

CURRICULUM VITAE

December 31, 2024

NAME: V. Michael Holers, M.D.

TITLE: Smyth Professor of Rheumatology
Director of Faculty Ventures, CU Innovations
Professor of Medicine and Immunology

ADDRESS: University of Colorado School of Medicine
Division of Rheumatology
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CU Innovations
Suite 6202, Anschutz Health Sciences Building
Aurora, CO 80045
Phone: (admin) 303-724-7605
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SOCIAL SECURITY NUMBER: Available on request

DATE OF BIRTH: 1-28-52

PLACE OF BIRTH: Napoleon, Ohio

CITIZENSHIP: USA

PERSONAL DATA:

Married:	Jill Marie Norris, Ph.D. Professor and Chair Department of Epidemiology Colorado School of Public Health Aurora, CO
Children:	Emma Page Holers (02/25/99) Nathaniel Michael Holers (03/06/01)

EDUCATION:

1970-73	B.S. Biology, Purdue University W. Lafayette, IN
1974-78	M.D., Washington University Medical School, St. Louis, MO

POSTGRADUATE TRAINING:

1978-79	Internship - Internal Medicine Barnes Hospital, St. Louis, MO
1979-81	Residency - Internal Medicine Barnes Hospital, St. Louis, MO
1981-83	Clinical Fellowship in Rheumatology University of Colorado School of Medicine Denver, CO
1983-85	Research Associate

Howard Hughes Medical Institute
St. Louis, MO

1983-85 Research Fellowship in Rheumatology
Washington University School of Medicine

APPOINTMENTS:

1985-86	Instructor in Medicine Washington University School of Medicine
1986-92	Assistant Professor of Medicine Washington University School of Medicine
1986-93	Assistant Investigator Howard Hughes Medical Institute
1987-93	Assistant Professor of Pathology Washington University School of Medicine
1987-93	Member, Division of Biology and Biomedical Sciences, Washington University School of Medicine
1992-93	Associate Professor of Medicine (with tenure) Washington University School of Medicine
1993-97	Associate Professor of Medicine (with tenure) University of Colorado Health Sciences Center
1994-98	Associate Professor of Immunology University of Colorado Health Sciences Center
1993-2008, 2021-	Smyth Professor of Rheumatology University of Colorado Health Sciences Center/School of Medicine
1997-	Professor of Medicine (with tenure) University of Colorado Denver School of Medicine
1998-	Professor of Immunology University of Colorado Denver School of Medicine
2000	Visiting Professor, INSERM U561, Paris, France
2000-2021	Head, Division of Rheumatology University of Colorado Denver School of Medicine
2008-2021	Scoville Professor of Rheumatology University of Colorado Denver School of Medicine
2021-	Director of Faculty Ventures, CU Innovations

LICENSURE:

Missouri No. R3A67 (1978-95)
Colorado No. 23841 (1981-present)

CERTIFICATION:

1982	American Board of Internal Medicine
1984	American Board of Rheumatology

MILITARY SERVICE:

None

HONORS:

1974	Phi Beta Kappa
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1985	American Rheumatism Association Senior Fellowship Award
1988-91	Hulda Irene Duggan Investigator, Arthritis Foundation
1993	Member, American Society for Clinical Investigation (ASCI)
1996	Ecker Lectureship, Case Western Reserve University Cleveland, OH
1997	Robert Wood Johnson Award, Arthritis Foundation
1997	Schwartz-Weinstein Research Award, Arthritis Foundation Rocky Mountain Chapter
1998	Harmon Foundation Award, Arthritis Foundation Rocky Mountain Chapter
1999	Kroc Lectureship, University of Iowa, Iowa City, IA
1999	Volunteer Leadership Award, National Arthritis Foundation
2000	Member, American Association of Physicians (AAP)
2002	Member, Henry Kunkel Society
2003	Pfizer Visiting Professor, Medical University of South Carolina
2004	Inventor of the Year, University of Colorado Denver School of Medicine
2007	Ogryzlo Day Merck Frosst Canada and Schering Canada Visiting Professor, University of Toronto
2008	Ephraim P. and Jean S. Engleman Visiting Professor, University of California San Francisco
2008	Pfizer Visiting Professor, Emory University School of Medicine
2008	American College of Rheumatology Distinguished Basic Investigator Award
2009	University of Colorado Technology Transfer Lifetime Pinnacle Awardee
2009	Kroc Lectureship, University of Texas Southwestern, Dallas, TX
2009	Eric Bywaters Lectureship, Hammersmith Hospital, London, UK
2009	Physician Pro Tempore, Hospital for Special Surgery, New York, NY
2009	Christian Lectureship, Hospital for Special Surgery, New York, NY
2009	Freyberg Lectureship, Hospital for Special Surgery, New York, NY
2010	Senior Fellow of the American Asthma Foundation
2011	Castle Connolly Top Doctor
2011	Zvaifler Lectureship, University of California San Diego, San Diego, CA
2014	Cochran Lectureship, University of Alabama Birmingham
2015	Rheumatology Research Foundation Memorial Lectureship San Francisco, CA
2016	Lane Lectureship, University of Washington

2016	Everett D. Reese Immunology and Rheumatology Lecturer, Ohio State University
2016	The Walter Bauer Lectureship, Harvard Medical School
2016	<i>Arthritis and Rheumatology</i> , Top 5% Reviewer
2017	SCARI Lectureship, University of Arizona
2017	<i>Journal of Rheumatology</i> , Duncan Gordon Manuscript Award
2017	Master, American College of Rheumatology
2018	Riven Lectureship, Vanderbilt University
2018	Washington University School of Medicine Alumni Achievement Award
2019	Napoleon High School Distinguished Alumnus Award
2020	John P. Atkinson Endowed Lectureship Inaugural Speaker, Washington University School of Medicine
2022	Lupus 21 st Century Meeting Randy T Fisher Award for Excellence in Basic Research
2022	Kroc Lectureship, Washington University School of Medicine
2022	National Institute of Environmental Health Sciences (NIEHS) Distinguished Lecturer
2023	Weissmann Lectureship, NYU Seminar in Advanced Rheumatology Keynote Lecture
2024	American College of Rheumatology Presidential Gold Medal Awardee

PROFESSIONAL SOCIETY MEMBERSHIPS:

American Federation of Clinical Research
American College of Rheumatology
American Association of Immunologists
American College of Physicians
American Society for Clinical Investigation
Western Society for Clinical Investigation
International Complement Society
American Association of Physicians
Henry Kunkel Society
Clinical Immunology Society

EDITORIAL AND REVIEW:

1992-99	Associate Editor, <i>Journal of Immunology</i>
1995-2000	Associate Editor, <i>Arthritis & Rheumatism</i>
2013-	Consulting Editor, <i>Journal of Clinical Investigation</i>
Ad hoc reviews	<i>Immunity, Journal of Experimental Medicine, Journal of Clinical Investigation, Nature, Nature Immunology, Proceedings of the National Academy of Science, Molecular Immunology, Blood, Journal of Immunology, Arthritis and Rheumatism, New England Journal of Medicine, Nature Reviews</i>

NATIONAL PEER GRANT REVIEW SERVICE:

1989-93	National Arthritis Foundation Biomedical Research Grant Review Committee
1993	Ad hoc member "Research in causal mechanisms of SLE" RFA Study Section, NIAMS
1993	Ad hoc member ALY Study Section, NIAID
1993-	NIH P0-1 and R0-1 ad hoc reviews, special study sections
1993-	Ad hoc reviewer for VA Career Development Awards
1991-	Ad hoc reviewer for National Science Foundation
1996-2000	Member, Allergy and Immunology (ALY) Study Section, Center for Scientific Review, NIH
2000-02	Pfizer Postdoctoral Fellowship Academic Advisory Board
2000-	Ad hoc reviewer for Immune Tolerance Network
2000-06	Chair, Scientific Advisory Board, North American Rheumatoid Arthritis Consortium (NARAC)
2001-04	Abbott Postdoctoral Fellowship Review Panel
2001-05	Advisory Board, Multiple Autoimmune Diseases Genetic Consortium (MADGC)
2003	Ad hoc member "Microcirculation and Target Organ Damage in Rheumatic and Skin Diseases" RFA Study Section, NIAMS
2003-04	Chair, American College of Rheumatology Research and Education Foundation Research Review Panel
2005	Chair, NIH CSR Special Study Section for Systemic Lupus Erythematosus Applications
2007-10	Chair, NIH CSR Special Study Sections
2012	Member, NIAMS P60 Centers Review Study Section
2020	Member, NIAID Immune Tolerance Network Review Study Section

NATIONAL PROFESSIONAL ACTIVITIES:

1992-	American College of Rheumatology Abstract Selection Subcommittees
1997	Subcommittee Chairman, American College of Rheumatology National Meeting Abstract Selection Committee
1995-98	Member, Committee on Research, American College of Rheumatology
1997-98	Annual Meeting Planning Committee, American College of Rheumatology
1998	ACR Basic Research Conference Co-Organizer
1995, 1998	Co-Chair, Complement Symposium, AAI Meeting
1998-2000	National Arthritis Foundation Publications Committee
1998-2000	International Complement Workshop Organizing Committee
1999	Co-Chair, ACR Basic Research Conference
1999-2002	Chair, Committee on Research, American College of

Rheumatology

1999-2002	Member, Board of Directors, American College of Rheumatology Research and Education Foundation
2000-02, 2004	Arthritis Foundation Fellows Research Conference Planning Committee
2000-01	Blue Ribbon Panel on Research, National Arthritis Foundation
2000-04	Founding Member and Secretary, International Complement Society
2002	Member, NIH Study Section Boundaries Team for Integrated Review Group (IRG) #10 (Immunology)
2001-03	Member, Abstract Oversight Committee, American College of Rheumatology
2002-04	Member, Board of Directors, American College of Rheumatology
2003-06	Program Committee Block Chair, American Association of Immunologists
2003-04	Chair, Task Force on Research Funding, American College of Rheumatology
2003-08	Steering Committee, NIH/NIAMS SLE Biomarkers Consortium
2004-07	Site Director, Lupus Clinical Trials Consortium
2004-07	Chair, Scientific Advisory Council, American College of Rheumatology Research and Education Foundation
2004-10	Member, Board of Directors, American College of Rheumatology Research and Education Foundation
2007	Member, ad hoc, FDA Guidance Panel "Abatacept"
2005-06	Chair, Rheumatoid Arthritis Initiative Task Force, American College of Rheumatology Research and Education Foundation
2007-09	Member, Nominating Committee, Henry Kunkel Society
2007-09	Member, ITN Strategic Planning Group for Autoimmunity
2011	Co-Chair, NIAMS Arthritis Biology Research Roundtable
2011-12	Co-Chair, American College of Rheumatology Blue Ribbon Task Force on Academic Rheumatology
2011-17	Member, Scientific Advisory Board, Lupus Research Institute
2011-14	Member, American College of Rheumatology Board of Directors
2012-	Member, International Complement Society Board of Councilors
2012-13	Member, NIAMS Centers Evaluation Working Group
2013	Member, NIAMS Target Evaluation Consortium Working Group
2013-14	Member, National Arthritis Foundation RA Task Force

