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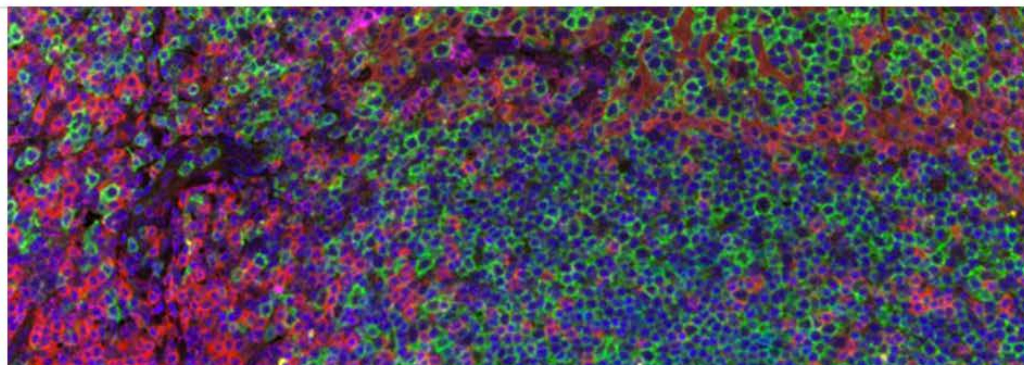
- HIMSR Home
- Meet the Team
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TRNPM

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Human Immunology & Immunotherapy Initiative (HI³)

After decades of investigation establishing principles in animal models, it has recently become possible to treat and cure some diseases in humans by interventions that target immunological functions. Immunotherapy, described by Science magazine as the Breakthrough of the Year in 2013, has led to major changes in the standard of care for some diseases and is particularly useful in infectious disease, autoimmunity, allergy/asthma, and especially cancer.

SUPPORT

ucdenver.edu/HumanImmunology

The **mission** of the **Human Immunology and Immunotherapy Initiative (HI³)** is to develop the infrastructure to create an all-inclusive facility that provides experimental models for the preclinical testing of new candidate therapeutics, reliable immunotherapeutic production, consistent clinical trials research support, and organized immune monitoring capabilities. In addition, the HI3 will train future scientific leaders within the realm of immunotherapy and recruit exemplary faculty to the CU Anschutz medical campus that will complement and enhance existing strengths.

The **ultimate goal** of the HI3 is to establish preeminence in human immune system-targeted therapies on the CU Anschutz medical campus.

HI3 Campus
Member Meeting
June 27, 2018

Visit the
HI3
website





Human Immunology & Immunotherapy Initiative (HI³)

SCHOOL OF MEDICINE

UNIVERSITY OF COLORADO **ANSCHUTZ MEDICAL CAMPUS**

A C T I V I T I E S

- **Faculty Recruitment**
- Human Immune Monitoring Shared Resource (HIMSR)
- Translational Research Networking & Preclinical Models (TRNPM)
- GMP Immunotherapeutic Production
- Training Program
- Clinical Research Program

HI3 Faculty Recruitment UPDATE

- **Amy Davis (endowed) Chair in Basic Human Immunology**
 - ✓ Eduardo Davila, PhD campus visits April, June & upcoming in July
 - ✓ in collaboration with Medical Oncology, Cancer Center, Dept. Surgery, Dept. Medicine, Dean Reilly, Patten Davis Foundation



Department of Immunology and Microbiology
Human Immunology and Immunotherapy Initiative (HI³)
INVITED GUEST SEMINAR

Eduardo Davila, PhD

Associate Professor | Dept. of Microbiology and Immunology
Co-Leader, UMGCCC Tumor Immunology & Immunotherapy Program
School of Medicine | University of Maryland



**"Expanding the T cell Repertoire and Lowering their
Activation Threshold"**

2:00-3:00 pm

Tuesday, April 17, 2018

Hensel Phelps West

video conferenced to National Jewish Health J107

- Currently funded from the NCI (R01, "Augmenting T cell activity to weak tumor antigens and reversing myeloid cell-mediated T cell inhibition" 2017-2022) and the VA (Merit Award, "IL-1 Receptor-Associated Kinase as a Cancer Therapeutic Target" 2018-2021)
- Patented "Universal Anti-tag Chimeric Antigen Receptors for Treating Cancer"
- Co-founded Living Pharmaceuticals, Inc., which was acquired by Miltenyi Biotec in 2017
- Awarded the BioMaryland LIFE (Leading Innovative Faculty Entrepreneur) in 2014
- Member of the Transplantation, Tolerance and Tumor Immunology (TTT) Study Section for the National Cancer Institute.
- R25 focused on increasing the number of URM pursuing a biomedical research degree and extensive track record of mentorship
- 2016 received the "UMB Dean's Faculty Award for Diversity and Inclusion"

HI3 Faculty Recruitment UPDATE

- **Autoimmunity**
 - ✓ HI3 Autoimmunity Program Director search on hold
- **Additional HI3 Supported Hires**
 - ✓ **Mike Verneris**, MD, University of Minnesota, Peds Hem/Onc, 9/16
 - ✓ **Doug Shepherd**, PhD, University of Colorado, CU Pharm, 10/17
 - ✓ **Ron Schuyler**, PhD, University of Colorado, HIMSR, 11/17
 - ✓ **Terry Fry**, MD, National Cancer Institute, Peds Hem/Onc, 1/18
 - ✓ **Paul Norman**, PhD, Stanford University, BIPM, 3/18
 - ✓ **Erin Schenk**, MD, Mayo Clinic, CU Med Onc, 5/18



