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## EDUCATION

1998 Ph.D. in Experimental Pathology, Albany Medical College, Albany, New York  
 1989 B.S. in Medical Technology, University of Iowa School of Medicine, Iowa City, IA

## ACADEMIC APPOINTMENTS

2019- Professor, Department of Surgery; Division of Immunotherapy, University of Louisville  
 2015-19 Professor, Department of Medicine, University of Louisville  
 2015- Professor, Department of Biochemistry and Molecular Biology, University of Louisville  
 2015- Adjunct Professor, Department of Immunology and Microbiology, University of Louisville  
 2008-15 *Associate Professor*, Department of Medicine, University of Louisville  
 2008-15 *Associate Professor*, Department of Biochemistry & Molecular Biology, University of Louisville – Joint Appointment  
 2008- *Associate Professor*, Department of Microbiology & Immunology, University of Louisville – Adjunct Appointment  
 2003-08 *Assistant Professor*, Department of Biochemistry & Molecular Biology, University of Louisville – Joint Appointment  
 2003- *Senior Faculty Member*, Graduate School, University of Louisville  
 2002-08 *Assistant Professor*, Department of Medicine, University of Louisville  
 2002- *Associate Faculty Member*, JG Brown Cancer Center, University of Louisville

## OTHER POSITIONS AND EMPLOYMENT

1999-01 *Senior Scientist*, Picower Institute for Medical Research, Manhasset, NY  
 1998-99 *Post-Doctoral Fellow*, Picower Institute for Medical Research, Manhasset, NY  
 1994-98 *Graduate Student*, Albany Medical College, Albany, NY  
 1992-94 *Senior Research Associate*, Picower Institute for Medical Research, Manhasset, NY  
 1991-92 *Senior Research Assistant*, Rockefeller University, New York, NY  
 1989-91 *Principal Research Assistant*, University of Minnesota, Minneapolis, MN

## PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

2006- American Association for Cancer Research  
 2005- International MIF Society  
 2002- American Association for the Advancement of Science

## COMMITTEE ASSIGNMENTS AND ADMINISTRATIVE SERVICES

### Internal – U of L Committees

2019- Member - Lung Cancer Research Working Group  
 2019- Co-chair and Member – New Immunometabolism P01 Planning Committee  
 2018-19 Member – CoBRE Grant Planning Committee  
 2017-18 Chair and Member – New P01 Planning Committee  
 2017- Co-Leader – JGBCC Grant Mentoring Program  
 2017- Member – JGBCC Research Development and Strategy Advisory Committee  
 2016 Chair and Member – P01 Resubmission Planning Committee  
 2015-17 Chair and Member – P01 Planning Committee  
 2015- Member – University of Louisville Research Scholar Committee  
 2014-16 Member – JGBCC New Investigator Internal Grant Review Study Section  
 2014-19 Member - Department of Medicine, Promotion and Tenure Committee  
 2013 Chair - Decanal Review Committee for RRF Center Director, Dr. William W. King  
 2013 Chair - Poster Review and Awards Committee, 2013 JGBCC Annual Retreat  
 2012 Member - MD/PhD Regional Meeting Speaker Selection Committee  
 2011- Member - University of Louisville Scholar/Distinguished Scholar Review Committee  
 2011-14 Member - Lung Cancer Research Working Group  
 2011-17 Member - University of Louisville Postdoc Advisory Committee  
 2010 Member - University of Louisville Grievance Committee  
 2008-11 Member - Biochemistry and Molecular Biology Exam 1 Committee  
 2008-10 Member - JGBCC Annual Retreat Poster Review and Awards Committee  
 2008-09 Member - JGBCC High School Summer Students Program Selection Committee  
 2006-08 Member - University of Louisville HSC Mouse Users Committee  
 2006-07 Member - Biochemistry and Molecular Biology Travel Award Committee  
 2006 Member - Biochemistry and Molecular Biology Exam 1 Committee  
 2005-07 Member - JGBCC Website Planning Committee  
 2005-06 Chair and Coordinator - Molecular Targets Seminar Series  
 2004-06 Member - JGBCC Survivors Day Volunteer  
 2005 Member - Cancer Cell Biology Core Curriculum  
 2004- Member - Molecular Targets COBRE Grant Internal Advisor  
 2003- Member - MD/PhD Advisory Committee

#### **External – Grant Review Committees**

NIH/NCI Workforce Diversity in Basic Cancer Research (*Ad hoc*) November, 2021  
 NIH/NCI Spore Review Meeting (*Ad hoc*) May, 2020  
 NIH/NCI Tumor Microenvironment Study Section (*Ad hoc*) October, 2019  
 NIH/NCI SEP-2 for Provocative Questions (*Ad hoc*) February, 2019  
 NIH Transformative Research Awards (*Ad hoc*) February, 2019  
 NIH/NCI Tumor Progression and Metastases Study Section (*Ad hoc*) July, 2018  
 NIH/NCI Tumor Microenvironment Study Section (*Ad hoc*) February, 2018  
 NIH/NCI P01 Study Section (*Ad hoc*) February, 2018  
 NIH/NCI SEP – Neural Regulation of Cancer (*Ad hoc*) July, 2017  
 NIH/NCI R15 AREA SEP (*Ad hoc*) November, 2016  
 NIH/NCI R21/R03 Special Emphasis Panel (*Ad hoc*) March, 2016  
 NIH/NCI Tumor Progression and Metastases Study Section (Member – 10/2011 – 9/2015)  
 NIH/NCI Tumor Progression and Metastases Study Section (*Ad hoc*)  
 NIH/NHLBI Hemostasis & Thrombosis study section (*Ad hoc*)  
 CDMRP - Department of Defense Breast Cancer Research Program (Member – 2006 – 2009)  
 CDMRP - Department of Defense Lung Cancer Research Program (*Ad hoc*)  
 CDMRP – Department of Defense Prostate Cancer Research Program (*Ad hoc*)  
 US-Israel Binational Science Foundation (BSF) (*Ad hoc*)  
 Human Research Council of New Zealand (Multiple)

Cancer Research UK (Multiple)  
RGC Hong Kong (Multiple)

### **External – Conference Committees**

2014-Pres Senior Member – Organizing Committee for Annual International MIF Symposia  
2014-Pres Associate Editor – Quarterly Journal of Medicine  
2013 Senior Member – Organizing committee for 6<sup>th</sup> International MIF symposium  
2012 Host and Chair – Organizing committee for 5<sup>th</sup> International MIF symposium (Held at the Seelbach Hotel – Louisville, KY – September, 2012)  
2010 Senior Member – Organizing committee for 4<sup>th</sup> International MIF symposium  
2009 Senior Member – Organizing committee for 3<sup>rd</sup> International MIF symposium  
2008 Senior Member – Organizing committee for 2<sup>nd</sup> International MIF symposium  
2006 Senior Member – Organizing committee for 1<sup>st</sup> International MIF symposium

### **EDUCATIONAL ACTIVITIES**

#### **Courses**

2008-20 Radiation Biology Course Regular Lecturer – “Signal Transduction Pathways in Cancer”  
2006-Pres Cancer Cell Biology Course Regular Lecturer – “Signal Transduction Pathways in Cancer”  
2008-11 Biochemistry and Molecular Biology Exam 1 Committee  
2007-08 Medical Biochemistry – “Genes, Molecules and Disease”  
2006-08 Hematology/Oncology Translational Rounds  
2005-08 Hematology/Oncology Fellows Research Seminar Series  
2006 Biochemistry and Molecular Biology Exam 1 Committee  
2005 Molecular Basis of Cancer – “Molecular and Cellular Mechanisms of Angiogenesis”