2013-17	Member, Arthritis Foundation Great West Region Medical and Scientific Committee
2014-15	Chair, American College of Rheumatology Division Directors Task Force
2014-15	Member, American College of Rheumatology Finance Committee
2015-16	President-Elect, International Complement Society
2015-18	Member, NIAMS Advisory Council
2015-18	Chair, American College of Rheumatology Division Directors Special Committee
2015-16	Chair, Accelerating Medicines Partnership RA/SLE National Leadership Council Executive Committee
2017-18	President, International Complement Society
2019-21	Past-President, International Complement Society
2017-18	Lupus Research Alliance Working Group on FDA Strategy
2018	Lupus Research Alliance Strategic Planning Committee
2018-19	Member, American College of Rheumatology Board of Directors
2018-21	Lupus Research Alliance LUCIN Drug Candidate Vetting Committee
2019-21	Vice President, ACR Rheumatology Research Foundation
2019-21	American College of Rheumatology Executive Committee ad hoc member
2019-20	NIAMS AMP Lessons Learned Working Group
2019-21	Member, American College of Rheumatology Committee on Nominations
2021-22	Member, ACR Rheumatology Research Foundation Strategic Planning Task Force
2021-	Member, Arthritis Foundation Expert Working Group on Rheumatoid Arthritis
2021-23	President, ACR Rheumatology Research Foundation
2021-23	Member, American College of Rheumatology Executive Committee
2023-	Member, ACR/ARP/RRF Volunteer Development Task Force
2023-	Chair, ACR Rheumatology Research Foundation Leadership Development Council
2024-	Member External Advisory Committee, Colton Center for Autoimmunity New York University Grossman School of Medicine

UNIVERSITY ACTIVITIES:

1996	Dean's Committee on Technology Transfer, UCSOM
1996-2001	Dean's Hughes Research Review Committee

1998-2005	Advisory Committee – Dean’s Distinguished Seminar Series
2002-04	Member and Chair, Dept of Medicine Space Committee
2000-05	Advisory Committee Member and Chair – Dean’s Distinguished Seminar Series
2007-10	Member, University of Colorado Committee on University Discoveries
2016-17	Chair, Search Committee, HI ³ Autoimmunity Program Director
2018-2020	CU Innovations/SPARK Program Liaison
2023-24	Member, CU President’s Innovation and Entrepreneurial (I&E) Working Group on Recruiting & Retaining Top I&E Talent: Promotion and Tenure

DEPARTMENTAL ACTIVITIES:

1990-92	Admissions Committee, Division of Biology and Biomedical Sciences, Washington University School of Medicine
1994-	Member, Immunology Program, UCSOM
1994-96	Seminar Series Committee, Department of Immunology, UCSOM
1994-97	Ph.D. in Clinical Sciences Program Development, Department of Medicine, UCSOM
1999-2006	Member, Executive and Admissions Committees, Ph.D. in Clinical Sciences Program, UCSOM
2000-	Member, Interdepartment Biomedical Sciences Program, UCSOM
2001-	Member, Structural Biology Program, UCSOM
2004-	Member, Reproductive Sciences Program, UCSOM
2006-	Member, Molecular Biology Program, UCSOM
2014-2015	Chair, Biomedical Informatics Division Head Search Committee

CLINICAL ACTIVITIES (Washington University, 1987-93):

1987-93	One half-day outpatient rheumatology teaching clinic/week, Barnes Hospital
1987-93	Rheumatology inpatient consultation service attending, Barnes Hospital (one month/year)
1987-93	Medicine service attending, Barnes Hospital (six weeks/year)

CLINICAL ACTIVITIES (UCSOM, 1993-present):

1995-96	One half-day outpatient rheumatology clinic/week, Denver Health and Hospitals
1995-2009	Rheumatology inpatient consultation service attending, University of Colorado Hospital (2-3 months/year)
2000-09	Fellows outpatient training clinic, University of Colorado Hospital (one half-day per week)

FORMAL TEACHING ACTIVITIES:

1986-	Clinical Translational Rheumatology instruction for
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	residents, fellows and medical students
1987-2009	Rheumatology Pathophysiology Course instructor
1993	Coursemaster, Molecular Mechanisms of Disease, Immunology Program, Washington University School of Medicine
1994-2009	“Complement, Innate Immunity and the Immune Response” lectures - in IMMU 7662/7663/7664 - Immune Mechanisms, Interdepartmental Immunology Program, UCHSC
1996-97	Coursemaster, IMMU 7664 - Immune Mechanisms, Interdepartmental Immunology Program, UCHSC
1998	“Methods and Presentation of Journal Article Reviews”, Interdepartment Biomedical Sciences Program
2000-	“Complement” and “B Cells” lecture – Rheumatology Fellows Lectures
2005-09	“Immunopathology/Autoimmunity Secondary to Infection” lecture - in MICB 7704 - Host Response to Infectious Disease, Microbiology Program, UCSOM
2011-2017	“Autoimmunity: Basic Concepts of Disease and Rheumatoid Arthritis as an Example” lecture – in IDPT 7646 – Tissue Biology and Disease Mechanisms, UCSOM

COMMUNITY ACTIVITIES:

1994-2008	Member, Board of Directors, Rocky Mountain Chapter, Arthritis Foundation
1996-2005	Executive Committee of the Board of Directors, Rocky Mountain Chapter, Arthritis Foundation
1997-2000	Chair, Medical and Education Committee, Rocky Mountain Chapter, Arthritis Foundation
1998-2000	Secretary, Rocky Mountain Chapter, Arthritis Foundation
1999-2001	Member, Colorado Arthritis Advisory Committee
2000-02	House of Delegates, National Arthritis Foundation
2000-02	Chair-Elect, Rocky Mountain Chapter, Arthritis Foundation
2002-03	Chair, Rocky Mountain Chapter, Arthritis Foundation
2003-05	Chair, Board Development Committee, Rocky Mountain Chapter, Arthritis Foundation

COMMERCIAL CONSULTATION (RECURRING):

1991-92	Monsanto Corporation, St. Louis, MO
1996-98	Amgen, Boulder, CO
2011-13	Alexion Pharmaceuticals, Cheshire, CT
2012-2014	Ignity, Inc., La Jolla, CA
2015-2016	Padlock Therapeutics, Inc., Cambridge, MA
2015-2019	Janssen Research and Development

2016-2019	Amgen Data Sharing Independent Review Panel, Thousand Oaks, CA
2017-	AdMIRx, Inc./Q32 Bio, Waltham, MA
2018-2019	Celgene, Inc., Boston, MA
2018-2019	BMS, Inc., Princeton, NJ

OTHER:

1987-90	Director, Antinuclear Antibody Laboratory, Barnes Hospital, St. Louis, MO
1998	Co-founder, Touch of Life Technologies (ToLTech), Denver, CO
1998-	Member, Board of Directors, ToLTech, Denver, CO
2004-2016	Director, Rheumatology Clinical Laboratory, University of Colorado School of Medicine, Denver, CO
2004	Co-founder, Taligen Therapeutics, Denver, CO
2004-2011	Chief Scientific Officer, Taligen Therapeutics, Denver, CO and Cambridge, MA
2017	Co-founder, AdMIRx, Inc./Q32 Bio, Aurora, CO and Cambridge, MA
2018-2020	Member, Board of Directors, AdMIRx Inc./Q32 Bio, Cambridge, MA
2019-	Co-Chair, Scientific Advisory Board, Q32 Bio, Waltham, MA

PAST TRAINEES:

Predoctoral level (years, degree, research award(s) and current position):

- 1) Karen Makar, Ph.D. (Immunology Ph.D. Program)
1994-99
B.S., Occidental College, 1993
Deputy Director, Global Health Discovery Collaboratory, Bill & Melinda Gates Foundation
Seattle, WA
- 2) Kristine A. Kuhn, MD/PhD (MSTP Program, UCHSC)
2002-2007
B.S., University of Kansas
ACR Rheumatology Research Foundation Physician Scientist Development Grant Awardee, NIH K08 and R01 Awardee, Boettcher Foundation Scholar
Division Head of Rheumatology
Professor of Medicine, University of Colorado School of Medicine
Aurora, CO
- 3) James Kovacs, Ph.D. (Structural Biology Program, UCSOM)
2006-2010
B.A., Goshen College
M.S., University of Colorado at Boulder
American Heart Association Pre-Doctoral Trainee Award
Assistant Professor, University of Colorado Colorado Springs, CO
- 4) Kristen M. (Nordick) Cordova, Ph.D. (Molecular Biology Program, UCSOM)
2006-2012
B.S., Metropolitan State College of Denver
Medical Writer, Oncology Resource Group, Palo Alto, CA

- 5). Van Willis (Molecular Biology Program, UCSOM)
2008-2012
B.S., University of Utah
Senior Scientific Communications Analyst, Inari Medical
Salt Lake City, UT
- 6) Rosa Rodriguez (MD/Masters Program, UCSOM)
2013-2014
Staff Physician, Veterans Administration Medical Center, University of Miami School of Medicine
- 7) Alexandra Antonioli (MD/PhD Program, UCSOM)
2011-2019
B.S., Yale University
Private Practice, Adjunct Faculty University of Texas Southwestern Medical Center

Postdoctoral level (years, degree, research award(s) and current position):

- 1) Deborah Parks, M.D.
1987-89
M.D., University of Kentucky School of Medicine, 1983
Clinical Professor of Medicine, Washington University Sch. of Medicine, St. Louis, MO
- 2) Elizabeth Rayhel, Ph.D.
1988-90
Ph.D., Indiana State University, 1988
Instructor, Missouri Baptist College, St. Louis, MO
- 3) Jean-Claude Carel, M.D.
1989-91
M.D., Faculte de Medicine, Paris-Ouest, 1982
Professor and Department Chair Pediatric Endocrinology, INSERM U342, Université Paris Hopital Robert-Debré, Paris, France
- 4) Ernesto Levy, M.D.
1989-92
M.D., University of Buenos Aires, 1985
Private Practice
- 5) Hector Molina, M.D.
1989-93
M.D., University of Puerto Rico School of Medicine, 1985
NIH R01 Awardee
Associate Professor of Medicine, Washington University School of Med, St. Louis, MO
- 6) Christine Pham, M.D.
1990-1993
M.D., University of Florida College of Medicine, 1985
NIH R01 Awardee
Professor of Medicine, Division Head of Rheumatology
Washington University School of Med, St. Louis, MO
- 7) Susan Jacobi, M.D.
1990-92
M.D., University of Iowa School of Medicine, 1986
Private Practice
- 8) Sharon Foley, M.D.
1991-93
M.D., University of Nebraska Medical School, 1986

Private Practice

- 9) Siobhan O'Connor, M.D.
1991-93
M.D., University of Texas, Houston, 1987
Senior Medical Officer
Office of the Director, Centers for Disease Control, Atlanta, GA
- 10) Yuko Kozono, Ph.D.
1993-96
Ph.D., Osaka University, 1987
Research Scientist, Science University of Tokyo, Chiba, Japan
- 11) Susan Tiegs, M.D.
1993-97
M.D., Rush Medical School, 1981
Private Practice
- 12) Joel Guthridge, Ph.D.
1993-99
Ph.D., University of Kentucky, 1992
Director, Translational Informatics & Clinical Research Resources
Associate Member, Oklahoma Medical Research Foundation, Oklahoma City, OK
- 13) Kevin Marchbank, Ph.D.
1997-99
Ph.D., University of Wales College of Medicine, 1997
Wellcome International Prize Travelling Research Fellowship Awardee
Wellcome Career Development Award Recipient, 2002
Professor, Institute of Human Genetics, Newcastle University, Newcastle-upon-tyne, UK
- 14) Tim Nichols, Ph.D.
1994-2000
Ph.D., Chicago Medical School, 1994
National Arthritis Foundation Postdoctoral Fellowship Awardee
Senior Manager, Pfizer, Inc. San Diego, CA
- 15) Susan Boackle, M.D.
1996-2000
M.D., University of Alabama School of Medicine, 1989
Smyth Research Fellowship Awardee, Rocky Mountain Chapter of the Arthritis Foundation, NIH K08, R01, R21 Awardee, Professor of Medicine
Private Practice
- 16) Daniela Ulgiati, Ph.D.
1998-2001
Ph.D., University of Western Australia
National Arthritis Foundation Postdoctoral Fellowship Awardee
Senior Lecturer and Associate Dean, University of Western Australia
- 17) Darcy S. Majka, M.D.
2001-2003
M.D., University of Nebraska School of Medicine, 1997
ACR REF Physician Scientist Development Awardee
NIH K12, K23, R01, R21 Awardee
Physician, Division of Rheumatology, Northwestern University School of Medicine Chicago, IL
- 18) Joshua M. Thurman, M.D.