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Hired within the last year



- **Ron Schuyler**, PhD - Bioinformatics, Assistant Research Professor, Immunology
 - Center for Genomic Regulation (Barcelona, Spain) and UC Denver



- **Doug Shepherd**, PhD - MIBI, Assistant Research Professor, Pharmacology
 - UC Denver (Downtown) and Los Alamos



- **Anjelica Miranda**, BS – Part-time PRA
 - UC Denver (Downtown student)

HI3 HIMSR – Personnel UPDATE

Full Team



- Jill Slansky, PhD - Director
- Kim Jordan, PhD - Assistant Director
- Elena Hsieh, MD - Experimental Design Support
- Jen McWilliams, PhD – Part-time Research Associate
- Angela Minic, MS - Sr. PRA
- Anjelica Miranda, BS - Part-time PRA
- Erin Kitten, BS - HIMSR/Flow Lab Manager
- Ron Schuyler, PhD - Bioinformatics
- Doug Shepherd, PhD - MIBI

HI3 HIMSR – User List UPDATE

Immunology & Microbiology

John Cambier
Ross Kedl
Roberta Pelanda/Julie Lang
Dohun Pyeon
Rosemary Rochford
Jill Slansky
Raul Torres
Jing Wang

Pathology

Dan Merrick
Jennifer Richer
Philip Owens (VA)
Xiao-jing Wang

Obstetrics and Gynecology

Kian Behbakht
Ben Bitler
Andy Bradford
Joshua Johnson

Endocrinology

Bryan Bergman
Jena French
Katja Kiseljak-Vassiliades
Rebecca Schweppe

Surgery

Martin McCarter
Richard Schulick

Radiation Oncology

Karen Goodman
Sana Karam
Christine Fisher/Tyler Robin

Hematology

Enkhee Purev

Cardiology

Kika Sucharov

Medical Oncology

Anthony Elias
Jen Diamond
Antonio Jimeno
Chris Lieu
Traci Lyons
Todd Pitts
William Robinson
Fred Hirsch
Peter Kabos
Erin Schenk

Infectious Disease

James Colbert
Adriana Weinberg
Cara Wilson

Pulmonary

Howard Li
David Schwartz

Pediatrics

Elena Hsieh- Allergy and Immunology
Kenneth Jones- Informatics
Joanne Masterson- Gastroenterology
Katja Gist- Cardiology
Stephanie Nakano- Cardiology
Carina Venter- Allergy and Immunology

Gastroenterology

Beth Tamburini

Renal Medicine

Josh Thurman
Katharina Hopp

Anesthesiology

Eoin McNamee

Barbara Davis Center

Janet Snell-Bergeon
Viral Shah

Linda Crnic Institute

Huntington Potter/Tim Boyd

CSU Environmental & Radiologic Health Sciences

Joshua Schaeffer

University of Nebraska Medical Center

Ted Mikuls

Commercial

Terumo
ElisaTech
Fluidigm

... ~60 Labs/PIs

HI3 HIMSR – Pending grant applications and letters of support

Medical Oncology

Ross Camidge- ARIAD trial
Aik Choon Tan- CLC
William Robinson- Melanoma Research Alliance
Kasey Coutts- Melanoma Research Alliance
Chris Lieu- RO1 & CLC
Todd Pitts- R21
Traci Lyons- RO1

Radiation Oncology

Sana Karam- Astrazeneca trial
Tyler Robin- training grant

Endocrinology

Katja Kiseljak-Vassiliades- CLC & DOD
Rebecca Schweppe- RO1

Allergy and Clinical Immunology

Stephen Dreskin- RO1

CU Cancer Center

Eric Clambey- SIRC application

Obstetrics and Gynecology

Ben Bitler

Environmental and Occupational Health

Alison Bauer- RO1

Infectious Disease

Cara Wilson and Mario Santiago
Adriana Weinberg- RO1 & UO1
Ed Janoff- RO1

Immunology

Jill Slansky- RO1

Pediatrics

Katja Gist- K23 & Webb-Waring Biomed Research Award
Nicholas Foreman- RO1
Stephanie Nakano- training grant

