on ATAC-seq peaks (A).
- Prognosis score derived from informative ATAC-seq peaks stratifies patient survival curves (B).
- Lead to the development of the ATAC Array technology (C) and the founding of Episteme Prognostics Inc.



MANAGEMENT AND STAFF

Fred Kolling, PhD
Director (7yrs)

Christian Lytle, BS
Lab Manager (21yrs)

Owen Wilkins, PhD
Senior Data Scientist (5yrs)

Heidi Trask, BS
Research Associate (35yrs)

Laurent Perreard, MS
Research Scientist (17yrs)

Carol Ringelberg, MS
Research Scientist (23yrs)

QUALITY AND OVERSIGHT

QA/QC

- Service contracts on all instrumentation
- Control samples included for library preparation and sequencing
- Electronic sample tracking with customized LIMS

Faculty Advisors

- Yina Huang – ICI
- Brock Christensen – CPS
- Aaron McKenna – SGN
- Louis Vaikus - TEC

CRTEC ACTIVITIES

- Train users on instrumentation
- Present at DCC program meetings
- Host vendor seminars to showcase new technologies
- Guest lecture for graduate courses

SELECTED PUBLICATIONS

Rawat K, Tewari A, Li X, Mara AB, King WT, Gibbins SL, et al. CCL5-producing migratory dendritic cells guide CCR5+ monocytes into the draining lymph nodes. *Journal of Experimental Medicine* 2023;**220**:e20222129. <https://doi.org/10.1084/jem.20222129>.

Salas LA, Zhang Z, Koestler DC, Butler RA, Hansen HM, Molinaro AM, et al. Enhanced cell deconvolution of peripheral blood using DNA methylation for high-resolution immune profiling. *Nat Commun* 2022;**13**:761. <https://doi.org/10.1038/s41467-021-27864-7>.

Molodtsov AK, Khatwani N, Vella JL, Lewis KA, Zhao Y, Han J, et al. Resident memory CD8+ T cells in regional lymph nodes mediate immunity to metastatic melanoma. *Immunity* 2021;**54**:2117–32.

ElTanbouly MA, Zhao Y, Nowak E, Li J, Schaafsma E, Le Mercier I, et al. VISTA is a checkpoint regulator for naive T cell quiescence and peripheral tolerance. *Science* 2020;**367**:eaay0524. <https://doi.org/10.1126/science.aay0524>.

Brog RA, Ferry SL, Schiebout CT, Messier CM, Cook WJ, Abdullah L, et al. Superkine IL-2 and IL-33 Armored CAR T Cells Reshape the Tumor Microenvironment and Reduce Growth of Multiple Solid Tumors. *Cancer Immunology Research* 2022;**10**:962–77. <https://doi.org/10.1158/2326-6066.CIR-21-0536>.

ACCESSIBILITY AND ACKNOWLEDGEMENT

Location
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Acknowledgement
CCSG: 5P30CA023108
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