2001-2003

M.D., University of Chicago Pritzker School of Medicine, 1997

Postdoctoral Fellowship American Society of Nephrology, NIH K08, R21, R01 Awardee

Temple Hoyne Buell and National Kidney Foundation Endowed Chair

Professor of Medicine, Univ. of Colorado Denver School of Medicine

Denver, CO

- 19) Elizabeth D. Ferucci, M.D.

2002-2003

M.D., New York University School of Medicine, 1997

Medical Research Associate, Alaska Native Tribal Health Consortium, Anchorage, AK

Affiliate Associate Professor, Univ. of Washington School of Medicine

- 20) Kevin D. Deane, M.D., Ph.D.

2002-2004

M.D., Loma Linda University School of Medicine, 1997

NIH K-23 Awardee, ACR Research and Education Foundation Within Our Reach Awardee

Professor of Medicine, Univ. of Colorado School of Medicine

Arend Professor of Rheumatology

Denver, CO

- 21) Taras Lyubchenko, Ph.D.

2001-2007

Ph.D., National T. Shevchenko University, 2000

Arthritis National Research Foundation Awardee, NIH K01 Awardee

Associate Professor, National Jewish Health

Denver, CO

- 22) Pendleton B. Wickersham, M.D.

2004-2006

M.D., Baylor College of Medicine, 2000

Private Practice

- 23) Damian Kraus, Ph.D.

1997-2007

Ph.D., University of New Mexico, 1997

National Arthritis Foundation Postdoctoral Fellowship Awardee

Research Scientist

Denver, CO

- 24) Jonathan P. Hannan, Ph.D.

2000-2008

Ph.D., University of East Anglia, 2000

Research Scientist

Denver, CO

- 25) Rengasamy Asokan, Ph.D.

2000-2008

Ph.D., University of Madras, 1997

Research Scientist

Denver, CO

- 26) Liudmila Kulik, Ph.D.

2000-2008

Ph.D., Ovchinnikov Institute of Bioorganic Chemistry, 1991

Research Associate Professor, University of Colorado School of Medicine

Denver, CO

- 27) Alison Gizinski, M.D.
2005-2008
M.D., University of Washington School of Medicine, 2001
ACR REF Physician Scientist Development Award
Assistant Professor, Emory University School of Medicine
Atlanta, GA
- 28) Cassy Cozine, Ph.D.
2006-2008
Ph.D., University of Iowa, 2006
Assistant Professor, Coe College
Cedar Rapids, IA
- 29) Anne M. Lynch, MB, BCh, MSPH, DObst
2004-2010
M.D., University College Dublin Medical School, 1979
NIH K23 Awardee
Professor of Ophthalmology, Univ. of Colorado School of Medicine
Denver, CO
- 30) Jennifer Kinslow, PhD
2012-2016
Ph.D., University of Colorado Department of Immunology
Research Associate III, Loyola University School of Medicine
Chicago, IL
- 31) Heather Berens, M.D., Ph.D.
2017-2019
M.D./Ph.D., University of Colorado School of Medicine
Medical Leave
Private Practice
- 32) Sabrina Fechtner, Ph.D.
2019-2022
Ph.D., Washington State University
Research Scientist, Athira Pharma
Seattle, WA

CURRENT TRAINEES:

Pre-doctoral students:

1)

Postdoctoral level:

1)

Visiting Scientists:

1)

VISITING SCIENTISTSj:

- 1) Hee Jung Kang, M.D.
1998-99
M.D., Seoul National University College of Medicine
Director, Clinical Immunology Laboratory, Seoul National University College of Medicine

- 2) Yuko Okamoto, M.D.
2016-2019
Assistant Professor, Tokyo Women's Medical University
- 3) Hyoun-Ah Kim, M.D., Ph.D.
2019-2020
Associate Professor, Department of Rheumatology
Ajou University School of Medicine, Suwon, Korea

CURRENT INDIVIDUAL RESEARCH SUPPORT:

1. Source: NIH R01 R01DK138960
PI: V. Michael Holers, M.D. / Joshua M. Thurman, M.D. (Multiple PI)
Title: Role of the Factor H Related Proteins in Kidney Disease
Amount: 3,145,297 (proposed) (3/1/24-2/28/29) total direct costs
2. Source: NIH P30 AR079369
PI: V. Michael Holers, M.D.
Title: Center for Mucosal Immunobiology and Rheumatic Disease Pathogenesis
Amount: \$2,000,000 (10/1/2021 to 9/30/26) total direct costs
3. Source: NIH R01 AR051749
PI: V. Michael Holers, M.D.
Title: Complement in the pathogenesis of autoimmune arthritis
Amount: \$1,500,000 (9/1/2020 to 12/31/25) total direct costs
4. Source: NIH R01 DK125823
PI: V. Michael Holers, M.D. / Joshua M. Thurman, M.D. (Multiple PI)
Title: Novel therapeutic approaches for lupus nephritis
Amount: \$1,425,000 (7/1/20-6/30/25)
5. Source: NIH R01 EY032456
PI: Anne M. Lynch, M.D., M.S.P.H.
Title: Biomarkers of systemic inflammation in intermediate age-related macular degeneration
Amount: \$1,632,000 (5/1/21-4/30/25) total direct costs
6. Source: Allen Institute for Immunology
PI: Kevin. D. Deane, M.D.,Ph.D. / V. Michael Holers, M.D. (Co-PI)
Title: Collaborative Research Agreement
Amount: \$3,200,000 (6/1/19-5/31/25) total direct costs
7. Source: NIH T3207534
PI: V. Michael Holers, M.D (PI changed 7/1/23 to Kristine A. Kuhn, M.D./Ph.D.)
Title: Research Training in Rheumatology
Amount: \$1,850,000 (9-1-22 to 8-31-27) total direct costs
8. Source: Smyth Professorship in Rheumatology
PI: V. Michael Holers, M.D.
Title: Endowment to the University of Colorado Denver
Division of Rheumatology

PRIOR INDIVIDUAL RESEARCH SUPPORT:

1. Source: Howard Hughes Medical Institute, Assistant Investigator
PI: V. Michael Holers, M.D.
Title: Analysis of complement receptors and regulatory proteins
Amount: \$2,500,000 (7/1/87 to 6/30/93) total direct costs
2. Source: Arthritis Foundation Arthritis Investigator Award
PI: V. Michael Holers, M.D.

- Title: Molecular characterization of the fibronectin receptor of human phagocytes
Amount: \$113,000 (7/1/88 to 6/30/91) total direct costs
3. Source: NIH R01 CA53615
PI: V. Michael Holers, M.D.
Title: Analysis of C3d/EBV receptor (CR2) ligand binding sites
Amount: \$2,000,000 (7/1/91 to 6/30/07) total direct costs
4. Source: Arthritis Foundation Biomedical Sciences Grant
PI: V. Michael Holers, M.D.
Title: Complement inhibitors and receptors in models of SLE
Amount: \$208,000 (7/1/93 to 6/30/96) total direct costs
5. Source: NIH R01 AI31105
PI: V. Michael Holers, M.D.
Title: Mouse membrane RCA proteins in the immune response
Amount: \$3,000,000 (6/1/93 to 5/31/09) total direct costs
6. Source: Arthritis Foundation Biomedical Sciences Grant
"Robert Wood Johnson, Jr. Biomedical Sciences Grant" Award
PI: V. Michael Holers, M.D.
Title: Analysis of an apoptotic defect in NZB mice
Amount: \$208,350 (7/1/97 to 6/30/00) total direct costs
7. Source: Juvenile Diabetes Foundation International
PI: V. Michael Holers, M.D.
Title: Manipulation of complement activities as a novel therapeutic strategy for autoimmune IDDM
Amount: \$181,800 (6/1/99 to 5/31/01) total direct costs
8. Source: Alliance for Lupus Research Project Grant
PI: Jane E. Salmon, M.D. (Holers as Co-P.I.)
Title: Complement activation as a mediator of anti-phospholipid antibody induced fetal loss
Amount: \$231,000 (3/1/01 to 2/28/03) total direct costs
9. Source: NIH U19 AI46374, Autoimmunity Center of Excellence (B. Kotzin, P.I.)
PI: V. Michael Holers, M.D. (P.I. of Clinical Project #2)
Title: Anti-C5 therapy of lupus nephritis
Amount: 462,240 (9/1/99 to 8/31/03) total direct costs Project #2
10. Source: NIH R01 AI42772
PI: David R. Karp, M.D. (subcontract to Holers)
Title: Gamma glutamyl transpeptidase and lymphocyte activation
Amount: \$85,824 (4/1/99 to 3/31/03) total direct costs
11. Source: NIH R01 DK55357
PI: Richard J. Quigg, M.D. (subcontract to Holers)
Title: Pathogenic role of the complement system in murine lupus
Amount: \$318,549 (7/1/99 to 6/30/03) total direct costs
12. Source: NIH R01 AI47469
PI: Gary S. Gilkeson, M.D. (subcontract to Holers)
Title: Role of complement factor B in the pathogenesis of SLE
Amount: \$250,000 (4/1/00 to 3/31/05) total direct costs
13. Source: Alliance for Lupus Research Project Grant
PI: Jane E. Salmon, M.D. (Holers as Co-P.I.)

- Title: Complement activation as a mediator of anti-phospholipid antibody induced fetal loss
Amount: \$325,000 (3/1/03 to 2/28/05) total direct costs
14. Source: NIH R21 AI61479
PI: V. Michael Holers, M.D.
Title: Evolution of autoimmunity in rheumatoid arthritis
Amount: \$250,000 (7/1/04 to 6/30/06) total direct costs
15. Source: NIH U19 AI50864 Cooperative Study Group in Autoimmune Disease Prevention (G. Eisenbarth, P.I.)
PI: V. Michael Holers, M.D. (P.I. of Project #2)
Title: RA associated autoimmunity in high risk populations
Amount: (\$980,000 (9/1/01 to 6/30/06) total direct costs
16. Source: US Army Medical Research and Materiel Command
PI: V. Michael Holers, M.D.
Title: Liposomes and liposome-annexin complexes as adjunctive therapy for reperfusion injury and hemorrhagic shock
Amount: \$80,000 (4/10/06 to 4/9/07) total direct costs
17. Source: Lupus Research Institute
PI: V. Michael Holers, M.D.
Title: Complement receptor 2 as a DNA receptor
Amount: \$215,000 (5/1/04 to 4/30/07) total direct costs
18. Source: NIH R01 AI55007
PI: Jane E. Salmon, M.D. (subcontract to Holers)
Title: Complement as a mediator of recurrent miscarriages
Amount: \$380,000 (12/15/03 to 11/30/08) total direct costs
19. Source: NIH U19 AI46374, Autoimmunity Center of Excellence (ACE)
PI: V. Michael Holers, M.D.
Title: Denver Autoimmunity Center of Excellence
Amount: \$2,950,000 (10/1/03 to 3/31/09) total direct costs to Denver ACE
20. Source: NIH U19 AI46374, Autoimmunity Center of Excellence (V. M. Holers, P.I.)
PI: V. Michael Holers, M.D. (P.I. of Basic Project #2)
Title: Complement in the immunopathogenesis of autoimmune diabetes
Amount: \$675,000 (10/1/03 to 3/31/09) total direct costs Project #2
21. Source: Sandler Program for Asthma Research Senior Investigator Award
PI: V. Michael Holers, M.D.
Title: Mechanisms of complement mediated inflammation in asthma
Amount: \$750,000 (7/1/06 to 6/30/09) total direct costs
22. Source: American College of Rheumatology Research and Education Foundation Within Our Research Grant
PI: V. Michael Holers, M.D. (sub-contract)
Title: Inhibition of PAD function as a novel treatment strategy for rheumatoid arthritis
Amount: \$200,000 (7/1/08 to 6/30/10) total direct costs
23. Source: NIH T32 AR07534
PI: V. Michael Holers, M.D.
Title: Research Training in Rheumatology
Amount: \$1,565,000 (7/1/01 to 6/30/11) total direct costs
24. Source: Taligen Therapeutics

