

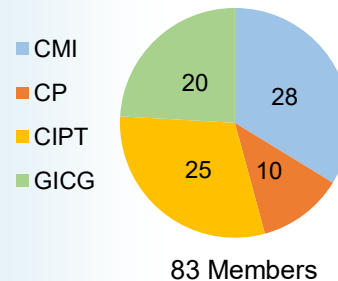


Immune Monitoring & Flow Cytometry Shared Resource

Aims

- The IMFC SR supports immune monitoring, Flow Cytometry phenotyping of tissue-infiltrating and circulating immune cells, cytokine and chemokine characterization and RNA analysis using NanoString nCounter technology
- We support the Good Manufacturing Practice by providing Replication Competent Retrovirus and Vector Copy Number Assays
- We invest in training & education with hands-on demonstration to CINJ basic and clinical researchers

Research Program Support (2018–2022)



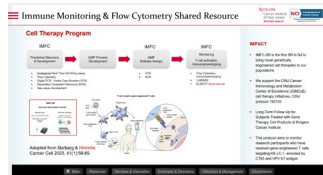
Publications

Total	110
IF>10	33

Peer-Reviewed Grants

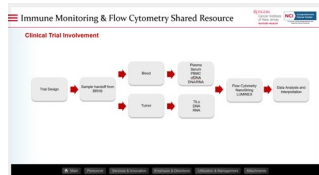
All	55
NCI	21

Cancer Immunotherapy

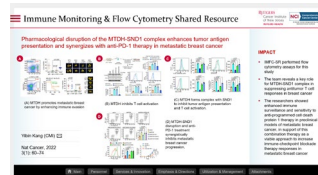


Cancer Cell 2023

Clinical Research IIT-Support

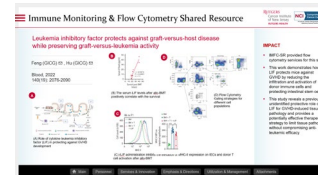


CMI



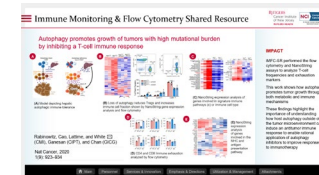
Nat Cancer 2022

GICG



Blood 2022

CMI, CIPT, GICG



Nat Cancer 2020



Leading Personnel & Roles



Christian Hinrichs, MD
Director
Started January 2021



Christina DeCoste
Managing Director, Princeton
Started 2010



Ankit Saxena, PhD
Managing Director, New Brunswick
Started March 2022

Services & Innovation

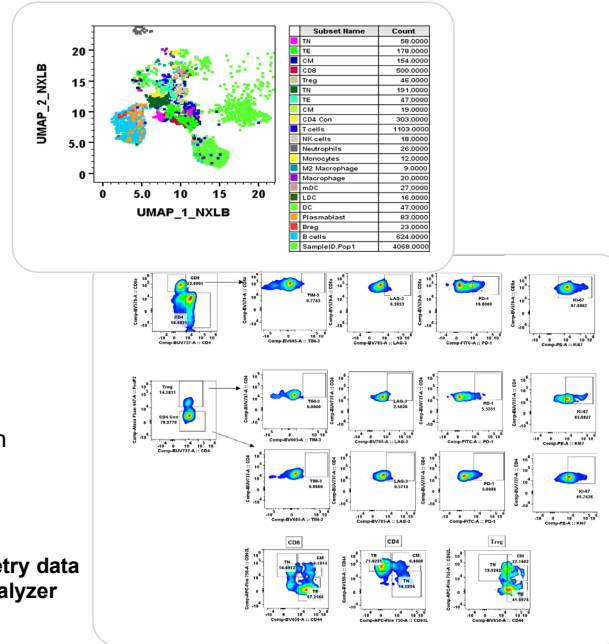
New

- Cytek Aurora spectral flow cytometer
- Cytek Aurora spectral high-speed cell sorter
- xCELLigence RTCA
- 24x7 Flow Cytometry

Services supporting clinical trials

- Clinical trial study design
- Tissue processing, including 10x single-cell prep
- Spectral flow cytometry
- Ncounter NanoString
- Luminex assay for cytokine, chemokine detection