#### **Current Graduate Students**

Jordan Noe, MD, PhD Candidate – BMB

#### **Past Graduate Students**

Mariana Barbosa, PhD – University of Sao Paolo, Brazil (PhD student – did thesis work in my lab)  
Ashley Wise, MS – M&I  
Anwasha Laha, PhD – BMB  
Sherri Mullins, MS – BMB  
Jerry Cowles, PhD – BMB  
Dan Xin, PhD – BMB  
Arlixer McGhee, PhD – M&I  
Derek Swant, MS – BMB  
Ivo Teneng, PhD – BMB  
Viny Souza, PhD – Pharm/Tox  
Lacey Verkamp, PhD – BMB

#### **Thesis Committees**

Krueger, PhD – Pharm/Tox, Ongoing  
Shrestha, PhD – M&I, Ongoing  
Whitt, PhD – Pharm/Tox, Ongoing  
Meng, PhD – Pharm/Tox, Graduated 2020  
Saforo, PhD – BMB, Graduated 2019  
Faughn, PhD – BMB, Graduated 2018  
Neely, PhD – BMB, Graduated 2017  
Muluhngwi, PhD – BMB, Graduated 2017

Mezzanote, MD, PhD – BMB, Graduated 2016  
 Schmidt, PhD – BMB, Graduated 2015  
 Zhu, PhD – M&I, Graduated 2014  
 Carroll, PhD – M&I, Graduated 2013  
 Mawhinny, PhD – Biochemistry, Graduated 2013 - (Served as external advisor on student's thesis (*Viva*) committee – University College, Dublin, Ireland)  
 Shukla, MS – BMB, Graduated 2012  
 Manavalan, PhD – BMB, Graduated 2012  
 Henson, PhD – BMB, Graduated 2012  
 Meier, PhD – BMB, Graduated 2011  
 Triplett, PhD – M&I, Graduated 2011  
 Teneng, PhD – BMB, Graduated 2010  
 Yalcin, PhD – BMB, Graduated 2009  
 Andres, PhD – BMB, Graduated 2009  
 Watkins, PhD – M&I, Graduated 2008  
 Short, PhD – BMB, Graduated 2007  
 Li, PhD – Biochemistry, Graduated 2007 (External *Viva* advisor – University College, Dublin, Ireland)  
 Kazanjian, PhD – BMB, Graduated 2006

#### **Other – Undergraduate/Community Engagement**

Isabella Zamborini, Bellarmine College Student – Summer-2021  
 Caroline Henry, duPont Manual HS Student – Summer-2019  
 Devin Frisby, College Undergraduate – R25 Mentoring Program, Summer-2018  
 Dr. Kavitha Yaddanapudi, Junior Faculty member – JGBCC/Department of Medicine: 2010-Present  
 Sam Fu, HS Student, Summer-2010, Summer/Fall-2011  
 Sahiba Chandel, U of L Bioengineering Co-op Student, 2009-2010  
 Dr. Allahyar Janjua, Hem/Onc Fellow: 2007-2008  
 Dr. Padmini Moffett, Hem/Onc Fellow: 2007  
 Stephanie Denkhoff, Summer College (Spaulding) Student: Summer-2006  
 Bradley Brewer, Medical Student, Summer-2004, Summer-2005  
 Harkina Rangi, HS Student, Summer-2004  
 Dr. James Slusher, Internal Medicine Resident: 2004

#### **GRANTS AND CONTRACTS**

##### **Pending Research Support**

NIH NCI R01 1R01CA258750-01A1 Mitchell (PI) 4/1/22 – 3/30/27

“Therapeutic Targeting of Macrophage Mitochondrial-Epigenetic Links”

This is a resubmitted R01 proposal that was previously unscored. This proposal seeks to investigate MIF- and ACLY-dependent metabolic homeostasis and therapeutic intervention in melanoma TAM-dependent immune suppression and anti-PD-1 immuno-therapeutic resistance.

Role: PI Direct costs/yr = \$252,106; F&A/yr = \$157,419; Total/yr = \$438,525

NIH NIA R21 1R21AG077152-01 Mitchell (PI) 4/1/22 – 3/30/24

“MIF as a determinant of misfolded SOD1-dependent senescence”

This is a new project that seeks funding from the National Institute of Aging to investigate a novel paradigm of MIF-dependent regulation of senescence and the potential use of small molecule therapeutics as novel senolytic agents.

Role: PI Direct costs/yr = \$150,000; F&A/yr = \$84,000; Total/yr = \$234,000

##### **Current Research Support**

NIH NIGMS 1P20GM12773938 Yan/Chesney (MPI) 4/1/20 – 3/31/25

“Center for Cancer Immunology and Immunotherapy (CCII)”

This is a Center's of Biomedical Research Excellence (CoBRE) P20 training grant that will establish a new Center for Cancer Immunology and Immunotherapy and fund 4 junior investigators here at the JGBCC. I will serve as the primary mentor for Project 4 (Yaddanapudi) and will devote 10% effort to this project.

Role: Mentor – Project 4      Direct costs/yr = \$1,500,000; F&A/yr = \$807,716; Total/yr = \$2,307,716

NIH NCI F30CA232550      Noe (PI)      3/1/19 – 2/28/23

“The role of MIF in mitochondrial metabolism and M2-TAM polarization”

This is an NRSA fellowship award for an MD/PhD graduate student, Jordan Noe, who is doing his dissertation in my laboratory. It seeks to investigate how MIF regulates glucose and lactate-dependent mitochondrial bioenergetics in M2 TAM polarization.

Role: Primary Mentor      Direct costs/yr = \$31,554; F&A/yr = \$0; Total/yr = \$31,554

NIH NCI R25CA134283      Hein/Kidd (MPI)      4/1/17 – 3/31/22

University of Louisville Cancer Education Program

Role: Mentor      Direct costs/yr = \$250,000; F&A/yr = \$68,600; Total/yr = \$318,600

NIH NCI T32 AI132146      Shirwan/Lamont (MPI)      8/1/18 – 7/31/23

Inflammation and Pathogenesis Training Program

Role: Mentor      Direct costs/yr = \$123,617; F&A/yr = \$0; Total/yr = \$123,617

Kosair Charities      Mitchell (PI)      4/1/21 – 3/31/22

“Structure-based drug design of Nit2 antagonists”

This is a pilot grant to support the identification of novel small molecule inhibitors of a new target enzyme Nitrilase 2 that works in conjunction with glutaminase and represents a unique anti-cancer/immunotherapeutic target.

Role: PI      Direct costs/yr = \$55,000

BCC Snow Fund      Mitchell (PI)      2/1/20 – 10/1/21

“Circulating lactate in late-stage melanoma patients”

This is a small gift grant to support studies into whether circulating lactate, pyruvate and or LDH act as prognostic/therapeutic predictors of disease in late-stage melanoma patients and whether immune evasion is involved.

Role: PI      Direct costs/yr = \$20,000

### **Past Research Support**

NIH NCI R01CA186661      Mitchell (PI)      4/1/14 – 3/31/20 (1 yr NCE)

Grants Management Office Number: OGMB140176

“Small molecule targeting of MIF as a novel melanoma therapeutic”

The goal of this project is to identify and characterize novel small molecule inhibitors of MIF to inhibit TAM/MDSC-mediated melanoma disease progression.

Role: PI      Direct costs/yr = \$207,500; F&A/yr = \$103,750; Total/yr = \$311,250

UofL School of Medicine Bridge Grant      Mitchell (PI)      6/01/19 – 5/31/20

“Identifying and targeting immune checkpoint inhibitor resistance in melanoma”. This is a competitive bridge funding grant from the University of Louisville's School of Medicine that is to be used to support additional data collection in support of the first grant listed in the “Pending Research Support”.