- PI: V. Michael Holers, M.D.
 Title: Modulators of CR2-C3d interactions
 Amount: \$450,000 (7/1/09 to 6/30/11) total direct costs
25. Source: NIH U19 AI50864 Cooperative Study Group in Autoimmune Disease Prevention (G. Eisenbarth, P.I.)
 PI: V. Michael Holers, M.D. (P.I. of Project #1)
 Title: Rheumatoid arthritis: biomarkers of progression from autoimmunity to disease
 Amount: \$1,150,000 (9/15/06 to 8/31/12) total direct costs Project #2
26. Source: NIH R01 AR051394
 PI: V. Michael Holers, M.D.
 Title: RA-related autoantibodies in healthy FDR of RA patients
 Amount: \$2,250,000 (7/18/05 to 6/30/12) total direct costs
27. Source: Beckman Institute for Macular Research
 PI: V. Michael Holers, M.D.
 Title: Development of a non-invasive method in progressive age-related macular degeneration to detect and quantitate disease-associated complement C3 activation fragments
 Amount: \$100,000 (7/1/11 to 6/30/12) total direct costs
28. Source: GlaxoSmithKline
 PI: V. Michael Holers, M.D.
 Title: PAD inhibition in collagen-induced arthritis
 Amount: \$75,000 (8/1/11-6/30/12) total direct costs
29. Source: Alnylam, Inc.
 PI: V. Michael Holers, M.D.
 Title: siRNA treatment of CAIA
 Amount: \$42,000 (12/1/13-2/28/14) total direct costs
30. Source: NIH R01 AR051749
 PI: V. Michael Holers, M.D.
 Title: Complement in the pathogenesis of autoimmune arthritis
 Amount: \$1,250,000 (12/1/09 to 11/30/14) total direct costs
31. Source: American College of Rheumatology
 Rheumatology Research Foundation
 PI: V. Michael Holers, M.D.
 Title: Pathogenic humoral autoimmunity in the transition to clinically apparent rheumatoid arthritis
 Amount: \$370,000 (7/1/12 to 6/30/14) total direct costs
32. Source: Arnold and Mabel Beckman Foundation
 PI: V. Michael Holers, M.D.
 Title: Inhibition of complement factor H related protein de-regulatory activity as a therapeutic strategy in age-related macular degeneration: Proof of concept in a murine model
 Amount: \$100,000 (07/01/14-06/30/15) total direct costs
33. Source: NIH R21 AI105717
 PI: V. Michael Holers, M.D.
 Title: Disconnecting CR2/CD21 from its C3d ligand to ameliorate lupus
 Amount: \$275,000 (04/01/13-03/31/15) total direct costs
34. Source: Target Identification in Lupus, Alliance for Lupus Research
 PI: V. Michael Holers, M.D.

- Title: CR2:C3d receptor:ligand interaction as a therapeutic target in lupus
Amount: \$528,909 (02/01/13-01/31/16) total direct costs
35. Source: NIH U01 AI101981
PI: V. Michael Holers, M.D.
Title: CSGADP: Early targets for antigen specific tolerance induction in preclinical rheumatoid arthritis
Amount: \$2,150,000 (7/5/12 to 6/30/17) total direct costs
36. Source: CO OEDIT
PI: V. Michael Holers, M.D.
Title: Novel tissue-targeted complement therapeutic agents for treatment of autoimmune and inflammatory diseases
Amount: \$125,000 (07/01/16 – 04/30/18)
37. Source: NIH R01 DK102912
PI: Steve Tomlinson, PhD. (subcontract to Holers)
Title: Antibodies and complement in ischemia reperfusion injury and regeneration
Amount: \$460,000 (7/1/15 to 6/30/19) total direct costs
38. Source: NIH UM2 AR067678
PI: Paul J. Utz, M.D. and V. Michael Holers, M.D. (Co-PI)
Title: Accelerating Medicines Partnership RA/Lupus Leadership Center
Amount: \$125,000 (9/24/14 to 9/23/19) total sub-contract direct costs
39. Source: NIH R21 NS097653
PI: Steve Tomlinson, PhD. (subcontract to Holers)
Title: Complement inhibitors targeted to the ischemic brain for the treatment of stroke
Amount: \$55,000 (4/15/17-3/31/20) total subcontract direct costs
40. Source: Pfizer ASPIRE Program
PI: V. Michael Holers, M.D.
Title: Causal inter-relationships between peripheral immune dysregulation and mucosal inflammation in subjects at-risk for future rheumatoid arthritis
Amount: \$152,604 (6/28/18-12/31/20) total direct costs
41. Source: AdMIRx
PI: V. Michael Holers, M.D.
Title: SRA-001
Amount: \$337,000 (5/7/18-6/30/21) total direct costs
42. Source: Janssen Research and Development, LLC
PI: Kevin D. Deane, M.D., Ph.D. (Holers is Co-PI)
Title: Targeting immune responses for prevention of RA (TIP-RA)
Amount: \$2,560,000 (5/1/16-12/31/20)
43. Source: NIH UH2 AR067681
PI: V. Michael Holers, M.D.
Title: Evolving adaptive and effector mechanisms from pre-RA through established disease
Amount: \$1,500,000 (9/24/14 to 9/23/16) total direct costs (additional annual request funded to 9/23/2021)
44. Source: NIH U01 AI130830
PI: John Harley, M.D., Ph.D. (subcontract to Holers)
Title: Exploration of Cytomegalovirus as compared to Epstein-Barr Virus infection as viral environmental factors that drive initial loss of tolerance and pathogenesis in populations at-risk for future RA

- Amount: \$118,094 (12/15/20-12/14/21) total direct costs
45. Source NIH U01 AI101981
 PI: V. Michael Holers, M.D.
 Title: CSGADP: Early targets for antigen specific tolerance induction in preclinical rheumatoid arthritis
 Amount: \$4,900,000 (7/1/17 to 6/30/22) total direct costs
46. Source NIH T32 AR07534
 PI: V. Michael Holers, M.D.
 Title: Research Training in Rheumatology
 Amount: \$2,000,000 (7/1/17 to 6/30/22) total direct costs
47. Source: NIH UM1 AI110503
 PI: V. Michael Holers, M.D.
 Title: Colorado Autoimmunity Center of Excellence
 Amount: \$350,000 (5/1/14 to 4/30/19 total direct cost; additional annual clinical trials support funded for StopRA to 10/31/23)
48. Source: NIH U01 HL152405
 PI: Richard Duke, Ph.D. (Co-Investigator Holers)
 Title: Colorado AMC REACH Hub
 Amount: \$999,434 (9/23/19-8/31/23) total direct costs

RESEARCH INTERESTS:

- B lymphocyte activation and development
- Role of complement in inflammation and autoimmunity
- Complement receptor and regulatory protein molecular structure
- Complement therapeutic strategies and optimization
- Transcriptional regulation in B lymphocyte development
- Computer-based haptic simulations in rheumatology education
- Development of pre-clinical autoimmunity in rheumatoid arthritis
- Etiopathogenesis and prevention of rheumatoid arthritis

PATENTS (issued):

1. "3-Dimensional Structure of Complement Receptor Type 2 and Uses Thereof", U.S. Patent 6,820,011, November 16, 2004
2. "Targeting complement factor H for treatment of diseases", U.S. Patent 7,759,304, July 20, 2010
3. "Anti-factor B antibodies" U.S. Patent 7,999,082, August 16, 2011
4. "Humaneered anti-factor B antibody" U.S. Patent 7,964,705, June 21, 2011
5. "Complement receptor 2 targeted complement modulators", U.S. Patent 8,007,804, August 30, 2011
6. "Biomarkers for rheumatoid arthritis", European Patent 2158326, June 20, 2012
7. "Inhibition of factor B, the alternative complement pathway, and methods related thereto" U.S. Patent 8,652,475, February 18, 2014
8. "Non-invasive detection of complement-mediated inflammation using CR2-targeted nanoparticles" U.S. Patent 8,840,868, September 23, 2014
9. "Inhibition of the alternative complement pathway for treatment of traumatic brain injury, spinal cord injury and related conditions" U.S. Patent 8,911,733, December 14, 2014
10. "Targeting complement factor H for treatment of diseases" U.S. Patent 9,212,212, December 15, 2015

11. "Anti-C3d antibody conjugates and methods of detecting complement activation" U.S. Patent 9,259,488, Feb 16, 2016
12. "Antibodies to the C3d fragment of complement component 3" U.S. Patent 9,815,890, November 14, 2017
13. "Modulating the alternative complement pathway" U.S. Patent 10,233,235, March 18, 2019
14. "Treatment of paroxysmal nocturnal hemoglobinuria, hemolytic anemias and disease states involving intravascular and extravascular hemolysis" U.S Patent 10,239,937, March 26, 2019
15. "Antibody-siRNA conjugates and uses thereof" U.S. Patent 10,278,986, May 7, 2019

h-INDEX: 89

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1. Rosenberg, N. L., Lacy, J. R., Kennaugh, R. C., **Holers, V. M.**, Neville, H. E., and Kotzin, B. L. 1985. Treatment of refractory chronic demyelinating polyneuropathy with lymphoid irradiation. Muscle and Nerve 8:223-232.
2. **Holers, V. M.**, and Kotzin, B. L. 1985. Human peripheral blood monocytes display surface antigens recognized by monoclonal antinuclear antibodies. J. Clin. Invest. 76:991-998.
3. Seya, T., **Holers, V. M.**, and Atkinson, J. P. 1985. Purification and functional analysis of polymorphic variants of CR1. J. Immunol. 135:2661-2667.
4. **Holers, V. M.**, Seya, T., Brown, E., O'Shea, J. J., and Atkinson, J. P. 1986. Structural and functional studies on the human C3b/C4b receptor (CR1) purified by affinity chromatography using a monoclonal antibody. Complement 3:63-78.
5. Yu, G., **Holers, V. M.**, Seya, T., Ballard, L., and Atkinson, J. P. 1986. Structural and functional characterization of a C3-binding membrane protein of human platelets. J. Clin. Invest. 78:494-501.
6. Nickells, M., Seya, T., **Holers, V. M.**, McCourt, D., Leykam, J., and Atkinson, J. P. 1986. Analysis of C3b/C4b receptor (CR1) polymorphic variants by tryptic peptide mapping. Mol. Immunol. 23:661-668.
7. VanDyne, S., **Holers, V. M.**, Lublin, D. M., and Atkinson, J. P. 1987. The polymorphism of the C3b/C4b receptor in the normal population and in patients with systemic lupus erythematosus Clin. Exp. Immunol. 68:570-579.
8. **Holers, V. M.**, Chaplin, D. D., Leykam, J. F., Gruner, B. A., and Atkinson, J. P. 1987. A human C3b/C4b receptor (CR1) poly A-mRNA polymorphism related to the CR1 allelic M_r polymorphism. Proc. Natl. Acad. Sci. 84:2459-2463.
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10. Lublin, D. M., Lemons, R. S., LeBeau, M. M., **Holers, V. M.**, Tykocinski, M. L., Medof, M. E., and Atkinson, J. P. 1987. The gene encoding Decay-Accelerating Factor (DAF) is located in the complement regulatory locus on the long arm of chromosome 1. J. Exp. Med. 165:1731-1735.
11. McNearney, T. A., Odell, C., **Holers, V. M.**, Spear, P. G. and Atkinson, J. P. 1987. Herpes simplex virus glycoproteins gC-1 and gC-2 bind to the third component of complement and provide protection against complement mediated neutralization of viral infectivity. J. Exp. Med. 166:1525-1535.
12. Stafford, H. A., Tykocinski, M. L., Lublin, D. M., **Holers, V. M.**, Rose, W. F., Atkinson, J. P. and Medoff, M. E. 1987. Normal polymorphic variations and transcription of the decay accelerating factor gene in paroxysmal nocturnal hemoglobinuria cells. Proc. Nat'l. Acad. Sci. 85:880-884.