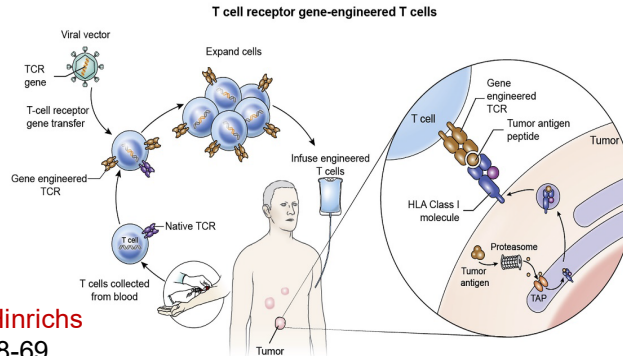
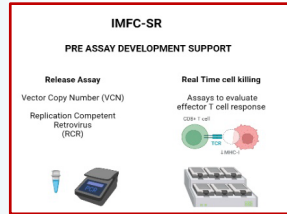
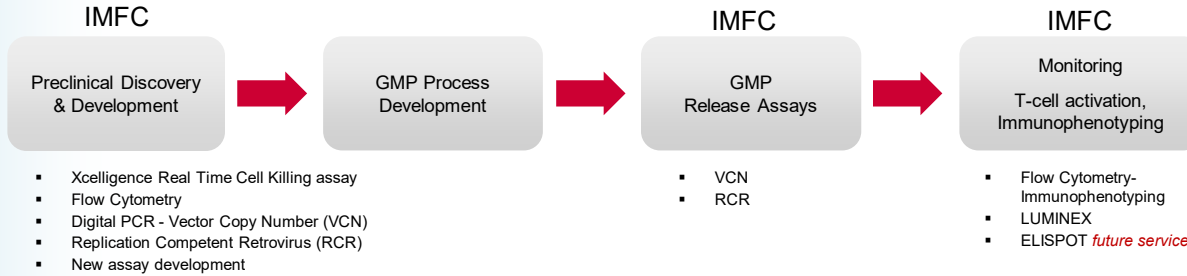
26-color spectral Flow Cytometry data generated on Cytek Aurora analyzer from mouse tumor samples



Continuing

- Flow Cytometry
 - 2 Attune NxT
 - FACSymphony A3 (S10-funded)
- High Speed Cell Sorting
 - MA-900
 - FACSaria Fusion
- Training
- Consultation, data analysis and interpretation