Dermatoogy

Dennis Roop- RO1

Renal Medicine

Katharina Hopp- KO1

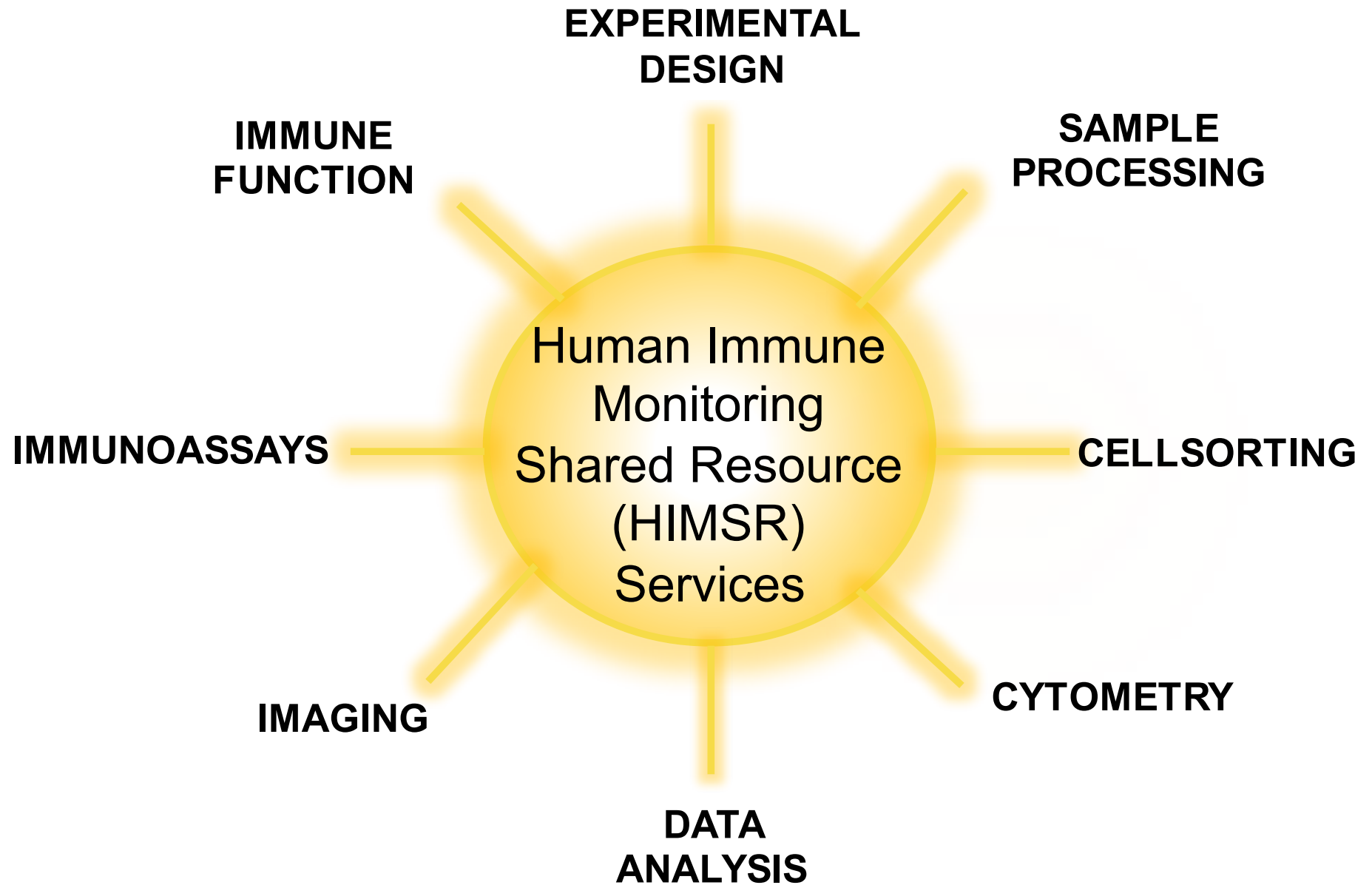
Gastroenterology

Beth Tamburini

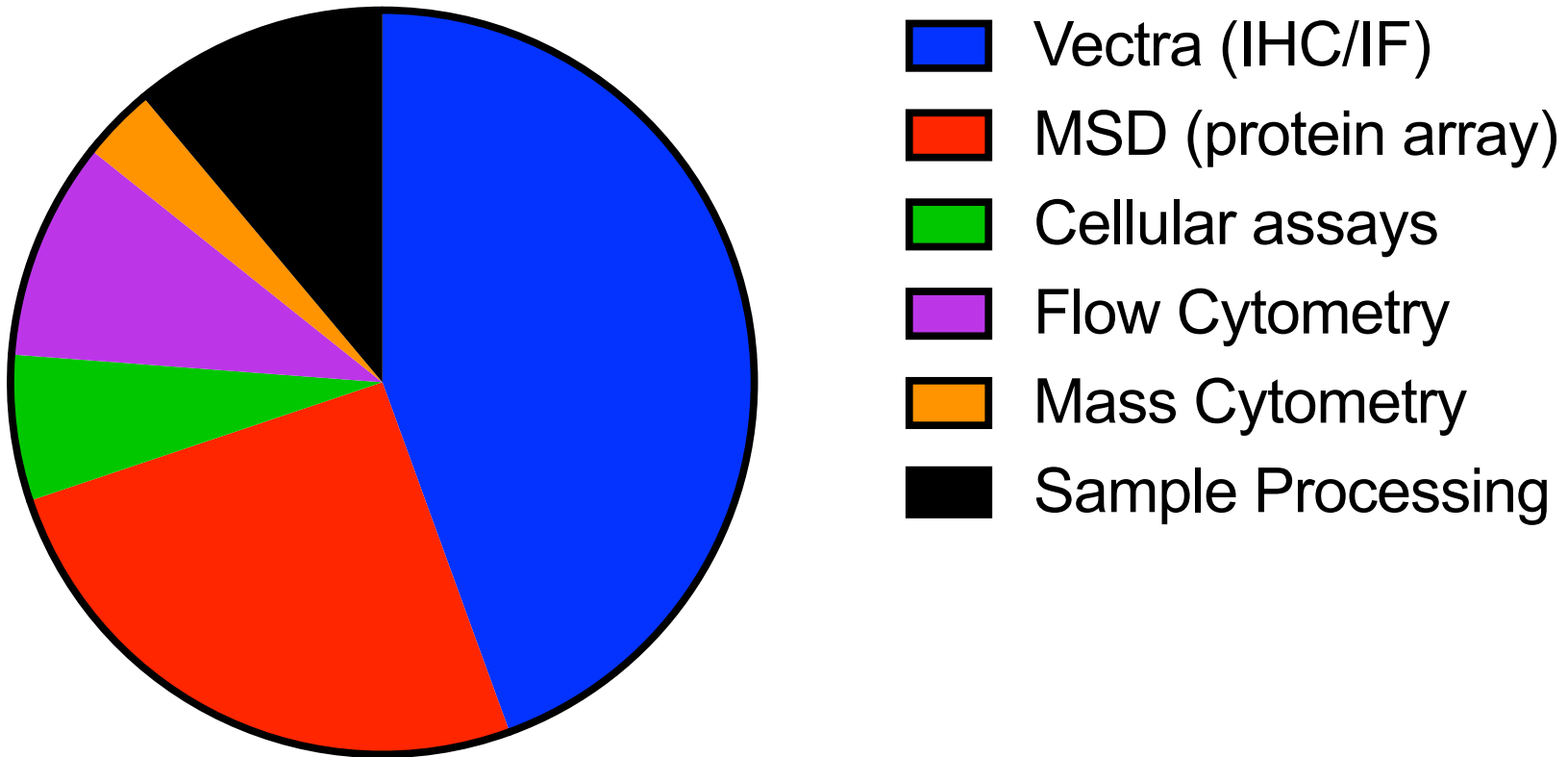
Barbara Davis Center

Richard Benninger- P30 (DRC)

HI3 HIMSR – Services UPDATE