13. Hourcade, D., Miesner, D. R., Atkinson, J. P., and **Holers, V. M.** 1988. Identification of an alternative polyadenylation site in the human C3b/C4b receptor (CR1) transcriptional unit and prediction of a secreted form. J. Exp. Med. 168:1255-1270.
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17. **Holers, V. M.**, Ruff, T. G., Parks, D. L., McDonald, J. A., Ballard, L. L., and Brown, E. J. 1989. Molecular cloning of a murine fibronectin receptor and its expression during inflammation. J. Exp. Med. 169:1589-1605.
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26. Secrist, H., **Holers, V. M.**, Egan, M., Nahm, M. H., Butch, A. W. and Peters, M. 1991. Induction of IL-4 and IL-6 in vitro: variation in signalling requirements and kinetics are dependent on the anatomic source of the responding mononuclear cells. Regional Immunol. 3:341-348.
27. Molina, H., Wong, W., Kinoshita, T., Brenner, C., Foley, S., and **Holers, V. M.** 1992. Distinct receptor and regulatory properties of recombinant mouse Complement Receptor 1 (CR1) and Crry, the two genetic homologs of human CR1. J. Exp. Med. 175:121-129.
28. Hourcade, D., Garcia, A. D., Post, T. W., Taillon-Miller, P., **Holers, V. M.**, Wagner, L. M., Bora, N. S. and Atkinson, J. P. 1992. Analysis of the Regulators of Complement Activation (RCA) gene cluster with yeast artificial chromosomes (YACs). Genomics 12:289-300.

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18. **Holers, V.M.** 1999. Complement deficiency states, disease susceptibility and infection risk in Systemic Lupus Erythematosus. Arth. Rheum. 42:2023-2025.
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35. Boackle, S. A., and **Holers, V. M.,** 2004. Complement receptor 2 and autoimmunity in Current Directions in Autoimmunity (Ed., G. Tsokos), Karger, Basel, Switzerland. p. 33-48.
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78. Deane, K.D., and **Holers, V.M.** 2019. The natural history of rheumatoid arthritis. Clin. Therap. May 14. PMID: 31196652
79. Raza, K., **Holers, V.M.**, and Gerlag, D. 2019. Nomenclature for the phases of the development of rheumatoid arthritis. Clin. Therap. May 03. PMID: 31196657
80. **Holers, V.M.** and Trouw, L. 2019; Complement system. Kelly & Firestein's Textbook of Rheumatology, 11th Edition. Elsevier, Philadelphia, PA.
81. Slight-Webb, S., Bourn, R.L., **Holers, V.M.**, and James, J.A. 2019. Shared and unique immune alterations in pre-clinical autoimmunity. Curr. Opin. Immunol. 61:60-68. PMCID: PMC6901719
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83. Deane, K.D., and **Holers, V.M.** 2021. Rheumatoid arthritis: Pathogenesis, prediction and prevention – an emerging paradigm shift. Arth. Rheum. 73: 181-193. PMCID: PMC7772259
84. **Holers, V.M.** 2021. Challenges and opportunities: Using omics to generate testable insights into pathogenic mechanisms in preclinical seropositive rheumatoid arthritis. Arth. Rheum. 73:1-4. PMID: 32776474
85. Nigrovic, P.A., Colbert, R.A., **Holers, V.M.**, Ozen, S., Ruperto, N., Thompson, S.D., Wedderburn, L.R., Yeung, R.S.M., and Martini, A. 2021. Biological classification of childhood arthritis: roadmap to a molecular nomenclature. Nature Reviews Rheumatology 17:257-269. PMID: 33731872
86. **Holers, V.M.**, Kuhn, K.A., Demoruelle, M.K., Norris, J.M., Firestein, G.S., James, E.A., Robinson, W.H., Buckner, J.H., and Deane, K.D. 2022. Mechanism-driven strategies for prevention of rheumatoid arthritis. Rheumatol. Autoimmun. 2: 109-119. PMCID: PMC9610829
87. Olsen, N.J., Okuda, D.T., **Holers, V.M.**, and Karp, D.R. 2022. Editorial: Understanding the concept of pre-clinical autoimmunity. Front. Immunol. doi: 10.3389/fimmu.2022.983310. PMCID: PMC9355672
88. West, S.G., and **Holers, V.M.** 2022. Clinical academic rheumatology: Still getting more than you pay for. Arth. Care Res. 74:1039-1040. PMID: 36194068
89. **Holers, V.M.** 2023. Contributions of animal models to mechanistic understandings of antibody-dependent disease and roles of the amplification loop. Immunol. Rev. 313:181-193. PMID: 36111456

90. Kemper, C., Ferreira, V.P., Paz, J.T., **Holers, V.M.**, Lionakis, M.S., and Alexander, J.J. 2023. Complement: The Road Less Traveled. J. Immunol. 210:119-125. PMCID: PMC10038130
91. **Holers, V. M.** 2023. Complement therapeutics are coming of age in rheumatology. Nat. Rev. Rheumatol. 19:470-485. PMID: 37337038.
92. **Holers, V. M.** 2023. Are there causal mucosal drivers in the preclinical development of rheumatoid arthritis? Semin. Art. Rheum. doi: 10.1016/j.semarthrit.2023.152324.
93. **Holers, V.M.** and Trouw, L. 2024; Complement system. Kelly & Firestein's Textbook of Rheumatology, 12th Edition. Elsevier, Philadelphia, PA (in press).
94. **Holers, V.M.**, Demoruelle, K.M., Buckner, J.H., James, E.A., Firestein, G.S., Robinson, W.H., Steere, A.C., Zhang, F., Norris, J.M., Kuhn, K.A., and Deane, K.D. 2024. Distinct mucosal endotypes as initiators and drivers of rheumatoid arthritis. Nature Reviews Rheumatology 20:601-613. PMID: 39251771
95. Deane, K.D., **Holers, V.M.**, Emery, P., Mankia, K., El-Gabalawy, H., Sparks, J.A., Costenbader, K.H., Schett, G., van der Helm-van Mil, A., van Schaardenburg, D., Thomas, R., and Cope, A.P. 2024. Therapeutic interception in individuals at risk of rheumatoid arthritis to prevent clinically impactful disease. Ann. Rheum. Dis. doi: 10.1136/ard-2023-224211. PMID: 39242182

OTHER MEDIA:

1. **Holers, V.M.** and Frazer-Abel, A. (2019, April 30). The complement system - an introduction for undergraduates [Video file]. In The Biomedical & Life Sciences Collection, Henry Stewart Talks. Retrieved May 3, 2019, from <https://hstalks.com/bs/3930/>.

INVITED LECTURES (1993-Present):

1. Washington University School of Medicine; St. Louis, MO; January 11, 1993; Immunology Seminar "Of mice and men: complement and the immune response"
2. Monsanto Corporate Research; St. Louis, MO; January 12, 1993; Immunology Seminar Series "Models of complement in the immune response"
3. Glaxo Institute for Molecular Biology; Geneva, Switzerland; April 1, 1993; Special Seminar Speaker "Complement receptor 2 in the immune response"
4. Ohio State University; Columbus, OH; April 5, 1994; Immunology Seminar "Regulation of B lymphocyte fate by CD21, a receptor for C3, CD23 and the Epstein-Barr virus"
5. University of Texas Southwestern Medical Center; Dallas, TX; September 30, 1994; Special Seminar Speaker "Roles of complement receptor 2 in B lymphocyte development and differentiation"
6. NYU Medical Center; New York, NY; December 15, 1994; Immunology Club Seminar Series "Complement receptors and regulatory proteins: evolutionary and immunologic lessons from mouse models"
7. Experimental Biology/AAI Meeting; Atlanta, GA; April 12, 1995; Mini-Symposium Speaker "Complement receptors"
8. IBC USA Conference: Controlling the Complement System; Boston, MA; May 9, 1995; Special Lecture "Characterization of mouse homologues of human complement receptors and regulatory proteins: analysis in the mouse MRL/lpr model of SLE"
9. University of Pennsylvania School of Medicine; Philadelphia, PA; March 28, 1996; Complement Seminar "Complement receptors and the cellular immune response"
10. Case Western Reserve University School of Medicine; Cleveland, OH; April 30, 1996; Immunology Seminar Series "Complement and the cellular immune response"

11. Department of Microbiology, UCHSC; October 11, 1996; Microbiology Seminar Series "Complement inhibitors: therapy for inflammatory and autoimmune disease?"
12. American Society of Nephrology National Meeting; New Orleans, LA; November 3, 1996; Clinical Science Symposium "Complement regulators and receptors in experimental and human SLE"
13. Webb-Waring Lung Institute; Denver, CO; January 7, 1997; Seminar Series "An association between complement receptors and glutathione regulation?"
14. Department of Pathology; Harvard Medical School, Boston, MA; March 5, 1997; Pathology Seminar Series "Complement, inflammation and autoimmunity"
15. Division of Rheumatology; Northwestern University Medical School; Chicago, IL; March 11, 1997; MAMDC Seminar Series "CD21, autoimmunity and the cellular immune response"
16. University of Virginia School of Medicine; Charlottesville, VA; March 12, 1998; Beirne Carter Center Immunology Series "Complement as a regulator of multiple phases of the immune response"
17. University of Cologne; Cologne, Germany; September 16, 1998; Department of Genetics Symposium "CD21, Immunity and Autoimmunity"
18. British Society for Immunology Meeting; Harrogate, UK; December 2, 1998; Invited Symposium Speaker "Manipulating complement regulatory protein levels in vivo demonstrates the importance of the complement system in murine models"
19. University of Alabama Birmingham; Birmingham, AL; January 12, 1999; Microbiology Seminar Series "Complement and the immune response: regulatory and effector roles"
20. University of Colorado Health Sciences Center; Denver, CO; March 17, 1999; Medical Grand Rounds "Complement inhibitors as new therapeutics for rheumatic diseases"
21. University of Washington School of Medicine; Seattle, WA; April 6, 1999; Special Seminar "Complement and the immune response: regulatory and effector roles"
22. University of Iowa School of Medicine; Iowa City, IA; May 5, 1999; Kroc Lecturer – Immunology Seminar "Complement and the immune response: regulatory and effector roles"
23. Henry Kunkel Society Meeting, International Conference on Autoantibodies and Autoimmunity; Oslo, Norway; June 27, 1999; Invited Speaker "Complement inhibitors as therapeutics for inflammatory and autoimmune diseases"
24. University of Nebraska School of Medicine; Omaha, NE; October 1, 1999; Medical Grand Rounds "Complement inhibitors as new therapeutics for autoimmune diseases"
25. Wake Forest University, Bowman Gray School of Medicine; Winston Salem, NC; October 14, 1999; Microbiology/Immunology Seminar "Manipulation of complement activities as a therapeutic strategy"
26. American College of Rheumatology Basic Research Conference; Boston, MA; November 13, 1999; Invited Symposium Speaker "The complex roles of complement proteins: protection from as well as effector mechanisms in humoral autoimmunity"
27. Hospital for Special Surgery, Weill Medical College of Cornell University; New York, NY; December 13, 1999; Immunology Lecture Series "Complement and the immune response: regulatory and effector roles"
28. Hopital Cochin; Paris, France; March 18, 2000; Immunology Series "Complement: regulatory and effector roles"
29. University of Wales College of Medicine; Cardiff, Wales; June 9, 2000; Immunology Series "Complement and the immune response: regulatory and effector roles"