Cell Therapy Program

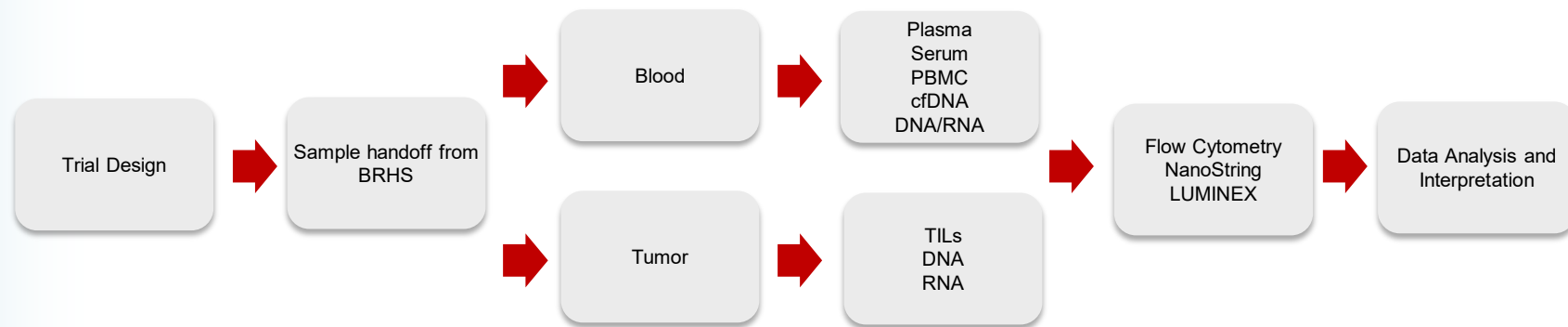


Adopted from Norberg & Hinrichs
Cancer Cell 2023, 41(1):58-69

IMPACT

- IMFC-SR is the first SR in NJ to bring novel genetically engineered cell therapies to our populations
- We support the CINJ Cancer Immunology and Metabolism Center of Excellence (CIMCoE) cell therapy initiatives, CINJ protocol 192103
- Long-Term Follow-Up for Subjects Treated with Gene Therapy Cell Products at Rutgers Cancer Institute
- This protocol aims to monitor research participants who have received gene-engineered T cells targeting KK-LC-1, encoded by CT83 and HPV E7 antigen

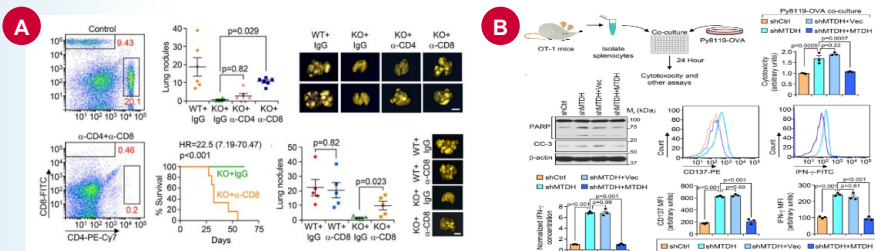
Clinical Trial Involvement



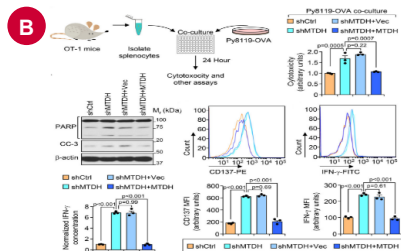
Investigator-Initiated Trials

Member	Protocol Title	Service	# of samples processed
Eugenia Girda	A Basket Trial of Pembrolizumab in Patients with Advanced Solid Tumors and Genomic Instability	Multi-parameter Flow Cytometry, NanoString	16
Mridula George	Phase 2 Study of INCMGA00012 and the Oncolytic Virus Pelareorep in Metastatic Triple Negative Breast Cancer	NanoString, cfDNA isolation	10
Salma Jabbour	A Phase II Study of Preoperative Pembrolizumab for Mismatch Repair Deficient, Epstein-Barr Virus Positive and/or PD-L1 Positive Gastric Cancer followed by Chemotherapy and Chemoradiation with Pembrolizumab	Multi-parameter Flow Cytometry, NanoString, LUMINEX	33
Janice Mehnert	A Phase 1 Study of Talimogene Laherparepvec and Panitumumab in Patients with Locally Advanced Squamous Cell Carcinoma of the Skin (SCCS)	Multi-parameter Flow Cytometry, NanoString	5
Christian Hinrichs	Long Term Follow Up for Subjects Treated with Gene Therapy Cell Products at Rutgers Cancer Institute	Multi-parameter Flow Cytometry	April 2023

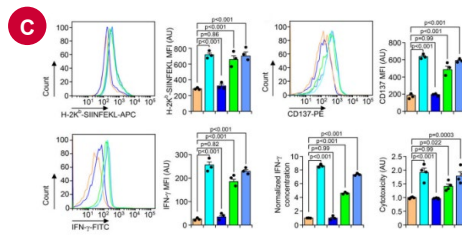
Pharmacological Disruption of the MTDH-SND1 Complex Enhances Tumor Antigen Presentation and Synergizes with Anti-PD-1 Therapy in Metastatic Breast Cancer



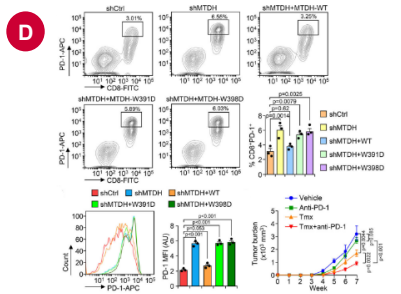
(A) MTDH promotes metastatic breast cancer by enhancing immune evasion