Role: PI      Direct costs/yr = \$40,000; F&A/yr = N/A; Total/yr = \$40,000

Baxalta Innovations GmbH (part of Shire)      Mitchell (PI)      9/29/17 – 12/1/19

Grants Management Office Number: CCDB171485

“oxMIF as a Novel Melanoma Immunotherapeutic”

This project will investigate whether the humanized anti-MIF monoclonal antibody – imalumab/Bax069 – is capable of inducing MDSC → DC differentiation and whether it can be used as a tool for detecting oxMIF in plasma.

Role: PI Direct costs/yr = \$50,000; F&A/yr = \$12,500; Total/yr = \$62,500

PHASE III CoBRE GM106396 Mitchell (PI) 7/1/15 – 6/30/18

Grants Management Office Number: OGMB130096P3

“Overcoming Melanoma Immunotherapeutic Resistance by MIF Targeting”

This is an internal CoBRE Pilot Project grant funded through the 1P30GM106396 grant to the Molecular Targets Program at the University of Louisville. This award is to develop projects for full submission of NIH R21 and/or R01 proposals.

Role: PI Direct costs/yr = \$75,000; F&A/yr = \$0; Total/yr = \$75,000

JHFE-Research Enhancement Grant Mitchell (PI) 10/1/2016 – 9/30/2017

Grants Management Office Number: 57130

“Overcoming Melanoma Immunotherapeutic Resistance”

The goal of this project is to investigate whether and how MDSC/DC spontaneous differentiation is regulated by MIF.

Role: PI Direct costs/yr = \$50,000; F&A/yr = \$0; Total/yr = \$50,000

NIH NCI R01CA122949 Mitchell (PI) 5/1/09 - 2/28/15\*

Grants Management Office Number: OGMB090533

“Amplification of tumor hypoxic responses by MIF-dependent HIF stabilization”

The goal of this project is to delineate the role of MIF in CSN5/Jab1-dependent HIF stabilization in pancreatic cancer.

Role: PI Direct costs/yr = \$201,275; F&A/yr = \$96,612; Total/yr = \$297,887

Kentucky Lung Cancer Research Program Mitchell (PI) 2/1/13 – 1/31/15

Grants Management Office Number: OGMB130397

“Metabolic stress adaptation by MIF family members in NSCLC”

This grant seeks to identify the functional phenotypic contributions of MIF and D-DT to AMPK tumor suppressor regulation and metabolic control in NSCLC.

Role: PI Direct costs/yr = \$68,182; F&A/yr = \$6,818; Total/yr = \$75,000

American Lung Association Eaton (MPI) 7/1/09 - 6/30/11

Grants Management Numbers: OGMB090283

“A Broad Spectrum Lung Cancer Stem Cell Vaccine”

The goal of this project was to investigate the potential of using embryonic stem cell antigens as a novel immunotherapeutic approach to vaccinating against lung cancer stem cells.

Role: MPI Direct costs/yr = \$99,567; No F&A allowed; Total costs/yr = \$99,567

NIH 3P2ORR018733-07S1 (ARRA) Miller (Co-PI) 09/24/09 – 09/23/11

Grants Management Office Number: OGMB080120S5

“Molecular Targets COBRE – Translational Lead Compound Identification Project”

The goal of this ARRA supplement was to identify novel MIF antagonists for use as anti-NSCLC compounds.

Role: Co-PI Direct costs/yr = \$106,426; F&A/yr = \$51,084; Total/yr = \$157,510

NIH NCI R01CA102285-S (ARRA) Mitchell (PI) 9/1/09 - 7/31/10

Grants Management Office Number: OGMB040442S1

“Role of MIF in Rb inactivation and Tumorigenesis”

The purpose of this administrative supplement was to provide funds that would allow us to complete animal studies from proposed in our parent award due to MPV outbreak in the old animal facility here at the U of L.

Role: PI Direct costs/yr = \$80,805; F&A/yr = \$38,786; Total/yr = \$119,591

NIH NCI R01CA102285 Mitchell (PI) 7/1/04 - 4/30/10

Grants Management Office Number: OGMB040442

“Role of MIF in Rb inactivation and Tumorigenesis”

The role of this project was to delineate the role of MIF in regulating the expression of cyclin D1 leading to Rb tumor suppressor inactivation in breast cancer.

Role: PI Direct costs/yr = \$160,146; F&A/yr = \$75,269; Total/yr = \$235,415

NIH NCI R01CA102285-S Mitchell (PI) 7/1/06 - 4/30/08

Grants Management Office Number: OGMB040442S

“Role of MIF in Rb inactivation and Tumorigenesis”

This was an administrative supplement to support a minority graduate student working on this NIH R01 parent project.

Role: PI Direct costs/yr = \$30,858; F&A/yr = \$12,081; Total/yr = \$42,939

Phillip Morris External Research Program Mitchell (PI) 8/1/07 – 7/30/10

Grants Management Office Number: OGMB060223

“Promotion of non-small cell lung cancer by MIF”

The goal of this study was to investigate the role of MIF in modulating Rac1-dependent lung tumor progression.

Role: PI Direct costs/yr = \$166,066; F&A/yr = \$79,712; Total/yr = \$245,778

Kentucky Lung Cancer Research Program Mitchell (PI) 7/1/06 - 6/30/08

Grants Management Office Number: OGMB061126

“Embryonic Stem Cells as a Novel Lung Cancer Vaccine”

The goal of this project was to investigate the potential of using embryonic stem cell antigens a novel immunotherapeutic approach to vaccinating against lung cancer-initiating stem cells

Role: PI Direct costs/yr = \$68,183; F&A/yr = \$6,818; Total/yr = \$75,000

Kentucky Lung Cancer Research Program Mitchell (PI) 7/1/03 – 6/30/06

Grants Management Number: OGMB030958

“Promotion of non-small cell lung cancer signaling and development by MIF”

The goal of this study was to investigate the role of MIF in cyclin D1-dependent tumor progression in normal, immortalized and transformed bronchial epithelial cells.

Role: PI Direct costs/yr = \$88,367; F&A/yr = \$8,837; Total/yr = \$97,204

NIH NIGMS P20RR018733 Miller (MPI) 7/1/03 – 6/30/04 (rotated off – due to R01)

Grants Management Office Number: GRNT030703G

“Small molecule targeting of macrophage migration inhibitory factor (MIF)” This project was a collaborative effort designed to use computational biology to identify novel small molecule antagonists of MIF enzyme/biologic activity.

Role: Project PI Direct costs/yr = \$160,889; F&A/yr = \$74,135; Total/yr = \$235,024

## PATENTS

### **Awarded**

Anti-MIF Antibodies

(USPTO # 7,517,523)

Method for Determining MIF Content

(USPTO # 6,998,238)

Compounds Having MIF Antagonist Activity

(USPTO # 6,492,248)

Inducible 6-Phosphofructo-2-Kinase and the Warburg Effect

(USPTO # 6,255,046)

Diagnostic Assays for MIF

(USPTO # 6,080,407)

Combination Method for Treating Diseases Caused by Cytokine-Mediated Toxicity  
(USPTO # 6,030,615)

**Pending**

MIF Targeting Reduces Immunosuppression and Increases Immune Checkpoint Inhibitor Efficacy  
(UofL Research Disclosure – 4/21/16)

Methods and Compositions for Modulating Ocular Damage  
(USPTO Serial # 13/698,518; Published – 10/13/15)

Novel Iodo Pyrimidine Derivatives Useful for the Treatment of MIF-implicated Diseases and Conditions  
(USPTO Serial # 13/498,036; Published – 5/8/13)

MIF Antagonists and Methods of Using the Same  
(USPTO Serial # 12/301,783; Published – 4/7/2015)

Methods and Agents for Immunization against Cancer  
(USPTO Serial # 12/225,140; Filed – 5/5/09)