Number of investigators/projects utilizing different services

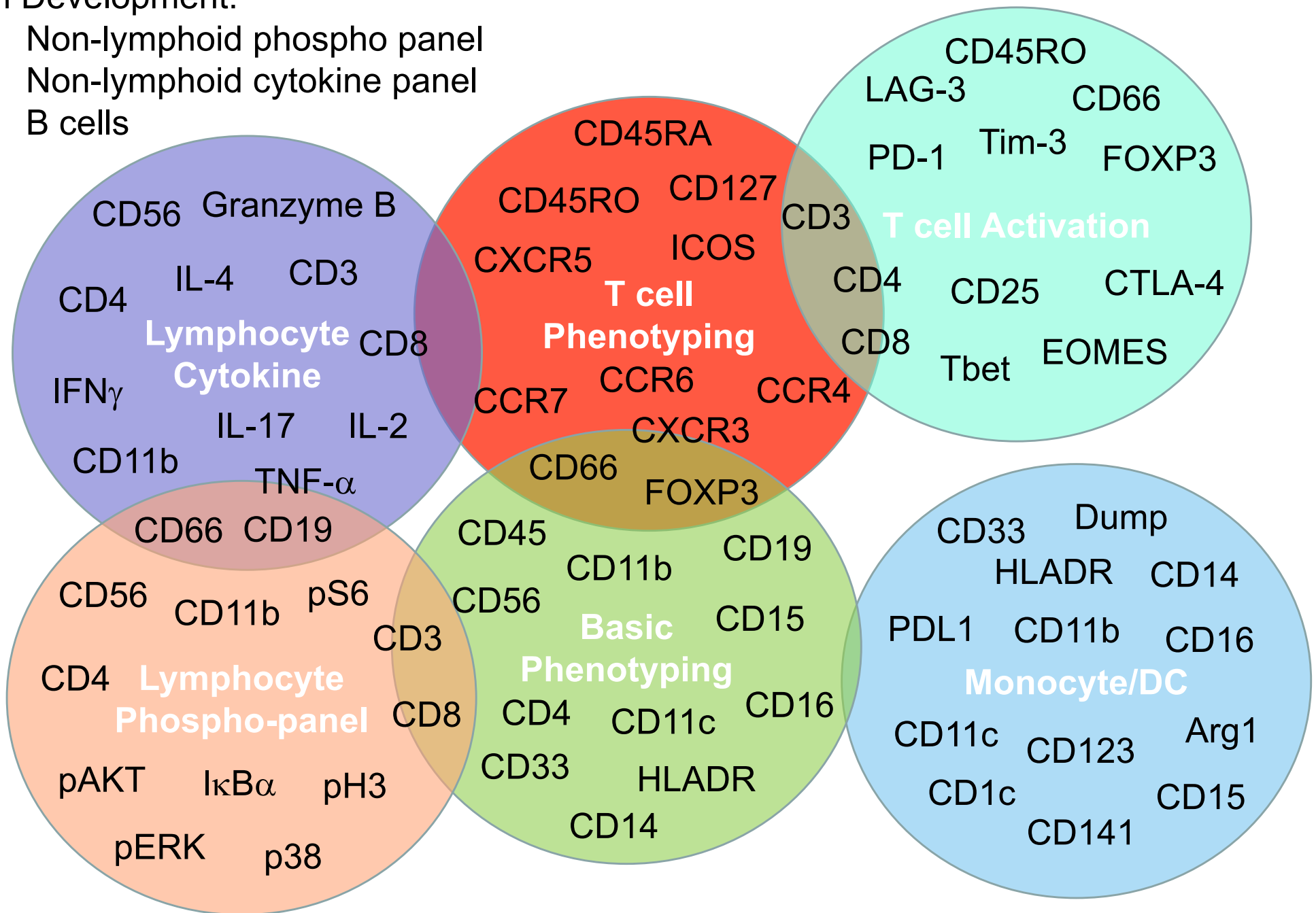


Total=63

HI3 HIMSR – Flow Cytometry Panels

In Development:

- Non-lymphoid phospho panel
- Non-lymphoid cytokine panel
- B cells



Phenotyping panel complete!