(B) MTDH inhibits T cell activation



(C) MTDH forms complex with SND1 to inhibit tumor antigen presentation and T cell activation



(D) MTDH-SND1 disruption and anti-PD-1 treatment synergistically inhibits metastatic breast cancer progression

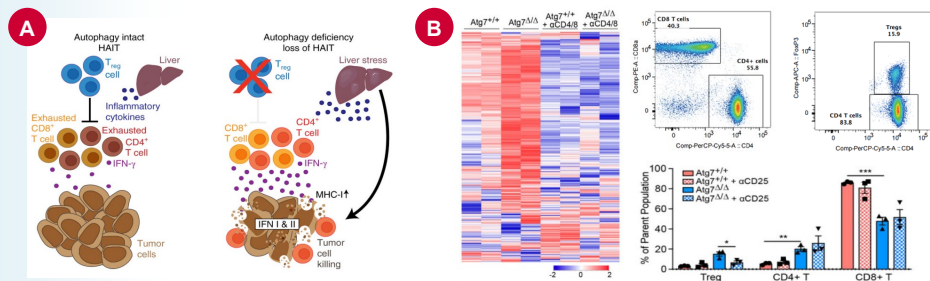
IMPACT

- IMFC-SR performed flow cytometry assays for this study
- The team reveals a key role for MTDH-SND1 complex in suppressing antitumor T cell responses in breast cancer
- The researchers showed enhanced immune surveillance and sensitivity to anti-programmed cell death protein 1 therapy in preclinical models of metastatic breast cancer, in support of this combination therapy as a viable approach to increase immune-checkpoint blockade therapy responses in metastatic breast cancer

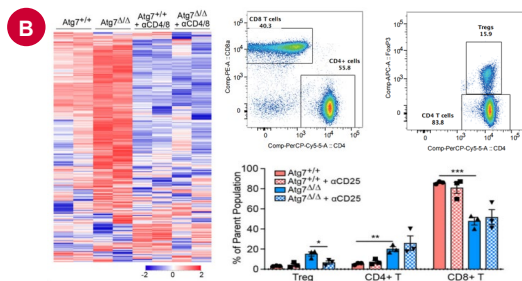
Yibin Kang (CMI) ✉

Nat Cancer, 2022
3(1): 60–74

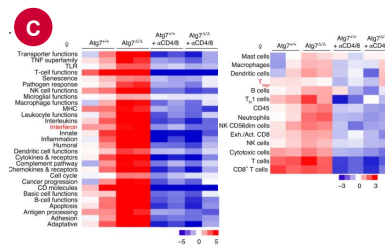
Autophagy Promotes Growth of Tumors with High Mutational Burden by Inhibiting a T-cell Immune Response



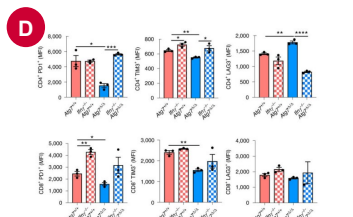
(A) Model depicting hepatic autophagic immune tolerance



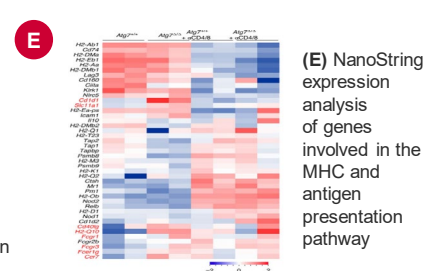
(B) Loss of autophagy reduces Tregs and increases immune cell fraction shown by NanoString gene expression analysis and flow cytometry



(C) NanoString expression analysis of genes involved in signature immune pathways or immune cell type



(D) CD4 and CD8 Immune exhaustion analyzed by flow cytometry



(E) NanoString expression analysis of genes involved in the MHC and antigen presentation pathway

IMPACT

IMFC-SR performed the flow cytometry and NanoString assays to analyze T-cell frequencies and exhaustion markers

This work shows how autophagy promotes tumor growth through both metabolic and immune mechanisms