**EDITORIAL WORK**

**Associate Editor**

Quarterly Journal of Medicine

**Reviewer**

Blood  
BMC Cancer  
Cancer  
Cancer Research  
Clinical Cancer Research  
Cytokine  
European Journal of Immunology  
FASEB Journal  
FEBS Letters  
Infection and Immunity  
Journal of Biological Chemistry  
Journal of Clinical Investigation  
Journal of Immunology  
Journal of Infectious Diseases  
Journal of Pathology  
Molecular Medicine  
Molecular Biology of the Cell  
Molecular & Cellular Biology  
Molecular Cancer Research  
Nature Immunology  
Oncogene  
Oncology  
PLOS One

**ABSTRACTS AND PRESENTATIONS**

**Oral Presentations**

1. Department of Biochemistry and Molecular Biology, University of Louisville



- "Mechanisms and Importance of MIF in Physiologic and Disease Processes" (August, 2002)
2. JG Brown Cancer Center Retreat; University of Louisville, Kentucky  
"Signal Transduction and Mechanisms of MIF's Contribution to Disease Processes" (September, 2002)
3. University College of Dublin; Dublin, Ireland  
"Signal Transduction by MIF in Cell Transformation and Tumor Progression" (February, 2003)
4. MD/PhD Program Meeting and Lecture; University of Louisville, Kentucky  
"Macrophage Migration Inhibitory Factor in Signaling Processes and Disease Pathophysiology" (April, 2003)
5. Kornhauser Library Friends Dinner; University of Louisville, Kentucky  
"Stem Cells, Tumors and Cancer Vaccines" (April, 2003)
6. JG Brown Cancer Center Molecular Targets Group Seminar; University of Louisville  
"A Novel Approach to Cancer Immunotherapy: Embryonic Stem Cell Vaccination" (June, 2003)
7. Jefferson County Medical Society; Hyatt Regency Hotel, Louisville, Kentucky  
"Embryonic Stem Cells: Vaccination Against All Cancer?" (September, 2003)
8. Second International Conference on Tumor Cell Metabolism; Point Clear, Alabama  
"Can Vaccination With Embryonic Stem Cells Prevent Cancer?" (November, 2003)
9. Organizational COBRE Review: University of Louisville, Kentucky  
"Development and Testing of Small Molecule Antagonists of MIF" (February, 2004)
10. Amgen Site Visit; JG Brown Cancer Center, University of Louisville, Kentucky  
"Macrophage Migration Inhibitory Factor in Chronic Autoimmune and Neoplastic Diseases" (March, 2004)
11. JG Brown Cancer Center Molecular Targets Seminar, University of Louisville, Kentucky  
"Killing Cancer With Copper" (March, 2004)
12. Organizational COBRE Review: University of Louisville, Kentucky  
"Development and Testing of Small Molecule Antagonists of MIF" (May, 2004)
13. Microbiology and Immunology Seminar Series; University of Louisville, Kentucky  
"Potential Use of Embryonic Stem Cells as a Novel Anti-Cancer Vaccine" (May, 2004)
14. Hematology/Oncology Fellowship Research Seminar Series; University of Louisville, Kentucky  
"Targeting Macrophage Migration Inhibitory Factor with Small Molecule Antagonists" (January, 2005)
15. Regional JG Brown Cancer Center Monthly Board Meeting; University of Louisville, Kentucky  
"MIF in Cancer and Inflammatory Disease: An Overview" (May, 2005)
16. JG Brown Cancer Center Molecular Targets Seminar, University of Louisville, Kentucky  
"Embryonic Stem Cell Vaccination Suppresses Lung Cancer" (March, 2006)
17. Albany Medical College, Albany, NY  
"From cytokines to cancer stem cells: Two novel approaches to lung cancer disease intervention" (June, 2006)
18. 1<sup>st</sup> Annual International Conference on Migration Inhibitory Factor; Dublin, Ireland  
"Contributions by MIF to microenvironmental adaptation and metastatic progression" (September, 2006)
19. Kentucky Lung Cancer Research Program Annual Meeting; Lexington, Kentucky  
"Promotion of NSCLC Signaling and Development by MIF" (October, 2006)
20. Department of Medicine, Grand Rounds; University of Louisville, Kentucky  
"Prevention of Lung Cancer by Embryonic Stem Cell-Based Vaccines" (April, 2007)
21. JG Brown Cancer Center Molecular Targets Seminar, University of Louisville, Kentucky  
"MIF – The Swiss Army Knife of Cytokines" (May, 2007)

22. Abramson Cancer Center, University of Pennsylvania, Philadelphia, PA “Modulation of tumor hypoxic adaptation by MIF-dependent HIF stabilization” (September, 2007)
23. Greenebaum Cancer Center, University of Maryland, Baltimore, MD  
“Malignant cell growth, invasion and hypoxic adaptation by MIF” (April, 2008)
24. 2<sup>nd</sup> International Symposium on MIF; Yale University, New Haven, CT  
“Insights into the Biology and Function of the MIF Homolog, D-DT” (May, 2008)
25. JG Brown Cancer Center Molecular Targets Seminar, University of Louisville, Kentucky  
“Modulation of tumor hypoxic adaptation by MIF-dependent HIF stabilization” (February, 2009)
26. Department of Ophthalmology Seminar Series, Kentucky Lion’s Eye Center, University of Louisville  
“Malignant cell growth, invasion and hypoxic adaptation by MIF” (November, 2009)
27. 3<sup>rd</sup> International Symposium on MIF – Hochhausen, Germany  
“Regulation of Adhesion Proteins and Membrane Dynamics by MIF” (December, 2009)
28. JG Brown Cancer Center Molecular Targets Seminar, University of Louisville, Kentucky  
“MIF: From gatekeeper to traffic cop – New insights into an old cytokine” (July, 2010)
29. Yale University – New Haven, CT  
“MIF as a cancer immunotherapeutic target” (May, 2011)
30. ARVO Annual Meeting – Ft. Lauderdale, FL  
“Modulation of RPE Wound Healing by Blocking MIF: A Novel Target for Age-related Macular Degeneration (AMD) Treatment” (Tezel - May, 2011)
31. JG Brown Cancer Center Molecular Targets Seminar, University of Louisville, Kentucky  
“Crazy Idea Day” (August, 2011)
32. 5<sup>th</sup> International Symposium on MIF – Louisville, KY  
“Control of tumor-associated macrophage alternative activation by MIF” (September, 2012)
33. 5<sup>th</sup> International Symposium on MIF – Louisville, KY  
“Metabolic stress adaptation by MIF family members in NSCLC” (September, 2012)
34. MIF in Health and Disease International Symposium – Piramal Pharma, Mumbai, India  
“Metabolic stress adaptation by MIF family members in NSCLC” (November, 2012)
35. Markey Cancer Center, University of Kentucky – Lexington, KY  
“Metabolic stress adaptation by MIF family members in lung cancer” (November, 2012)
36. Department of Microbiology and Immunology Research Seminar, University of Louisville  
“Control of innate-immune melanoma progression by MIF” (March, 2014)
37. 6<sup>th</sup> International Symposium on MIF – Zermatt, Switzerland  
“MIF controls myeloid-derived immunosuppression in malignant melanoma” (April, 2014)
38. Invited Lecture – St. Louis University – St. Louis, Missouri  
“Control of innate-immune melanoma progression by MIF” (April, 2014)
39. Kentucky Lung Cancer Research Program External Review – Louisville, KY  
“MIF family member-dependent lung adenocarcinoma disease promotion” (April, 2014)
40. JG Brown Cancer Center Molecular Targets Seminar, University of Louisville, Kentucky  
“Melanoma MDSCs Get MIF’ed” (January, 2015)
41. Invited Lecture – University of Iowa Cancer Center – Iowa City, IA  
“Control of innate-immune melanoma progression by MIF” (February, 2015)