CD4, CD8, helper T cell subsets, memory/naïve T cells, regulatory T cells, effector T cells, NK cells, B cells, memory/naïve B cells, monocytes, activated monocytes, pDCs, CD1c+ DCs, CD141+ DCs, MDSCs (monocytic and granulocytic), PD-1/PDL-1 expression



Currently working on phospho- and cytokine panels


89	CD45	HI30
113	CD45RO	UCHL1
115	CD66b	B1.1
139La		
141Pr	CD196 CCR6	11a9
142Nd	CD19	HIB19
143Nd	CD123	6H6
144Nd	CCR5	NP6G4
145Nd	CD7	CD-6B7
146Nd	IgD	IA6-2
147Sm	CD1c	AD5-8E7
148Nd	CD38	HIT2
149Sm	CD127	A019D5
150Nd	CD86	IT2.2
151Eu	ICOS	DX29
152Sm	CD141	M80
153Eu	CD11b	ICRF44
154Sm	CD3	UCHT1
155Gd	CD27	L128
156Gd	CXCR3	G025H7
158Gd	PD-1	EH12.2H7
159Tb	PDL1	29E.2A3
160Gd	CD14	M5E2
161Dy	Tbet	4b10
162Dy	CD11c	Bu15
163Dy		
164Dy	CD15	W6D3
165Ho	Foxp3	150D/E4
166Er	Eomes	WD1928
167Er	CCR7	G043H7
168Er	CD8a	SK1
169Tm	CD25	2A3
170Er	CD33	WM53
171Yb	CXCR5	51505
172Yb	IgM	MHM-88
173Yb	HLA-DR	L243
174Yb	CD4	SK3
175Lu	CCR4	
176Yb	CD56	HCD56
209Bi	CD16	3G8

HI3 HIMSR – Vectra Workflow and Panel Optimization (human)

1. Investigator decides which primary antibodies they are interested in- **Customization**

Lineage/Phenotypes		Activation/Effector		Inhibitory		Tissue Markers	
CD3	muCD45	CD45RO	*IL-1 β	CTLA4	PDL1	CD31	Lyve-1/D240
CD4	CD56	CD127	Ki67	IDO	Lag3	α -actinin	SMA
CD8	CD64	CTLA4	Perforin	IL-10	Tim3	Cytokeratin	SOX10
CD11b	CD66b	EOMES	ROR γ t	PD1		Epcam	Vimentin
CD11c	CD68	Granzyme B	Tbet			Inhibin- α	CDCP1
CD14	CSFR1/CD115	HLADR/DP/DQ	GATA3			CD146	
CD15	C-kit/CD117	pSTAT3					
CD16	CD127						
CD19	CD163						
CD20	CCR2/CD192						
CD33	Elastase						
huCD45	FOXP3						

2. HIMSR staff design a preliminary panel  3. Pre-test in human tonsil
- Separate co-expressing markers
 - Abundant markers on dimmer opals 
 - Closest we can get to an existing panel
- Opal balancing/unmixing
 - Staining morphology
 - Autostainer programming

5. Large slide batch in experimental tissue  4. Pre-test in tissue of interest
- Always run control tonsil
 - Test scan several slides in a batch
- Opal balancing/unmixing
 - Staining morphology

Currently working on ISH/IHC combining RNA/protein

HI3 HIMSR UPDATE- What about Mouse panels for Vectra?

HIMSR Mouse Imaging User Group

Objective: Share protocols and avoid re-inventing the wheel!

- ✓ Email list of interested investigators
- ✓ Online spreadsheet of antibodies and protocols
- ✓ Reagent bank available for some primary and secondary antibodies



HIMSR Mouse IHC/IF Workshop

Objective: To titrate 5 primary antibodies for the development of a 7-color immune cell panel for mouse tissue

- ✓ Labs can titrate antibodies in their own labs & develop 7-color panels
- ✓ HIMSR scans slides on the Vectra
- ✓ Once developed, 7-color panels can be run on the HIMSR autostainer (human panels have priority, but ~once per week for mouse panels is reasonable)

Current mouse panel: CD3, FOXP3, CD4, CD8, F480, B220

HIMSR Vectra User Group

- Meets on the **first Thursday of every month at 2:00pm in RC1N, Room 8108**
 - ✓ discuss problems
 - ✓ present data
 - ✓ ask questions
 - ✓ obtain feedback
 - ✓ training seminars for inForm and Phenochart analysis software
- Next Meeting is August 2nd, 2018 at 2:00pm
 - TOPIC: inForm Software training