These findings highlight the importance of understanding how host autophagy outside of the tumor microenvironment can induce an antitumor immune response to enable rational application of autophagy inhibitors to improve responses to immunotherapy

Rabinowitz, Cao, Lattime, and White (CMI), Ganesan (CIPT), and Chan (GICG)

Nat Cancer, 2020
1(9): 923–934

Emphasis & Future Directions

Outreach

- Research Program presentations
- Link for IMFC-SR services on Princeton Flow Cytometry website
- Participation in Rutgers University events

Christian S. Hinrichs (2022)

OncoCell Therapy Summit, “Improving Solid Tumor Targeting Engineered T-Cell Therapies”, Boston, Massachusetts

ASCO Annual Meeting, “Updates in HPV Treatment Approaches,” Chicago, Illinois

Ankit Saxena,

Training users for independent use
Education, CRTEC workshop

Christina DeCoste

President of MetroFlow, the NY/NJ Flow Cytometry Users Group since 2015

Future Directions

- IMFC-SR to support the clinical aims of the Good Manufacturing Practice (GMP) facility and cell therapy program.
- Perform needs assessment for transcriptomics-based assays to support Immune Therapy basic and clinical research
- Centralized and cost-effective services for clinical trials
- Increase Outreach, Training and Workshops

CRTEC Workshop, September 2022



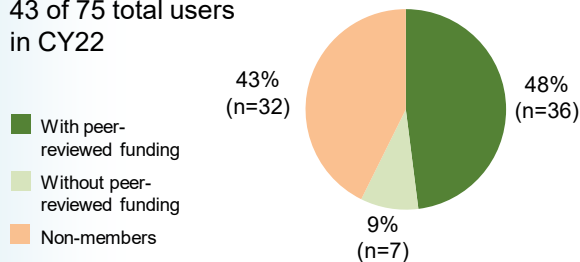


Immune Monitoring & Flow Cytometry Shared Resource

Utilization & Management

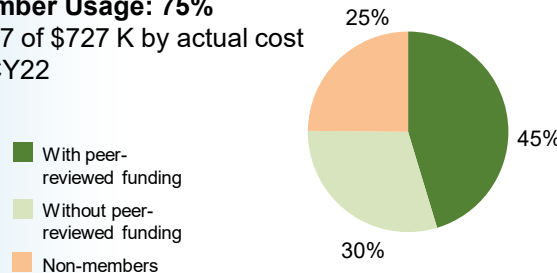
Member Users: 57%

43 of 75 total users in CY22

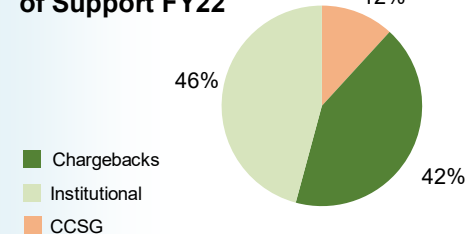


Member Usage: 75%

\$547 of \$727 K by actual cost in CY22

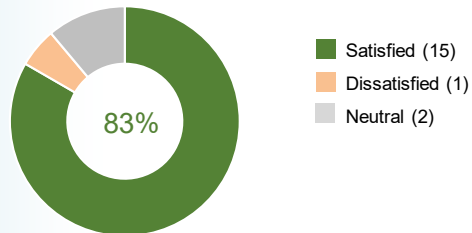


Sources of Support FY22



FY24 Chargeback target: 45%

Satisfaction Survey for CY22 services



Participated: 18 of 43 members (42%)

Organization & Governance

IMFC SR

6.6 FTE

SRACs

- Advisory Committee meets annually
- Discusses operational and scientific progress
- SRM supports organization

SRM

- SR Faculty Directors report to the ADSR
- SRM tracks and supports SRAC recommendations, productivity, service development, outreach

CINJ Director

- RLC
- Finance & Admin
- EAB

Supporting Information

Program Support

Publications

Grants

5 Year User List

Advisory Committee

FY23 Presentation

Action Items

Notes

Quality Satisfaction

Annual Survey
Action Items

Usage

CY22 Usage

Submitted Information

Research Strategy

Aims

SRM Research
Strategy