42. Invited Lecture – 7<sup>th</sup> International MIF Symposium – Weizmann Institute, Rehovot, Israel  
“MIF is necessary for melanoma patient MDSC immune suppression and differentiation” (October, 2015)
43. JG Brown Cancer Center Cancer Colloquia, University of Louisville, Kentucky  
“MIF Targeting As A Cancer Immunotherapy” (April, 2016)
43. JG Brown Cancer Center Cancer Colloquia, University of Louisville, Kentucky  
“OSCC Cells Promote Macrophage Polarization in an MIF-dependent Manner” (M. Rizzo - November, 2016)
44. Invited Lecture – 8<sup>th</sup> International MIF Symposium – Trinity College, Dublin, Ireland  
“Regulation of macrophage metabolic homeostasis by MIF” (March, 2017)
45. JG Brown Cancer Center Cancer Colloquia, University of Louisville, Kentucky  
“Regulation of macrophage metabolic homeostasis by MIF” (November, 2017)
46. Presentation to Pfizer Representatives, Office of Tech Transfer, UofL, Louisville, KY  
“MIF targeting by 4-IPP as a unique immunotherapeutic agent for melanoma” (January, 2018)
47. Invited Lecture – 9<sup>th</sup> International MIF Symposium – Ludwig Maximilian University, Munich, Germany  
“Metabolic control of innate immune cell-mediated immune suppression” (October, 2018)
48. JGBCC Seminar Series, University of Louisville, Kentucky  
“Metabolic control of innate immune cell-mediated immune suppression” (November, 2018)
49. Biochemistry and Molecular Genetics Department Retreat – Louisville, KY  
“Metabolic Cooperation between Cancer Cells and Tumor-Associated Macrophages: The Role of MIF and Mitochondrial Lactate Metabolism (J. Noe - August, 2019)
50. Division of Immunotherapy – University of Louisville  
“The Role of MIF in Mitochondrial Metabolism and M2-TAM Polarization” (October, 2019)
51. Department of Surgery Grand Rounds – University of Louisville  
“MIF as a Novel Immunotherapeutic Target” (January, 2020)
52. Owen’s Wish Luncheon – Department of Surgery, University of Louisville  
“MIF as a Novel Immunotherapeutic Target” (February, 2020)
53. 10<sup>th</sup> International MIF Symposium – Shanghai, China (Remote due to Covid)  
“MIF as a link between mitochondrial homeostasis and tumor immune evasion” (October, 2020)
54. Society for Leukocyte Biology Annual Meeting – Remote  
“Lactate Supports a Metabolic-epigenetic Link in Macrophage Polarization” (May, 2021)
55. JG Brown Cancer Center Seminar Series – University of Louisville, KY  
“MIF as a link between mitochondrial homeostasis and tumor immune evasion” (October, 2021)

#### **Posters (Senior Author)**

1. JG Brown Cancer Center Retreat – Louisville, Kentucky  
Poster: “Adhesion-dependent Signal Transduction by MIF” (September, 2002)
2. JG Brown Cancer Center Retreat – Louisville, Kentucky  
Poster: “Universal Vaccine for the Prevention of Cancer” (September, 2003)
3. JG Brown Cancer Center Retreat – Louisville, Kentucky  
Poster: “A Case of IDM and Ulcerative Colitis in a Young Man: What Roles do Cytokines Play” (September, 2003)
4. JG Brown Cancer Center Retreat – Louisville, Kentucky  
Poster: “Use of Embryonic Stem Cells in the Prevention of Cancer” (October, 2004)

5. JG Brown Cancer Center Retreat – Louisville, Kentucky  
Poster: “Rho GTPase-dependent signaling is required for MIF-mediated expression of cyclin D1”  
\*2<sup>nd</sup> Place Award for Graduate Student Category (October, 2004)
6. Research Louisville! University of Louisville, Kentucky  
Poster: “Use of Embryonic Stem Cells in the Prevention of Cancer” (November, 2004)  
\*2<sup>nd</sup> Place Award in Medical Student Category
7. Research Louisville! University of Louisville, Kentucky  
Poster: “Rho GTPase-dependent signaling is required for MIF-mediated expression of cyclin D1” (November, 2004)  
\*2<sup>nd</sup> Place Award for Graduate Student Category
8. Southern Society of Clinical Investigation Regional Meeting – New Orleans, Louisiana  
Poster/Oral Presentation (Brewer): “Use of Embryonic Stem Cells in the Prevention of Cancer” (February, 2005)
9. Southern Society of Clinical Investigation Regional Meeting – New Orleans, Louisiana  
Poster: “Rho GTPase-dependent signaling is required for MIF-mediated expression of cyclin D1” (February, 2005)
10. American Association for Cancer Research; Molecular Targets Meeting – Philadelphia, PA  
Poster: “Contribution of MIF to the metastatic and anchorage-independent phenotype of NSCLC cells” (November, 2005)
11. American Association for Cancer Research; Annual Meeting – Washington, DC  
Poster: “Prevention of Lung Cancer by Embryonic Stem Cell Vaccination” (April, 2006)
12. American Association for Cancer Research; Annual Meeting – Washington, DC  
Poster: “Cooperative regulation by cytokine family members MIF and D-DT in NSCLC-derived angiogenic growth factor production” (April, 2006)
13. National Institutes of Health IDEA Conference – Washington, DC  
Poster: “Prevention of Lung Cancer by Embryonic Stem Cell-Based Vaccines” (July, 2006)
14. Association of Medical Laboratory Immunologists Annual Meeting – Washington, DC  
Poster: “Cooperative regulation by MIF and D-DT in NSCLC-derived angiogenic growth factor production” (August, 2006)
15. Keystone Meeting, *Ubiquitin Signaling* – Big Sky, Montana  
Poster: “Amplification of Tumor Hypoxic Responses by MIF-Dependent HIF-1 $\alpha$  Stabilization” (February, 2007)
16. Abcam Stem Cell Meeting – Punta Cana, Dominican Republic  
Poster: “Prevention of Lung Cancer by Embryonic Stem Cell-Based Vaccines” (December, 2007)
17. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Cooperative regulation by MIF and D-DT in NSCLC-derived angiogenic growth factor production” (November, 2007)
18. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “A novel, suicide antagonist of MIF enzymatic activity inhibits lung cancer cell migration and anchorage-independence” (November, 2007)
19. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “The MIF homolog, D-dopachrome tautomerase, functionally inhibits p53 stabilization” (November, 2007)
20. American Association for Cancer Research; Annual Meeting – Denver, CO  
Poster: “MIF modulates adherens junction proteins in non-small cell lung carcinoma cells” (April, 2009)
21. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Compensatory function of the homologous proteins MIF and D-DT p53 regulation in NSCLC” (November, 2010)
22. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Vaccination with Embryonic Stem Cells Elicits Anti-tumor Immunity” (November, 2010)

23. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Modulation of T lymphocyte activation and potential tumor-immune response modifier activity by small molecule inhibitors of MIF” (November, 2010)  
\*2<sup>nd</sup> Place Award in Junior Faculty Category (Yaddanapudi)
24. ARVO Annual Meeting – Ft. Lauderdale, FL  
Poster: “Modulation of RPE Wound Healing by Blocking MIF: A Novel Target for Age-related Macular Degeneration (AMD) Treatment” (Tezel - May, 2011)
25. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “MIF-dependent promotion of tumor-induced macrophage alternative activation and melanoma progression” (October, 2011)
26. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Compensatory functions MIF and D-DT in the regulation of AMPK-dependent metabolic-stress pathways in NSCLC” (October, 2011)
27. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Vaccination with Embryonic Stem Cells protects against Lung Cancer” (October, 2011)
28. American Association for Cancer Research; Annual Meeting – Chicago, IL  
Poster: “Metabolic stress adaptation by MIF family members” (April, 2012)
29. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Metabolic stress adaptation by MIF family members” (October, 2012)
30. JG Brown Cancer Center Retreat – Louisville, KY  
Poster: “Control of tumor-associated macrophage alternative activation by MIF” (October, 2013)
31. AACR Tumor Microenvironment Meeting – San Diego, CA  
Poster: “Control of tumor-associated macrophage alternative activation by MIF” (February, 2014)
32. Southeastern Medical Scientist Symposium; Vanderbilt University – Nashville, TN  
Poster: “Altered bioenergetics during alternative activation of MIF-deficient macrophages”
33. Research Louisville! University of Louisville – Louisville, Kentucky  
Poster: “Altered bioenergetics during alternative activation of MIF-deficient macrophages” (October, 2015)  
\*2<sup>nd</sup> Place – Norton Healthcare Medical Student Award (Noe)
34. Research Louisville! University of Louisville – Louisville, Kentucky  
Poster: “MIF-Dependent AMPK Control of Immune Suppression” (October, 2015)
34. Research Louisville! University of Louisville – Louisville, Kentucky  
Poster: “OSCC Cells Promote Macrophage Polarization in an MIF-dependent Manner” (October, 2016)
35. South Eastern Medical Scientist Symposium (SEMSS) – Vanderbilt University, Nashville, TN  
Poster: “Altered bioenergetics during alternative activation of MIF-deficient macrophages” (September, 2015)
37. BMG Departmental Retreat – University of Louisville, Louisville, KY  
Poster: “The role of MIF in mitochondrial metabolism and macrophage polarization” (August, 2017)  
\*This poster tied for Best Graduate Student Poster
38. South Eastern Medical Scientist Symposium (SEMSS) – Emory University, Atlanta, GA  
Poster: “MIF regulates mitochondrial lactate metabolism and phenotypic polarization in TAMs” (November, 2017)
39. American Association of Cancer Research (AACR) National Meeting – Chicago, IL  
Poster: “Mitochondrial Metabolism in Macrophage Polarization: The Role of MIF and Tumor-Derived Lactate” (April, 2018)

40. American Physician Scientist Association Annual Meeting – Chicago, IL  
Poster: “The Role of MIF in Mitochondrial Metabolism and Tumor-Associated Macrophage Polarization” (April, 2018)
41. National MD/PhD Student Conference – Keystone, CO  
Poster: “Mitochondrial Metabolism in M2 Macrophage Polarization: The Role of MIF and Lactate” (July, 2018)
42. Southeastern Medical Scientist Symposium – Nashville, TN  
Poster: “Mitochondrial Metabolism in M2 Macrophage Polarization: The Role of MIF and Lactate” (November, 2018)
43. National American Physician-Scientist Association (APSA) Conference – Chicago, IL  
Poster: “Metabolic Cooperation between Cancer Cells and Tumor-Associated Macrophages: The Role of MIF and Mitochondrial Lactate Metabolism (April, 2019)
44. Biochemistry and Molecular Genetics (BMG) Department Research Conference - Louisville, KY  
Student Presentation: “Mitochondrial Metabolism in Tumor-Associated Macrophages: The Role of MIF and Tumor-Derived Lactate” (September, 2020 – J. T. Noe)
45. AACR Special Conference on Epigenetics and Metabolism – Virtual  
Student Presentation: Mitochondrial lactate metabolism in M2 macrophage polarization and ACLY-dependent histone acetylation (October, 2020 – J.T. Noe)
46. American Physician-Scientist Association (APSA) National Conference – Chicago, IL  
Student Presentation: “Lactate Supports a Metabolic-Epigenetic Link During Macrophage polarization” (April, 2021 – J.T. Noe:)

## PUBLICATIONS

### Peer Reviewed Manuscripts

1. K.W. Harris, **R.A. Mitchell** and J.C. Winkelmann (1991) Ligand Binding Properties of the Human Erythropoietin Receptor Extracellular Domain Expressed in E. Coli. *J. Biol. Chem.* (267) 15205-15209. PMID: 1321832
2. J. Bernhagen, T. Calandra, **R.A. Mitchell**, S.B. Martin, K.J. Tracy, W. Voelter, K.R. Manogue, A. Cerami and R. Bucala (1993) Macrophage migration inhibition factor (MIF) is a pituitary-derived cytokine that potentiates lethal endotoxaemia. *Nature* (365) 756-759. PMID: 8413654
3. T. Calandra, J. Bernhagen, **R.A. Mitchell**, and R. Bucala (1994) The macrophage is an important and previously unrecognized source of macrophage migration inhibitory factor. *J. Exp. Med.* (79)6 1895-1902. PMID: 8915715
4. J. Bernhagen, **R.A. Mitchell**, T. Calandra, W. Voelter, A Cerami, and R. Bucala (1994) Purification, bioactivity, and secondary structure analysis of mouse and human macrophage migration inhibitory factor (MIF). *Biochemistry* (33)47 14144-14155. PMID: 7947826
5. **R.A. Mitchell**, M. Bacher, J. Bernhagen, T. Pushkarskaya, M.F. Seldin and R. Bucala (1995) Cloning and characterization of the gene for mouse macrophage migration inhibitory factor (MIF). *J. Immunol.* (154)8 3863-3870. PMID: 7706726
6. R. Bucala, **R.A. Mitchell**, K. Arnold, T. Innerarity, H. Vlassara and A. Cerami (1995) Identification of the major site of apolipoprotein B modification by advanced glycosylation end products blocking uptake by the low density lipoprotein receptor. *J. Biol. Chem.* (270)18 10828-10832. PMID: 7738020
7. B. Sherry, G. Zybarth, M. Alfano L. Dubrovsky, **R.A. Mitchell**, D. Rich, P. Ulrich, R. Bucala, A. Cerami and M. Bukrinsky (1998) Role of cyclophilin A in the uptake of HIV-1 by macrophages and T lymphocytes. *Proc. Natl. Acad. Sci.* 95(4) 1758-1763. PMID: 9465090
8. J. Chesney, **R.A. Mitchell**, F. Benigni, M. Bacher, L. Spiegel, Y. Al-Abed, J.H. Han, C. Metz and R. Bucala (1999) An inducible gene product for 6-phosphofructo-2-kinase with an AU-rich instability element: Role in tumor cell glycolysis and the Warburg effect. *Proc. Natl. Acad. Sci.* 96(6) 3047-3052. PMID: 10077634
9. **R.A. Mitchell**, C. Metz, T. Peng and R. Bucala. (1999) Sustained MAP kinase and cPLA<sub>2</sub> activation by macrophage

inhibitory factor (MIF): Regulatory role in cell proliferation and glucocorticoid action. *J. Biol. Chem.* 274 18100-18106. PMID: 10364264

10. **R.A. Mitchell** and R. Bucala (2000) Tumor growth-promoting properties of macrophage migration inhibitory factor (MIF). *Semin. Cancer Biol.* 10(5):359-66. PMID: 11100884

11. A.V. Sampey, P.H. Hall, **R.A. Mitchell**, C.N. Metz and E.F. Morand (2001) Regulation of synoviocyte phospholipase A2 and cyclooxygenase-2 by macrophage migration inhibitory factor. *Arthritis Rheum.* 44(6) 1273-80. PMID: 11407686

12. P.D. Senter, Y. Al-Abed, C.N. Metz, F. Benigni, **R.A. Mitchell**, C.G. Gartner, S.D. Nelson, G.J. Todaro and R. Bucala (2002) Inhibition of macrophage migration inhibitory factor (MIF) tautomerase and biological activities by acetaminophen metabolites. *Proc. Natl. Acad. Sci.* 99(1):144-149. PMID: 11773615