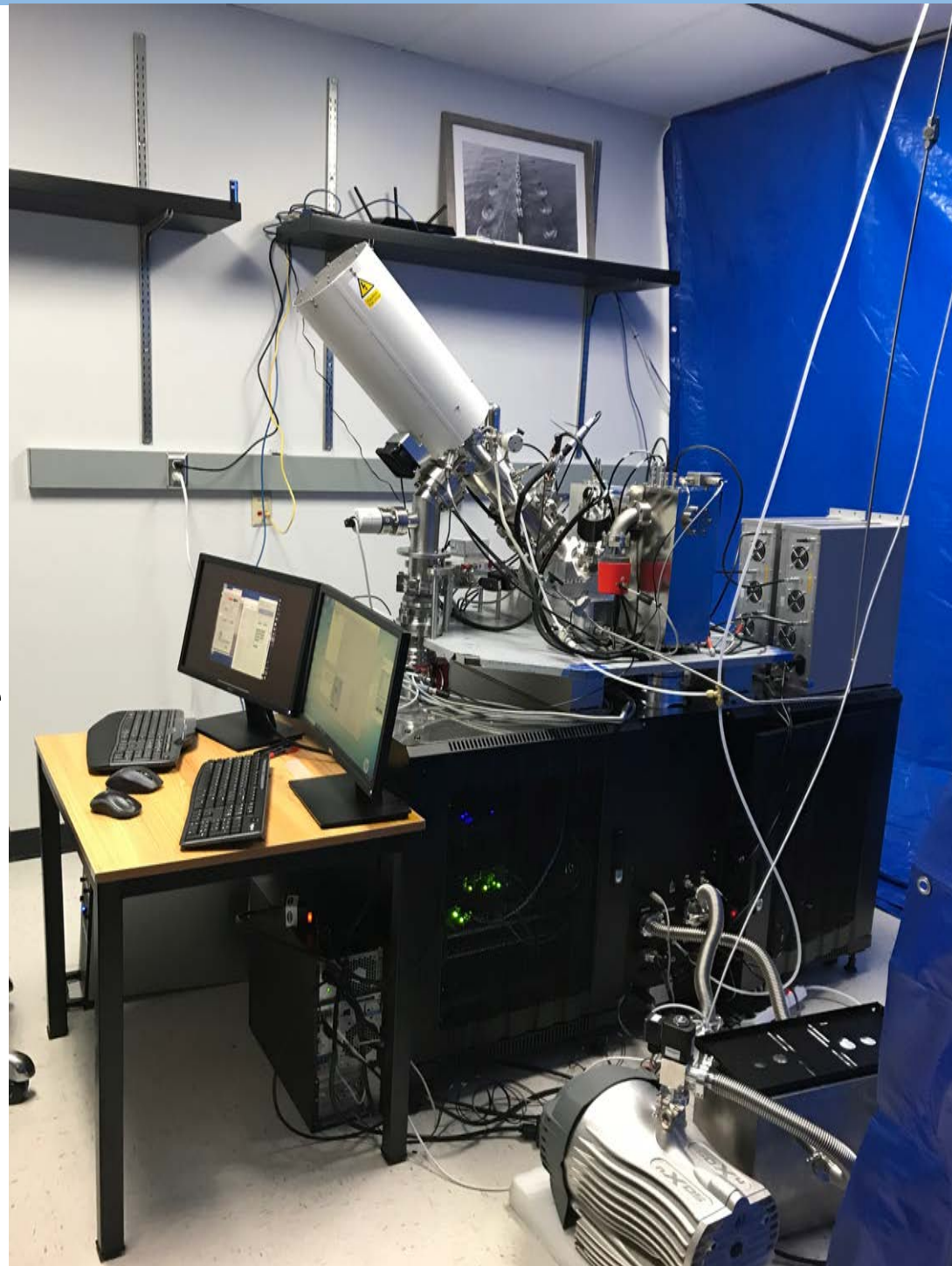
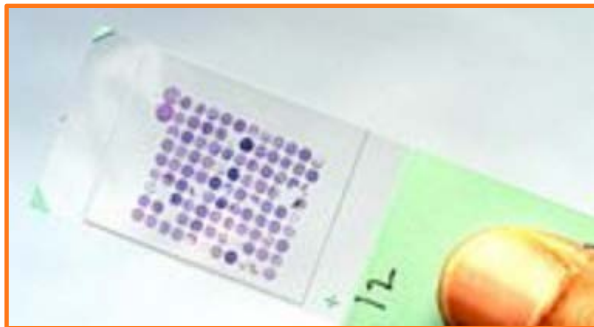
HI3 HIMSR – Equipment UPDATE

The MIBI!

- MIBI 'training session' held at IonPath March 12-16
- Expected date of arrival: Aug 2018

What to expect upon arrival:

- HIMSR will validate antibody panels and instrument
- Not a high throughput machine
- Investigators need to create tissue microarray slides (TMAs)
- Will not be ready for use until we're happy with the data



MesoScale Discovery SQ120

- Assay plate reader is now available- sign up in iLabs!
- HIMSR can perform the assays for you as well

Equipment Wish list

XCELLigence 96-well plate Real Time Cell Analyzer

- Proliferation and cytotoxicity assays

Nanostring nCounter Analysis System

- Gene expression measurements using targeted panels

Terumo Automated Buffy Coat isolation (TACSI)

- automated isolation of peripheral blood mononuclear cells

New flow cytometer... TBD

Website update- coming soon

- Antibody panels
- New services descriptions
- Instructions to access training video links on Office 365
- HI3 Acknowledgement and grant description language (Office 365)

iLabs Billing- May 2018

- Services will be entered by HIMSR staff
- Billing will be performed monthly through iLabs
- Update your speedtypes!

Biorepository and Sample processing

- Establishing a streamlined/standard workflow
- Biorepository manages sample kits & interfaces with clinical team
- Biorepository will track clinical samples in Encore
- HIMSR performs the same-day processing required for immunology-related assays (de-identified)
- Extra samples will be stored at the Biorepository

Bioinformatics and Data Analysis Tools (Ron Schuyler)

CyTOF Data-

- Data normalization across multiple sets of samples
- Unsupervised hierarchical clustering of cellular sub-populations

Vectra/Imaging Data-

- "Zero Correction" for quantification
- Conversion of the data to .fcs files for analysis
- Automated data analysis for quantification
- Nearest neighbor analysis (spatial relationships)

Genomics Data-

- RNAseq
- Deep sequencing of peptide libraries

COPD collaboration

- Katerina Kechris
- Statistical analysis and multi-omics integration

Please fill out the Bioinformatics Project Request form on the HIMSR website if you are interested in working with Ron!