30. National Institutes of Health; Bethesda, MD; September 4, 2001; NIH Conference: Role of Innate Immunity in the Etiopathology of Autoimmunity "Complement receptors in the regulation of self-reactive B cells"
31. Oklahoma Medical Research Foundation; Oklahoma City, OK; September 9, 2001; First International Lupus Genetics Conference "Complement Receptor 2: Role of genetic and acquired deficiencies in SLE"
32. American College of Rheumatology Annual Meeting; San Francisco, CA; November 13, 2001; Invited Symposium Speaker "Autoimmunity and the complement conundrum"
33. University of Pennsylvania School of Medicine; Philadelphia, PA; January 22, 2002; Immunology Colloquium "Complement, immunity and autoimmunity"
34. University of Pennsylvania School of Medicine; Philadelphia, PA; January 22, 2002; Medicine Grand Rounds "Therapeutic opportunities by targeting the complement system"
35. University of Alabama Birmingham; Birmingham, AL; March 5, 2002; Microbiology Seminar Series "Complement, immunity and autoimmunity"
36. University of Virginia School of Medicine; Charlottesville, VA; March 18, 2002; Beirne Carter Center Immunology Series "Complement, immunity and autoimmunity"
37. FASEB Summer Research Conference – Tucson, AZ; August 4, 2002; Invited Symposium Speaker "Impact of structure-function analyses on the understanding of complement receptor 2 roles in normal immune responses and autoimmunity"
38. National Institutes of Health; Bethesda, MD; September 12, 2002; International Workshop on Autoantibodies as Predictors of Autoimmune Diseases "Pre-clinical autoimmunity in rheumatoid arthritis"
39. Center for Blood Research; Boston, MA; March 25, 2003; Research Seminar "CR2/CD21: A model for understanding interactions of innate and acquired immune systems"
40. Massachusetts Institute of Technology; Cambridge, MA; March 25, 2003; B Cell Bash "Premature introduction of complement receptor signals alters B cell development and immune responses: mechanisms and implications"
41. National Institutes of Health; Bethesda, MD; March 31, 2003; Biomarkers for the Assessment of Systemic Lupus Erythematosus Meeting "Complement"
42. Medical University of South Carolina; Charleston, SC; April 9, 2003; Pfizer Visiting Professor/Medical Grand Rounds "Complement as a therapeutic target for human disease"
43. AAI Annual Meeting; Denver, CO; May 7, 2003; Major Symposium Speaker "Complement and the immune response: from shaping the repertoire to mediating effector functions"
44. Second Workshop on Complement Associated Diseases, Animal Models and Therapeutics; Mykocos, Greece; June 4, 2003; Invited Symposium Speaker "Diminished responses to antigenic challenge in mice that prematurely express Complement Receptor 2 (CR2/CD21) during B cell development"
45. Transplantation Society Basic Sciences Symposium; Keystone, CO; September 16, 2003; Plenary Session Speaker "Complement and the regulation of immunity"
46. University of Nebraska School of Medicine; Omaha, NE; October 10, 2003; Medical Grand Rounds "Evolution of autoimmunity in rheumatoid arthritis: insights into etiology?"
47. American College of Rheumatology Basic Research Conference; Orlando, FL; October 24, 2003; Invited Speaker "Complement in rheumatoid arthritis"
48. American Society of Nephrology Advances in Research Conference; Orlando, FL; November 13, 2003; Invited Symposium Speaker "Therapeutic approaches to the complement system"

49. Northwestern University School of Medicine; Chicago, IL; December 16, 2003; Microbiology-Immunology Seminar Series "CR2/CD21: A model for understanding the interactions between innate and acquired immunity"
50. Washington University School of Medicine; St. Louis, MO; January 12, 2004; Immunology Research Seminar "Innate recognition of self: mechanisms and consequences"
51. Washington University School of Medicine; St. Louis, MO; January 14, 2004; Rheumatology Translational Research Seminar "Evolution of autoimmunity in rheumatoid arthritis: insights into pathogenesis?"
52. Cedars Sinai Medical Center; Los Angeles, CA; August 24, 2004; Division of Rheumatology Grand Rounds "Evolution of autoimmunity in rheumatoid arthritis: insights into pathogenesis?"
53. International Congress of the Transplantation Society; Vienna, Austria; September 7, 2004; State-of-the-Art Symposium "Innate immunity and transplant rejection"
54. Hospital Charite – Benjamin Franklin; Berlin, Germany; September 10, 2004; Department of Trauma Surgery Grand Rounds "Role of alternative complement pathway in tissue injury"
55. Global Arthritis Research Network; Montreal, Canada; September 22, 2004; Symposium Speaker "Innate immunity and rheumatic disease"
56. Hospital for Special Surgery; New York, NY; December 15, 2004; Rheumatology Grand Rounds "Evolution of autoimmunity in rheumatoid arthritis: insights into pathogenesis – and prevention?"
57. NIDDK Glomerular Disease Workshop; Bethesda, MD; January 24, 2005; Invited Symposium Speaker "Complement, therapeutics and glomerular disease"
58. Duke University Medical Center; Durham, NC; February 1, 2005; Rheumatology Grand Rounds "Evolution of autoimmunity in rheumatoid arthritis: insights into pathogenesis – and prevention?"
59. Duke University Medical Center; Durham, NC; February 1, 2005; Immunology Seminar "CR2/CD21, immunity and autoimmunity"
60. University of Texas Southwestern Medical Center; Dallas, TX; March 9, 2005; Excellence in Immunology Lecture "Autoimmune and pathogenic mechanisms in inflammatory arthritis"
61. University of Texas Southwestern Medical Center; Dallas, TX; March 10, 2005; Rheumatology Grand Rounds "Evolution of autoimmunity in rheumatoid arthritis: insights into pathogenesis – and prevention?"
62. University of Colorado Health Sciences Center; Denver, CO; April 22, 2005; Research Symposium on the Health of Women and Girls "Progress in prevention strategies for autoimmune diseases"
63. FASEB Summer Research Conference – Immunoreceptors; Tucson, AZ; July 24, 2005; Invited Speaker "Complement Receptor 2: Novel ligands and new perspectives on structure-function relationships"
64. AMLI Annual Meeting; Denver, CO; August 23, 2005; Plenary Session Speaker "Unexpected role of the alternative pathway in disease"
65. Global Arthritis Research Network Symposium; Vienna, Austria; September 15, 2005; Invited Speaker "Antibodies to citrullinated proteins enhance tissue injury in inflammatory arthritis"
66. Johns Hopkins University School of Medicine; Baltimore, MD; December 14, 2005; Molecular Pathology Seminar Series "Unexpected role of the alternative complement pathway in tissue injury"
67. University of California San Diego; San Diego, CA; February 28, 2006; Symposium on Inflammation and Autoimmunity "Pathogenesis of early rheumatoid arthritis"
68. EULAR: Annual European Congress of Rheumatology; Amsterdam, Netherlands; June 21, 2006; Invited Speaker "Pathogenesis of autoantibodies"

69. FOCIS: Federation of Clinical Immunology Societies Meeting; San Francisco, CA; June 2, 2006; Symposium on Autoantigens “Evolution and pathogenesis of autoantibodies to citrullinated antigens in rheumatoid arthritis”
70. American College of Rheumatology Annual Meeting; Washington, DC; November 10, 2006; ACR Basic Research Conference “Alternative pathway mediating rheumatic diseases: scientific rationale and evidence for causality?”
71. American College of Rheumatology Annual Meeting; Washington, DC; November 11, 2006; ACR Frontiers in Translational Research “Identifying individuals at risk for developing rheumatoid arthritis in the asymptomatic stage: is it possible?”
72. Brigham and Women’s Hospital; Boston, MA; February 6, 2007; Rheumatology Grand Rounds “Evolution and mechanisms of pathogenic autoimmunity in rheumatoid arthritis”
73. FOCIS: Federation of Clinical Immunology Societies Meeting; San Diego, CA; June 9, 2007; Symposium, Immune Responses to Modified Self Antigens “Citrullination: Target of pathogenic autoimmunity in rheumatoid arthritis”
74. University of Toronto; Toronto, Canada; June 26, 2007; Ogryzlo Day Keynote Presentation “Evolution and mechanisms of pathogenic autoimmunity in rheumatoid arthritis”
75. Emory University School of Medicine; February 12, 2008; Medicine Grand Rounds “The emergence of complement targeted therapies”
76. Emory University School of Medicine; February 13, 2008; Pfizer Visiting Professor Rheumatology Grand Rounds Lecture “Evolution and mechanisms of pathogenic autoimmunity in rheumatoid arthritis”
77. ARVO Annual Meeting, April 27, 2008; Invited Special Interest Group Symposium Speaker “New concepts regarding the role of the alternative pathway of complement in disease pathogenesis”
78. Feinstein Institute for Medical Research; May 28, 2008; Rheumatology Grand Rounds Conference “Evolution and mechanisms of pathogenic autoimmunity in rheumatoid arthritis”
79. University of Geneva; October 3, 2008; Department of Immunology Seminar “Evolution and mechanisms of pathogenic autoimmunity in rheumatoid arthritis”
80. National Jewish Health; November 21, 2008; Kauvar Conference on Excellence in Research Keynote Speaker “Natural history of rheumatoid arthritis: methods to study early disease pathogenesis”
81. Imperial College London, Hammersmith Hospital; February 12, 2009; Frontiers in Rheumatology: Eric Bywaters Lecture “Evolution of autoimmunity in rheumatoid arthritis: insights into pathogenesis and the potential for prevention”
82. Imperial College London, Hammersmith Hospital; February 13, 2009; Immunology Seminar “Importance and mechanisms of alternative complement pathway mediated injury in immune complex disease”
83. University of Nebraska School of Medicine; April 24, 2009; Medicine Grand Rounds “Rheumatoid arthritis pathogenesis and implications for disease management: today and tomorrow”
84. Cincinnati Children’s Hospital; May 6, 2009; Combined Research Conference “Evolution of autoimmunity in rheumatoid arthritis: insights into pathogenesis and the potential for prevention”
85. University of Texas Southwestern School of Medicine; August 21, 2009; Medicine Grand Rounds, Kroc Lectureship “Rheumatoid arthritis pathogenesis and implications for disease management: today and tomorrow”
86. University of Colorado Denver; September 30, 2009; Structural Biology Research Seminar “Complement receptor type 2 (CR2/CD21): approaches to understanding immune-related structure-function relationships in their biologic context”