13. **R.A. Mitchell**, H. Liao, J. Chesney, G. Fingerle-Rowson, J. Baugh, J. David and R. Bucala (2002) MIF sustains macrophage pro-inflammatory function by inhibiting p53: Regulatory role in the innate immune response. *Proc. Natl. Acad. Sci.* 99(1):345-350. PMID: 11756671

14. A. Dios, **R.A. Mitchell**, B. Aljabari, J. Lubetsky, K.A. O'Connor, H. Liao, P.D. Senter, K.R. Manogue, E. Lolis, C.N. Metz, R. Bucala, D.J. Callaway and Y. Al-Abed (2002) Inhibition of MIF bioactivity by rational design of pharmacological inhibitors of MIF tautomerase activity. *J. Med. Chem.* 45(12):2410-2416. PMID: 12036350

15. J.B. Lubetsky, A. Dios, J. Han, B. Aljabari, B. Ruzsicska, **R.A. Mitchell**, E. Lolis and Y. Al-Abad (2002) The tautomerase activity of MIF is a potential target for discovery of novel anti-inflammatory agents. *J. Biol. Chem.* 277(28):24976-82. PMID: 11997397

16. T. Atsumi, J. Chesney, C. Metz, L. Leng, S. Donnelly Z. Makita, **R.A. Mitchell**, and R. Bucala. (2002) High Expression of Inducible 6-Phosphofructo-2-kinase/fructose-2,6-bisphosphatase (iPFK-2; PFKFB3) in Human Cancers. *Cancer Res.* 62(20):5881-7. PMID: 12384552

17. H. Liao, R. Bucala and **R.A. Mitchell** (2003) Adhesion-dependent signaling by macrophage migration inhibitory factor (MIF). *J. Biol. Chem.* 278(1):76-81. PMID: 12297513

18. D. Lacey, A. Sampey, **R.A. Mitchell**, L. Santos, M. Leech and E. Morand (2003) Control of fibroblast-like synoviocyte proliferation by macrophage migration inhibitory factor. *Arthritis Rheum.* 48(1):103-9. PMID: 12528110

19. O. Petrenko, G. Fingerle-Rowson, T. Peng, **R.A. Mitchell** and C.N. Metz. (2003) MIF-deficiency is associated with altered cell growth and reduced susceptibility to Ras-mediated transformation. *J. Biol. Chem.* 278(13):11078-11085. PMID: 12538581

21. B. Rendon-Mitchell, M. Ochani, J. Li, J. Han, H. Wang, S. Susarla, C. Czura, **R.A. Mitchell**, A. Sama, K. Tracey and H. Wang (2003) IFN $\gamma$  induces HMGB1 release partially through a TNF-dependent mechanism. *J. Immunol.* 170(7):3890-3897. PMID: 12646658

22. L. Leng, C. Metz, Y. Fang, J. Xu, S. Donnelly, J. Baugh, T. Delohery, Y. Chen, **R.A. Mitchell** and R. Bucala (2003) MIF signal transduction initiated by binding to CD74. *J. Exp. Med.* 197(11):1467-1476. PMID: 12782713

23. G. Fingerle-Rowson, O. Petrenko, C.N. Metz, T.G. Forsthuber, **R.A. Mitchell**, R. Huss, U. Moll, W. Muller and R. Bucala (2003) The p53-dependent effects of macrophage migration inhibitory factor revealed by gene targeting. *Proc Natl Acad Sci U S A.* 100(16):9354-9359. PMID: 12878730

24. J.D. Swant, B.E. Rendon, M. Symons and **R.A. Mitchell** (2005) Rho GTPase-dependent signaling is required for MIF-mediated expression of cyclin D1. *J. Biol. Chem.* 280(24):23066-23072. PMID: 15840582

25. M.A. McDevitt, J. Xie, G. Shanmugasundaram, J. Griffith, A. Liu, C. McDonald, P. Thuma, V.R. Gordeuk, C.N. Metz, **R.A. Mitchell**, J. Keefer, J.R. David, L. Leng and R. Bucala (2006) A critical role for the host mediator, MIF, in the pathogenesis of malarial anemia. *J. Exp. Med.* 15;203(5):1185-96. PMID: 16636133

26. M. Winner, A.C. Koong, B.E. Rendon, W. Zundel and **R.A. Mitchell** (2007) Amplification of tumor hypoxic responses by MIF-dependent HIF stabilization. *Cancer Res.* 67(1):186-193. PMID: 17210698

27. T. Atsumi, Y.R. Cho, L. Leng, C. McDonald, T. Yu, C. Danton, E.G. Hong, **R.A. Mitchell**, C. Metz, H. Hiwa, J. Takeuchi, S. Onodera, T. Umino, J.K. Kim and R. Bucala (2007) The pro-inflammatory cytokine MIF regulates glucose metabolism during systemic inflammation. *J Immunol.* 2007 179(8):5399-5406. PMID: 17911626
28. B.E. Rendon, I. Teneng, M. Zhao, M. Winner, Y. Al-Abed and **R.A. Mitchell** (2007) Regulation of human lung adenocarcinoma cell migration and invasion by MIF. *J. Biol. Chem.* 282:29910-18. PMID: 17709373
29. A.M. Coleman, D. Xin, M. Zhao, M.W. Qian, R. Bucala, B.E. Rendon and **R.A. Mitchell** (2008) Cooperative Regulation of NSCLC Angiogenic Potential by MIF and its Homolog, D-Dopachrome Tautomerase. *J. Immunol.* 181(4):2330-7. PMID: 18684922
30. D. Kamir, S. Zierow, L. Leng, Y. Cho, Y. Diaz, J. Griffith, C. McDonald, M. Merk, **R.A. Mitchell**, J. Trent, Y. Chen, Y.K. Kwong, H. Xiong, J. Vermeire, M. Cappello, D. McMahon-Pratt, J. Walker, J. Bernhagen, E. Lolis E, R. Bucala (2008) A Leishmania ortholog of macrophage migration inhibitory factor modulates host macrophage responses. *J Immunol.* 180(12):8250-61. PMID: 18523291
31. M. Winner, J. Meier, S. Zierow, B.E. Rendon, G. Crichlow, R. Riggs, R. Bucala, L. Leng, N. Smith, E. Lolis, J.O. Trent and **R.A. Mitchell** (2008) A novel, macrophage migration inhibitory factor suicide substrate inhibits motility and growth of lung cancer cells. *Cancer Res.* 68(18):7253-7. PMID: 18794110
32. BE Rendon, SS Willer, W. Zundel and **R.A. Mitchell** (2009) Mechanisms of MIF-dependent tumor-microenvironmental adaptation. *Exp Mol Pathol.* 86(3):180-5. PMID: 19186177
33. M. Merk, J. Baugh, S. Zierow, L. Leng, U. Pal, S.J. Lee, A.D. Ebert, Y. Mizue, J.O. Trent, **R.A. Mitchell**, W. Nicke, PB Kavathas, J. Bernhagen and R. Bucala (2009) The Golgi-associated protein p115 mediates the secretion of macrophage migration inhibitory factor. *J Immunol.* 182(11):6896-906. PMID: 19454686
34. M. Gadjeva, J. Nagashima, T. Zaidi, **R.A. Mitchell** and Pier GB (2010) Inhibition of macrophage migration inhibitory factor ameliorates ocular Pseudomonas aeruginosa-induced keratitis. *PLoS Pathog.* 6(3):e1000826. PMID: 20361053
35. D. Xin, B.E. Rendon, M. Zhao, M. Winner, A. Coleman and **R.A. Mitchell** (2010) The MIF homolog, D-dopachrome tautomerase (D-DT), promotes COX-2 expression through  $\beta$ -catenin-dependent and independent mechanisms. *Mol. Cancer Res.* 12:1601-1609. PMID: 21071513
36. M. Tarnowski, K. Grymula, R. Liu, J. Tarnowska, J. Drukala, J. Ratajczak, **R.A. Mitchell**, M.Z. Ratajczak and M. Kucia (2010) MIF is secreted by rhabdomyosarcoma cells, modulates tumor metastasis by binding to CXCR4 and CXCR7 receptors and inhibits recruitment of cancer-associated fibroblasts. *Mol Cancer Res.* 8(10):1328-43. PMID: 20861157
37. K. Yaddanapudi\*, **R.A. Mitchell\***, Putty K, Willer S, Sharma RK, Yan J, Bodduluri H, Eaton JW (2012) Vaccination with embryonic stem cells protects against lung cancer: is a broad-spectrum prophylactic vaccine against cancer possible? *PLoS One.* 7(7):e42289. PMID: 22860107 \*Equal Contribution
38. M. Merck, **R.A. Mitchell** and R. Bucala (2012) D-dopachrome tautomerase (D-DT or MIF-2): Doubling the MIF cytokine family. *Cytokine* 59(1):10-17. PMID: 22507380
39. S.E. Brock, B.E. Rendon, K. Yaddanapudi and **R.A. Mitchell** (2012) Negative regulation of AMPK activity by MIF family members in NSCLC. *J. Biol. Chem.* 287(45):37917-25. PMID: 22988252
40. K. Yaddanapudi, **R.A. Mitchell** and J.W. Eaton (2013) Cancer vaccines: Looking to the future. *Oncoimmunology* 2(3):e23403. PMID: 23802081
41. K. Yaddanapudi, K. Putty, B.E. Rendon, A. Satoskar, A. Lasnik, J.W. Eaton and **R.A. Mitchell** (2013) Control of tumor-associated macrophage alternative activation by MIF. *J Immunol.* 190(6):2984-93. PMID: 23390297
42. M. Dwyer, Q. Shan, S. D'Ortona, R. Maurer, **R.A. Mitchell**, H. Olesen, S. Thiel, J. Huebner and M. Gadjeva (2014) Cystic Fibrosis Sputum DNA has NET-like characteristics. *Journal of Innate Immunity* 6(6):765-79. PMID: 24862346
43. S.E. Brock, B.E. Rendon, D. Xin, K. Yaddanapudi and **R.A. Mitchell** (2014) Cooperative antagonism of p53 stabilization and activity by MIF family members in lung adenocarcinoma. *PLOS One* 16;9(6):e99795 PMID: 24932684