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HI3 TRNPM UPDATE

“Human Immune Tissue Network Biobank” COMIRB protocol approved

- Umbrella protocol will allow any HI3 investigator to obtain and study fresh human tissue of immunological relevance (adult and pediatric) without the need of obtaining their own COMIRB protocol
- To obtain tissue, investigators simply fill out a form provided by the HI3
- Names of clinicians from which to obtain human tissue and the consent form, when needed, will be provided by HI3
- **If interested in obtaining human tissue through this protocol, please contact Roberta Pelanda**

Human Immune System Mice

- Moving mice to breeding barrier in R2 in order to be able to send mice out directly to other investigators rooms without the need for quarantine



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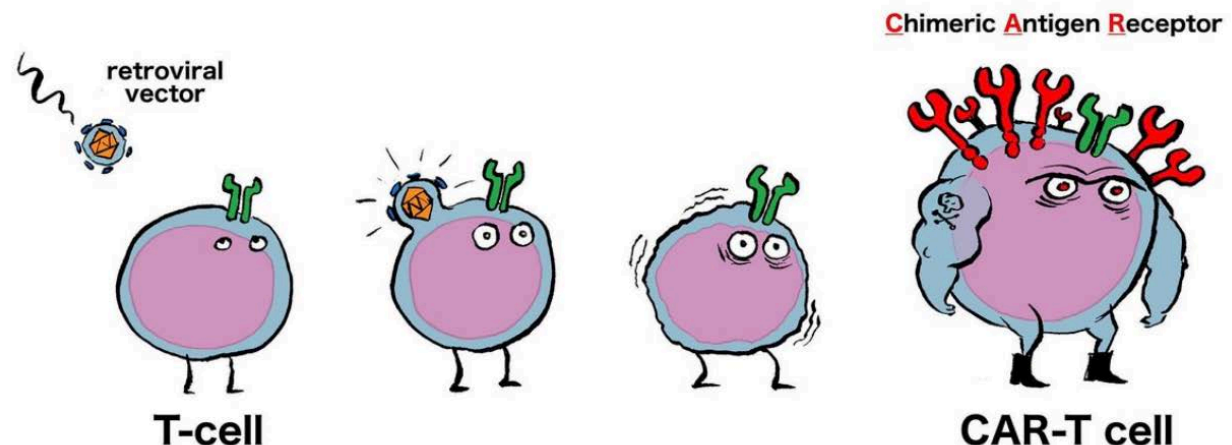
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- **GMP Immunotherapeutic Production**
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- Clinical Research Program

HI3 GMP Immunotherapeutic UPDATE

Collaborate with CU AMC GMP facilities toward the production of clinical grade biological reagents and cell-based immunotherapeutic products

- Provided \$250,000 to Drs. E. Purev & C. Jordan for CAR-T cell process development in collaboration with Clinimmune and the Gates Center
- Successful scale-up production of ~2 billion CD19 CAR T cells (>60% CAR expression) took place in the Gates Manufacturing Facility process development suite in preparation for a GMP run
- HI3 HIMSR was able to analyze the cells to validate CAR-T protocols

Generating super-soldiers the production of CAR-T cells



HI3 GMP Immunotherapeutic UPDATE

Facilitate the use of campus CLIA labs for monitoring patient responses and clinical decision-making (full list and links on HI3 website)

- Exsera BioLabs - complement and autoimmune diagnostics
- Colorado Molecular Correlates Laboratory (CMOCO) - anatomic path.
- Clinimmune - flow cytometry, cell sorting, histocompatibility, stem cells
- UC Cord Blood Bank (UCCBB) at Clinimmune
- The Barbara Davis Center Autoantibody/HLA Service Center
- Colorado Genetics Laboratory – pre- and postnatal testing, cancer testing
- Hirsch Biomarker Analysis Laboratory – IHC, SISH/CISH, mRNA-ISH
- Clinical Laboratories at Children's Hospital
- Clinical Laboratories at University of Colorado Hospital
- Diagnostic Immunology Lab – LPA, IFN γ ELISPOT, HIA
- iC42 Bioanalytic Service Center – quantitative mass spec, metabolomic and protein profiling
- Advanced Diagnostics Lab at NJH – immune response testing



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HI3 Guest Speakers



HI3 Training UPDATE

- Monetarily support trainees across the continuum at the pre-doctoral, post-doctoral, and junior faculty level
 - ✓ Establish fellowships to support training and research for future leaders in immunotherapy starting in year 3 of initiative – 2 PhD candidates, 1 post-doctoral fellow, 1 junior faculty
- Provide educational resources for trainees
 - ✓ Develop and implement a 2-day introductory overview course on human immunology for Terumo BCT – June 2018
 - ✓ Develop and implement a 2.5-day introductory overview for HI3 trainees and scientists who would like to expand or update their understanding of the field and address its role in health and disease and learn more about HIMSR services – October 2018
 - ✓ Continue to coordinate a **'Human Translational Immunology' case study seminar series** to highlight the investigation and treatment of diseases of the immune system currently underway on the Anschutz campus and connect clinicians with basic scientists

HI3 'Human Translational Immunology' case study seminar series

Highlight the investigation and treatment of diseases of the immune system currently underway on the Anschutz campus and connect clinicians with basic scientists.