87. Hospital for Special Surgery; November 12, 2009; Alumni Association Meeting: Christian Lecture "Rheumatoid arthritis pathogenesis and implications for disease management today and tomorrow"
88. Hospital for Special Surgery; November 13, 2009; Alumni Association Meeting: Freyberg Lecture "Complement in the pathogenesis of inflammatory arthritis: new concepts and emerging therapeutic approaches"
89. University of California San Francisco; April 27, 2010; Rheumatology Seminar Series "Rheumatoid arthritis: early phase natural history studies provide insights into pathogenesis and reveal opportunities for primary prevention"
90. University of Toledo; October 16, 2010; 2010 Workshop on Infection and Immunity "The properdin system and the Ohio connection: evolution of a new human therapeutic paradigm"
91. American College of Rheumatology Annual Meeting; November 9, 2010; Basic Science Symposium Invited Speaker "Experimental arthritis and anti-CCP"
92. American Society of Nephrology; November 18, 2010; Renal Week Invited Speaker "Complement dysfunction in pre-eclampsia and related diseases of pregnancy"
93. Mario Negri Institute for Pharmacological Research; May 7, 2011 2nd International Conference on Membranous Nephropathy "Site-directed complement inhibitors"
94. University of Leiden; August 24, 2011; European Meeting on Complement in Human Disease "Complement therapeutics in human disease: Opportunities and challenges into the 21st century"
95. Estes Park, CO; September 15, 2011; 12th Annual Colorado Immunology Conference "Antibodies to citrullinated protein antigens (ACPA) and peptidyl arginine deiminases in the pathogenesis of rheumatoid arthritis: perpetrators or innocent bystanders"
96. University of Colorado School of Medicine; November 2, 2011; Medical Grand Rounds "Complement therapeutics 2011: PNH, aHUS, AMD and beyond"
97. Barbara Davis Center for Childhood Diabetes; December 13, 2011; DERC Research in Progress Seminar "Bridging the gap between academic science and pharmaceutical development to improve the complement therapeutics pipeline"
98. University of California San Diego; January 10, 2012; Rheumatology, Allergy and Immunology Seminar Series "Rheumatoid arthritis: early stage natural history studies provide insights into pathogenesis and new potential opportunities for prevention"
99. University of California San Diego; January 11, 2012; Department of Medicine Grand Rounds Nathan J. Zvaifler Rheumatology Lectureship: "Complement therapeutics come of age in hemolytic, thrombotic microangiopathic, and potentially ophthalmologic and autoimmune diseases"
100. Santa Fe, NM; January 22, 2012; Keystone Symposium on Rheumatoid Arthritis: Molecular and Clinical Insights "When does RA begin: inflammatory and autoimmune signatures precede clinical onset"
101. Department of Rheumatology, NYU Hospital for Joint Diseases; February 9, 2012; Rheumatology Basic Science Seminar "Complement in the pathogenesis of inflammatory arthritis: new concepts and emerging therapeutic approaches"
102. Department of Rheumatology, NYU Hospital for Joint Diseases; February 9, 2012; Rheumatology Grand Rounds "Insights from natural history studies into the early pathogenesis and strategies for prevention of rheumatoid arthritis"
103. Rheumatism Society of the District of Columbia; March 21, 2012; Invited Speaker "Rheumatoid arthritis: early stage natural history studies provide insights into pathogenesis and new potential opportunities for prevention"

104. Aplastic Anemia and MDS International Foundation; March 23, 2012; Bone Marrow Failure Symposium Invited Lecture "Complement: taming the double-edged sword for therapeutic benefit"
105. Division of Rheumatology, University of Massachusetts Medical School; April 12, 2012; Leaders in Rheumatology Speaker Series "Rheumatoid arthritis: early stage natural history studies provide new insights into pathogenesis and potential opportunities for prevention"
106. Division of Rheumatology, University of Massachusetts Medical School; April 13, 2012; Rheumatology Research Seminar "Complement in the pathogenesis of human disease and inflammatory arthritis: new concepts and emerging therapeutic approaches"
107. Feinstein Institute for Medical Research; April 25, 2012; Rheumatology Research Conference "Rheumatoid arthritis: early stage natural history studies provide new insights into pathogenesis and potential opportunities for prevention"
108. University of Colorado Denver; May 3, 2012; Department of Medicine Innovations Conference "Bridging the gap between academic science and drug development - to improve the complement therapeutics pipeline"
109. XV International Symposium on Retinal Degeneration; July 16, 2012; Bad Gogging, Germany; Plenary Lecture "Context-specific roles for complement in innate and adaptive immune responses"
110. 1st C3 Glomerulopathy Meeting; August 19, 2012; Hinxton, UK; Invited Speaker "Targeted C3 inhibitors"
111. Lupus 2012 – New Targets, New Approaches; September 29, 2012; Whistler, Canada; Invited Speaker "Evaluating the B cell C3d:CR2 innate-adaptive immune interaction as a therapeutic target in lupus"
112. American College of Rheumatology Annual Scientific Meeting; November 11, 2012; Washington, DC; Basic Science Symposium Invited Speaker "Question: is rheumatoid arthritis a preventable disease"
113. 3rd International Pre-RA/RA-Risk Workshop January 28, 2013; Stockholm, Sweden; Invited Speaker "Insights into the earliest phases of RA obtained from studies of high risk individuals identified through family and community health fair screening"
114. 3rd International Pre-RA/RA-Risk Workshop; January 29, 2013; Stockholm, Sweden; Invited Speaker "Update on events in the lungs before onset of RA: The Denver experience"
115. Karolinska Institute Min-Symposium; January 29, 2013; Stockholm, Sweden; Invited Speaker "The earliest phases of RA; family studies using experiences from pre-diabetes studies"
116. Johns Hopkins University; March 1, 2013; Baltimore, MD; Rheumatology Rounds Presentation "Initiation and early evolution of rheumatoid arthritis: insights from mechanism-focused natural history studies"
117. Ohio State University; March 21, 2013; Columbus, Ohio; Medicine Grand Rounds "Complement therapies come of age: genetic drivers and pathophysiologic outcomes"
118. New York University; April 25, 2013; New York, NY; Immunology Club Seminar Speaker "Citrullinated protein autoreactivity in the pathogenesis of rheumatoid arthritis"
119. American College of Rheumatology Annual Scientific Meeting; October 25, 2013; San Diego, CA; Preclinical Rheumatic Disease Research Conference Speaker "Why is the study of preclinical phases of rheumatic disease important?"
120. American College of Rheumatology Annual Scientific Meeting; October 30, 2013; San Diego, CA; Basic Science State of the Art Lecture "Emerging and unexpected regulatory roles for complement in the rheumatic diseases"

121. British Society for Immunology Congress; December 3, 2013; Liverpool, England; Invited Speaker "Complement in the pathogenesis of inflammatory arthritis"
122. University of Birmingham; December 4, 2013; Birmingham, England; Division of Rheumatology Seminar "Natural history of rheumatoid arthritis: lessons and insights from studies of at-risk individuals"
123. Cardiff University Institute of Infection and Immunity; December 6, 2013; Cardiff, Wales; Complement Mini-Symposium "The CR2:C3d interface: utilization for therapeutic and diagnostic considerations"
124. University of California Irvine; February 27, 2014; Irvine, CA; Institute for Immunology Seminar "Complement therapeutics come of age: current status and evolving approaches to targeted therapy"
125. University of Alabama Birmingham; March 19, 2014; Birmingham AL; Department of Medicine Grand Rounds: Cochrane Lectureship "Rheumatoid arthritis: Preclinical natural history studies provide key insights into disease initiation, pathogenesis and prevention"
126. University of Alabama Birmingham; March 20, 2014; Birmingham AL; Rheumatology Grand Rounds "Natural history of rheumatoid arthritis: What we learn from studies of at-risk individuals"
127. University of Alabama Birmingham; March 20, 2014; Birmingham AL; Program in Immunology Seminar "Complement in the pathogenesis of inflammatory arthritis: How animal models inform the new era of human therapeutics"
128. University of Colorado; April 10, 2014; Denver, CO; Research and Innovation Conference "Studies of the etiology of rheumatoid arthritis: a multi-disciplinary approach"
129. New York University; April 16, 2014; New York, NY; Rheumatology Grand Rounds "Natural history of rheumatoid arthritis: What we learn from studies of at-risk individuals"
130. University of Pittsburgh; May 22, 2014; Pittsburgh, PA; Department of Medicine Research Day Plenary Speaker "Early natural history studies provide novel insights into pathogenesis and opportunities for prevention of rheumatoid arthritis"
131. University of Pittsburgh; May 23, 2014; Pittsburgh, PA; Rheumatology Grand Rounds "Natural history of rheumatoid arthritis: Lessons and insights from studies of at-risk individuals"
132. University of Pittsburgh; May 23, 2014; Pittsburgh, PA; Department of Medicine Grand Rounds "Complement therapeutics (finally) come of age: current uses and emerging opportunities"
133. University of Colorado Denver; June 2, 2014; Denver, CO; Technology Transfer Office Awards Luncheon Featured Speaker "Living in the 'tidal pool': bridging the gap between academic science and pharmaceutical development"
134. Oregon Health & Science University; January 7, 2015; Portland, OR; Rheumatology Grand Rounds "Natural history of rheumatoid arthritis: Mechanic insights from studies of at-risk individuals"
135. University of Colorado Denver; January 28, 2015; Denver, CO; Department of Medicine Grand Rounds "Moving the bar from treatment to prevention of autoimmune disease: the case for rheumatoid arthritis"
136. NIAMS Intramural Research Program; February 6, 2015; Bethesda, MD; Rheumatology Grand Rounds "Natural history of rheumatoid arthritis: mechanistic insights from studies of at-risk individuals"
137. Royal Society Hooke Committee Complement Meeting; February 23, 2015; Chicheley, UK; Complement: Drive of Inflammation and Therapeutic Target in Diverse Diseases Speaker "Targeting sites of complement activation for imaging and therapy"
138. University of Chicago; March 17, 2015; Chicago, IL; Rheumatology Grand Rounds "Natural history of rheumatoid arthritis: Mechanic insights from studies of at-risk individuals"

139. University of Colorado Denver; April 30, 2015; Denver, CO; Structural Biology and Biochemistry Symposium "Living in the 'Tidal Pool': Bridging the gap between academic science and pharmaceutical development"
140. PEGS: The Essential Protein Engineering Summit; May 5, 2015; Boston, MA; Biologics for Autoimmune Disease Session "The complement system as a target for biologics against autoimmune diseases"
141. University of Colorado Denver; May 7, 2015; Denver, CO; Department of Medicine Faculty Research and Innovation Conference "Targeting mechanisms of local complement activation for diagnostic and therapeutic applications"
142. FOCIS Meeting; June 25, 2015; San Diego, CA; Best of Rheumatology Session "Characterizing the molecular origins of human rheumatoid arthritis"
143. Aegean 8th International Conference on Complement Therapeutics; September 3, 2015; Chania, Greece; Invited Speaker "Pathogenic natural antibodies: common neoepitopes found across multiple disease models and use as targeting modules for novel complement inhibitors"
144. American College of Rheumatology Basic Research Conference; November 6, 2015; San Francisco, CA; Invited Speaker "The intersection of genes and environment in the initiation and early development of rheumatoid arthritis"
145. Rheumatology Research Foundation Memorial Lectureship; November 10, 2015; San Francisco, CA; "Rheumatoid arthritis: mechanisms and predictors of pre-clinical RA"
146. American College of Rheumatology Annual Scientific Meeting; November 10, 2015; Rheumatology Research Foundation Disease Targeted Research Special Session "Pathogenic humoral autoimmunity in the transition to clinically apparent arthritis"
147. Uppsala University; November 20, 2015; Uppsala, Sweden; Research Seminar "Targeting the complement C3d:CR2 interface for therapeutic and diagnostic purposes"
148. University of Leeds; February 24, 2016; Leeds, England; Yorkshire Regional Rheumatology Seminar "Pre-RA: The evolution of autoimmunity in rheumatoid arthritis"
149. European Workshop on Rheumatology Research; February 26, 2016; York, England; Invited Speaker "Insights into the initiation and preclinical pathogenesis of rheumatoid arthritis from studies of at-risk populations"
150. Northwestern University; March 17, 2016; Chicago, IL; Rheumatology Grand Rounds "Insights into the initiation and preclinical pathogenesis of rheumatoid arthritis from studies of at-risk populations"
151. University of Washington; March 25, 2016; Seattle, WA; Lane Lectureship/Rheumatology Seminar "The mucosal hypothesis and the molecular origins of rheumatoid arthritis"
152. Ohio State University; April 26, 2016; Columbus, OH; Everett D. Reese Immunology and Rheumatology Seminar "Insights from studies of at-risk populations into the initiation and preclinical pathogenesis of rheumatoid arthritis"
153. Harvard Medical School; April 28, 2016; Boston, MA; Medical Grand Rounds Bauer Lectureship "Insights into the initiation and preclinical pathogenesis of rheumatoid arthritis from studies of at-risk populations"
154. Aegean 9th International Conference on Complement Therapeutics; June 29, 2016; Rhodes, Greece; Invited Speaker "Amelioration of disease in the MRL/*lpr* model of lupus by treatment with an anti-C3d monoclonal antibody that blocks C3d:CR2 ligand:receptor interactions"
155. Colorado Immunology Conference; September 1, 2016; Steamboat Springs, CO; Invited Speaker "Rheumatoid arthritis and the mucosal origins hypothesis"