44. **R.A. Mitchell** and K. Yaddanapudi (2014) Stromal-dependent tumor promotion by MIF family members. *Cell Signal.* 26(12):2969-2978. PMID: 25277536
45. K. Yaddanapudi, K. Putty, B.E. Rendon, A. Satoskar, A. Lasnik, J.W. Eaton and **R.A. Mitchell** (2013) Control of tumor-associated macrophage alternative activation by MIF. *J Immunol.* 190(6):2984-93. PMCID: PMC3593945
46. **R.A. Mitchell** and K. Yaddanapudi (2014) Stromal-dependent tumor promotion by MIF family members. *Cell Signal.* 26(12):2969-2978. PMID: 25277536
47. K. Yaddanapudi, B.E. Rendon, G. Lamont, E.J. Kim, N. Al Rayyan, J. Richie, S. Albeituni, S. Waigel, A. Wise and **R.A. Mitchell** (2016) MIF controls myeloid-derived immunosuppression in human malignant melanoma. *Cancer Immunol. Res.* 4(2):101-12. PMID: 26603621
48. S. Waigel, B.E. Rendon, G. Lamont, J. Richie, **R.A. Mitchell\*** and K. Yaddanapudi\* (2016) MIF inhibition reverts the gene expression profile of human melanoma cell line-induced MDSCs to normal monocytes. *Genom Data.* 7:240-2. PMID: 26981417 \*Corresponding Authors
49. **R.A. Mitchell** (2016) QJM cancer review series introduction. *Quarterly Journal of Medicine* 109(3):149. PMID: 26385231
50. J. Chesney, **R.A. Mitchell\*** and K. Yaddanapudi\* (2017) Myeloid-derived suppressor cells - a new therapeutic target to overcome resistance to cancer immunotherapy. *J. Leuk. Biol.* 102(3):727-740. PMID: 28546500 \*Corresponding
51. Rizzo M.B., de Carvalho M, Kim E.J., Rendon B.E., Noe J.T., Wise-Mitchell AD and **R.A. Mitchell** (2018) Oral squamous carcinoma cells promote macrophage polarization in an MIF-dependent manner. *Quarterly Journal of Medicine* 111(11):769-778. PMID: 30016493
52. Noe J.T. and **R. A. Mitchell** (2019) Tricarboxylic acid cycle metabolites in the control of macrophage activation and effector phenotypes. *J. of Leuk. Biol.* 106(2):359-367 PMID: 30768807
53. Noe, J.T. and **R.A. Mitchell** (2020) MIF-dependent control of tumor immunity. *Front Immunol.* 11:609948 PMID: 33324425
54. Guo, Y., Lu, X., Chen, Y, Rendon, B., **Mitchell, R.A.**, Cuatrecasas, M., Postigo, A., Li, Y., Cortes, M. and D.C. Dean (2021) Zeb1 Induces Immune Checkpoints to Form an Immunosuppressive Envelope Around Invading Cancer Cells. *Sci. Adv.* 7(21) PMID: 34020945
55. Morrissey S, Zhang F, Ding C, Yang C, Wang Z, Hu X, Fang Y, Fox M, Zhang HG, Guo H, Tieri D, Kong M, Watson CT, **Mitchell RA**, Zhang X, Huang J, McMasters KM, and Yan J. (2021) Tumor-derived Exosomes Drive Immunosuppressive Macrophages in a Pre-metastatic Niche through Glycolytic Dominant Metabolic Reprogramming. *Cell Metabolism* (In Press).
56. Noe, J.T., Rendon, B.E, Geller, A.E., Morrissey, S.M., Conroy, L.R., Kim E.J., Wise-Mitchell A., Barbosa de Souza Rizzo M., Young, L.E, Bruntz, R.C., Affronti, H.C., Baby, B.V, McMasters, K.M., Clem, B.F., Yan, Y., Wellen, K.E., Sun, R.C. Sun, and **R.A. Mitchell** (2021) Lactate supports a metabolic-epigenetic link in macrophage polarization. *Sci. Adv.* (In Press)
57. Geller AE, Shrestha R, Guo H, Ding C, Woeste MR, Andreeva K, Chariker JH, Hu X, Zhou M, Tieri D, Watson CT, **Mitchell RA**, Zhang HG, Li Y, Martin R, Rouchka EC and Yan J. (2021) The Induction of Peripheral Trained Immunity in the Pancreas Incites Antitumor Activity to Control Pancreatic Cancer Progression. *Nature Communications* (In Revision)
58. Rendon B.E., Kim E.J., Noe J.T. and **R. A. Mitchell** (2021) Glutamine deprivation promotes histone methylation and PD-L1 expression in lung adenocarcinoma. (*Manuscript in preparation*)
59. Rendon, B.E., Yan, J., Noe, J.T., Rai, S., Hall, M., Chesney, J.A. and **R.A. Mitchell** (2021) Elevated levels of circulating lactate in late-stage melanoma patients. (*Manuscript in preparation*)

#### **Peer Reviewed Invited Book Chapters and Reviews**

1. **R.A. Mitchell** (2004) Mechanisms and effectors of MIF-dependent promotion of tumorigenesis. *Cell. Signal.* 16(1):13-

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