2017/2018

Wednesday, October 25, 2017

A Day in the Life of a Clinical Immunologist: An Interesting Case of Type I Diabetes

Elena Hsieh, MD

HENSEL PHELPS WEST

Assistant Professor | University of Colorado | Department of Immunology and Microbiology

Children's Hospital Colorado | Pediatrics, Division of Allergy and Immunology

Wednesday, November 15, 2017

They'll See You Before They See Me:

Multidisciplinary Collaborations Identifying Monogenic Forms of Immune Dysregulation

Cullen Dutmer, MD

Assistant Professor | Children's Hospital Colorado | Pediatrics, Division of Allergy and Immunology

Wednesday, December 20, 2017

WINTER HOLIDAY BREAK

Wednesday, January 31, 2018

Molecular Drivers of "Asymptomatic Autoimmunity"

Mike Holers, MD

Professor | University of Colorado | Medicine, Division of Rheumatology

Wednesday, February 21, 2018

The Many Faces of Inflammatory Bowel Disease

Ed deZoeten, MD, PhD

Associate Professor | Children's Hospital Colorado | Pediatrics, Gastroenterology, Hepatology & Nutrition

Wednesday, March 21, 2018

Inflammatory Dysregulation with Disseminated Intravascular Coagulation

Brian Branchford, MD

Assistant Professor | Children's Hospital Colorado | Pediatrics, Division of Hematology/Oncology/BMT

Wednesday, April 18, 2018

Complications and Management of Immunotherapeutic Strategies in Pediatric Leukemia

Lia Gore, MD

Professor | Children's Hospital Colorado | Pediatrics, Division of Hematology/Oncology/BMT

Wednesday, May 9, 2018

Pathophysiology of Eosinophilic Esophagitis

Glenn Furuta, MD

Professor | Children's Hospital Colorado | Pediatrics, Gastroenterology, Hepatology & Nutrition

Director Gastrointestinal Eosinophilic Disease Program

Wednesday, September 19, 2018

CAR-T Targets CD19 and CD22

Terry Fry, MD

Professor | Children's Hospital Colorado | Pediatrics, Division of Hematology/Oncology/BMT

University of Colorado | Department of Immunology and Microbiology

Wednesday, October 17, 2018

Multiple Sclerosis

Timothy L. Vollmer, MD

FAAN Professor | University of Colorado | Department of Neurology

Co-Director, RMMSC Anschutz Medical Center | Medical Director, Rocky Mountain MS Center

Wednesday, November 28, 2018

the Eradication of Polio

Edwin J. Asturias, MD

Associate Professor | Children's Hospital Colorado | Pediatrics and Epidemiology

Wednesday, December 19, 2018

WINTER HOLIDAY BREAK

Wednesday, January 16, 2019

Spondyloarthritis and Inflammatory Bowel Disease (IBD)

Kristi Kuhn, MD, PhD

Assistant Professor | University of Colorado | Medicine, Division of Rheumatology

Wednesday, February 20, 2019

Type 1 Diabetes TrialNET

Kimber Simmons, MD

Assistant Professor | Children's Hospital Colorado | Pediatric Endocrinology and Diabetes

Wednesday, March 20, 2019

Development of bi- and tri-specific immune killer engagers (BiKs and TriKs)

Michael Verneris, MD

Professor | Children's Hospital Colorado | Pediatrics, Division of Hematology/Oncology/BMT

Wednesday, April 17, 2019

Diabetes Resistant MHC class II Molecules

Aaron Michels, MD

Associate Professor | University of Colorado | Pediatrics & Medicine

Director of Clinical Immunology | Barbara Davis Center for Diabetes

Wednesday, May 15, 2019

Development and Use of clinical grade CAR-T Cells

Enkhtsetseg 'Enkhee' Purev, MD, PhD

Assistant Professor | University of Colorado | Department of Medicine Blood Cancer and BMT Program



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HI3 Clinical Immunology Research Program UPDATE

HI3 member participation in newly created CU Cell Therapy and Immunotherapy Task Force

Goals and Scope

- Review process for all protocols using ACT or new immunotherapy agents
- Review initial cell therapy proposals
- Develop process map(s) for the exact steps investigators need to take to get cell therapies into the pipeline

HI3 Clinical Immunology Research Program UPDATE

Possible Directions – could be separate or overlapping

1. Clinical Immunology Core

- Provide ready access to high quality clinical data and biospecimens from subjects who have an immune-system related disease, are at high-risk for disease and healthy controls

2. HI3 Clinical Research Program

- Provide expertise and coordination with campus clinical research services to HI3 research teams to effectively operationalize clinical research



University of Colorado

Boulder | Colorado Springs | Denver | Anschutz Medical Campus

ADVANCEMENT | CU FOUNDATION



Gift Basket

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GIVE NOW

Human Immunology and Immunotherapy Initiative Fund


To provide support to the HI3 initiative in the School of Medicine on the University of Colorado Anschutz Medical Campus.

Campus: **CU Anschutz**

Keywords: **School of Medicine**

Allocation Code: **0222914**

Interest: **Science, Research & Innovation**

The screen that you will see when you click on the  button

I would like to give:

Amount

50

100

250

500

Other amount

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