156. 8th International Forum on Rheumatoid Arthritis; October 22, 2016; Tokyo, Japan; Invited Speaker “Studies of at-risk populations provide insights into the origins, pathogenesis and prevention of rheumatoid arthritis”
157. NYU Langone Seminar in Advanced Rheumatology; March 16, 2017; New York, NY; Invited Speaker “Treating early and pre-clinical rheumatoid arthritis”
158. Cleveland Clinic Biologic Therapies Summit VII; April 6, 2017; Cleveland, OH; Invited Speaker “Pre-rheumatoid arthritis: Can we define it and prevent its progression?”
159. New York Academy of Science “Complement Pathways in Disease”; April 25, 2017; New York, NY; Invited Speaker “Harnessing innate immune recognition of injured tissues for therapeutic and diagnostic purposes”
160. University of Arizona SCARI Lectureship; May 19, 2017; Tucson, AZ; Invited Professorship “Studies of at-risk populations provide insights into the origins, pathogenesis and prevention of rheumatoid arthritis”
161. Brigham and Women’s Hospital-Harvard Medical School Rheumatology Grand Rounds; May 23, 2017; Boston, MA; “Studies of at-risk populations provide insights into the origins and pathogenesis of pre-clinical rheumatoid arthritis”
162. 10th International Conference on Complement Therapeutics; June 27, 2017; Crete, Greece; Invited Speaker “Interconnections and key roles of alternative and lectin pathway components in the pathogenesis of experimental rheumatoid arthritis”
163. Karolinska Institute Research Seminar Series; September 6, 2017; Stockholm, Sweden; Invited Speaker “Studies of at-risk populations provide insights into the mucosal origins and causal pathogenesis of pre-clinical rheumatoid arthritis”
164. Vanderbilt University Division of Rheumatology Seminar Series; January 25, 2018; Nashville, TN; Invited Speaker “Rheumatoid Arthritis and the Mucosal Origins Hypothesis”
165. Vanderbilt University Department of Medicine Grand Rounds Riven Lectureship; January 25, 2018; Nashville, TN; Invited Professorship “Pathogenesis and Prevention of Rheumatoid Arthritis”
166. University of Colorado School of Medicine; January 31, 2018; Aurora, CO; Human Immunology and Immunotherapeutics Initiative Translational Immunology Case Study Seminar Series; Invited Speaker “Molecular Drivers of ‘Asymptomatic Autoimmunity’; Evolution of the Rheumatoid Arthritis Molecular Origins Hypothesis”
167. Cleveland Clinic Medicine Grand Rounds; March 8, 2018; Cleveland, OH; Invited Professor “New Ideas in the Pathogenesis and Prevention of Rheumatoid Arthritis”
168. Frontiers of Rheumatology: 36th Carl M. Pearson Memorial Symposium; April 13, 2018; Marina del Rey, CA; Invited Speaker “Pathogenesis and Prevention of Rheumatoid Arthritis”
169. Cincinnati Children’s Hospital P30 Seminar Series; June 6, 2018; Cincinnati, OH; Invited Speaker “Rheumatoid Arthritis and the Mucosal Origins Hypothesis”
170. JDRF Revisiting Autoimmunity: Common Mechanisms Meeting “Innate-Adaptive Interface - Have We Ignored Innate Immunity?” Session; June 19, 2018; San Francisco, CA; Invited Speaker “Insights from the Development of the Rheumatoid Arthritis Mucosal Origins Hypothesis”
171. FOCIS Meeting Session “New Mechanisms for Old Players: Complement”; June 23, 2018; San Francisco, CA; Invited Speaker “Complement: Taming the Hydra for Therapeutic Benefit”
172. University of Lübeck International Research Training Group “Inflammation in Allergy and Infection” Distinguished Lecture Series; July 5, 2018; Lübeck, Germany; Visiting Professor “Studies of At-Risk Populations Provide Insights into the Pre-Clinical Pathogenesis and Prevention of Rheumatoid Arthritis”

173. University of Colorado SPARK Program; August 22, 2018; Invited Speaker “Living in the ‘Tidal Pool’: Faculty Considerations in Bridging the Gaps Between Academic Roles and Pharmaceutical Development”
174. 10th International Forum on Rheumatoid Arthritis: September 14, 2018; Beijing, China; Publication Workshop Invited Speaker “Using Informative Murine Models to Address Human Clinical Research Questions: An Evolving Paradigm”
175. 10th International Forum on Rheumatoid Arthritis: September 15, 2018; Beijing, China; Invited Speaker “Rheumatoid Arthritis and the Mucosal Origins Hypothesis: Does Protection Turn to Destruction?”
176. Precision Medicine in Autoimmunity Conference: October 12, 2018; Denver, CO; Invited Speaker “Natural History Studies of Rheumatic/Autoimmune Diseases in Biomarker Discovery: A Rich Source of Potential Mechanistic and Predictive Information”
177. Symposium Honoring John Atkinson at Washington University School of Medicine; November 12, 2018; St. Louis, MO; Invited Speaker “Multiple Roles of Complement in the Initiation and Evolution of Rheumatoid Arthritis”
178. Barbara Davis Center for Childhood Diabetes Grand Rounds; January 8, 2019; Aurora, CO; Invited Speaker “Rheumatoid Arthritis and the Mucosal Origins Hypothesis: Insights into Pathogenesis and Prevention”
179. Cleveland Clinic Lerner Research Institute Department of Inflammation and Immunity Seminar; January 22, 2019; Cleveland, OH; Invited Speaker “Multiple Pathogenic Roles of Complement in the Evolution of Rheumatoid Arthritis”
180. Israel Institute for Advanced Studies Conference on Complement Regulation and Human Disease; February 12, 2019; Edmond J. Safra Campus, Givat Ram, Jerusalem, Israel; Invited Speaker “Complement in the Evolution of Rheumatoid Arthritis: A Dual Edge Sword”
181. University of Colorado Division of Renal Medicine and Hypertension Research Seminar; March 4, 2019; Aurora, CO; Invited Speaker “Explorations of the Roles of Complement in the Development of Lupus Nephritis Through a Molecular Dissection of the C3d:CR2 Ligand:Receptor Interaction”
182. RheumNow Live; March 22, 2019; Ft. Worth, TX; Invited Speaker “Insights into Preclinical Rheumatoid Arthritis”
183. General Assembly and Scientific Meeting of the Japan College of Rheumatology Presidential Symposium; April 15, 2019; Kyoto, Japan; Plenary Speaker “Rheumatoid Arthritis and the Mucosal Origins Hypothesis: Implications for Pathogenesis and Prevention”
184. ACR 2019 Biologic Classification of Disease Consensus Conference; May 10, 2019; Atlanta GA; Invited Speaker “Classification of Rheumatoid Arthritis Preclinical Disease”
185. European Congress of Rheumatology (EULAR) 2019; June 14, 2019; Madrid, Spain; Invited Symposium Speaker “Is Complement a Critical Ingredient in the Development of Rheumatoid Arthritis?”
186. 11th International Forum on Rheumatoid Arthritis; September 25-27, 2019; Washington, DC; Co-Organizer and Invited Speaker “Identification of Novel Targets in Rheumatoid Arthritis?”
187. American College of Rheumatology Annual Scientific Meeting; November 10, 2019; Atlanta, GA; Invited Symposium Speaker “Emerging Complement-Based Therapeutics”
188. American College of Rheumatology Annual Scientific Meeting; November 13, 2019; Atlanta, GA; Invited Symposium Speaker “Complement-Mediated Regulation of Rheumatoid Arthritis”
189. John P. Atkinson Endowed Lectureship; January 16, 2020; St. Louis, MO; Inaugural Speaker “Complement in Human Disease: Current and Emerging Therapeutic Opportunities”

190. American College of Rheumatology Winter Symposium: January 30, 2020; Snowmass, CO; Invited Speaker “Emerging Insights into the Molecular Origins, Preclinical Evolution and Prevention of Rheumatoid Arthritis”
191. American College of Rheumatology Winter Symposium: January 31, 2020; Snowmass, CO; Invited Speaker “Complement Therapeutics: New Strategies, Indications and Clinical Impact”
192. University of North Carolina Thurston Arthritis Research Center Visiting Professor: February 14, 2020; Invited Lecture “Emerging Insights into the Molecular Origins, Preclinical Evolution and Prevention of Rheumatoid Arthritis”
193. 13th Annual Perspectives in Rheumatic Disease; September 12, 2020; Virtual Conference; Invited Speaker “Predicting and Preventing Rheumatoid Arthritis: Is the Future Close?”
194. 12th International Forum on Rheumatoid Arthritis; September 18, 2020; Virtual Conference; Invited Speaker “Identification of Novel Therapeutic Targets in Preclinical Rheumatoid Arthritis”
195. American College of Rheumatology Annual Scientific Meeting; November 8, 2020; Virtual Conference; Invited Symposium Speaker “Transitioning from “RA Drugs” Today to Mechanism-Based Interventions Tomorrow”
196. University of Colorado Department of Medicine Research and Innovation Conference; December 10, 2020; Aurora, CO; Invited Seminar Speaker “Transitioning from “RA Drugs” Today to Mechanism-Based Interventions Tomorrow in Preclinical Rheumatoid Arthritis: A Team Science Approach”
197. GSK Research Seminar; December 11, 2020; Virtual Seminar; Invited Speaker “Complement Regulation of Rheumatoid Arthritis: From Preclinical Initiation to Clinical Disease Transitions”
198. University of Colorado Division of Rheumatology Research Seminar; December 15, 2020; Aurora, CO; Invited Speaker “Role of Complement in the Asymptomatic Preclinical Evolution of Autoimmunity and Subsequent Development of Clinically Apparent Joint Disease in Rheumatoid Arthritis”
199. University of Texas Austin Dell Medical School Internal Medicine Virtual Grand Rounds; January 13, 2021; Austin, TX; Invited Speaker “Complement Therapeutics: New Strategies, Indications, and Clinical Impact”
200. Asia Pacific League of Associations for Rheumatology (APLAR) Hybrid Congress 2021; August 28, 2021; Kyoto, Japan; Invited Plenary Speaker “Insights into Pathogenesis and Prevention from Studies of Systemic and Local Immune Dysregulation in Preclinical Rheumatoid Arthritis”
201. 13th International Conference on Complement Therapeutics; September 11, 2021; Ioannina, Greece; Invited Speaker “Biomarker Studies in Asymptomatic Preclinical Rheumatoid Arthritis Subjects and in Early Rheumatoid Arthritis Suggest Multiple Independent Pathogenic Roles for Complement Activation”
202. 13th International Forum on Rheumatoid Arthritis Virtual Conference; September 18, 2021; Invited Speaker “Causal Insights into Rheumatoid Arthritis from Studies of Innate and Adaptive Immune Dysregulation in At-Risk Individuals”
203. Hanson Wade 5th Annual Complement-based Drug Development Summit; October 27, 2021; Invited Speaker “Next-Gen Complement Therapeutics: Opportunities for Indication Expansion and Tissue Targeted Immunomodulation”
204. Hospital for Special Surgery Research Meeting Contemporary Topics in Inflammatory Arthritis Keynote Speaker; May 6, 2022; New York, NY; “Rheumatoid Arthritis and the Mucosal Origins Hypothesis: Insights into Pathogenesis, Prediction and Prevention”
205. American Association of Immunologists (AAI); May 7, 2022; Portland, OR; Invited Speaker “Stage- and Context-Dependent Roles of Complement in Rheumatoid Arthritis”

206. Perspectives in Rheumatology Meeting; September 8, 2022; Las Vegas NV; Invited Lecture "Complement Biology for the Clinician: The New Relevance"
207. 14th International Forum on Rheumatoid Arthritis Virtual Conference; September 16, 2022: Invited Speaker "Rheumatoid Arthritis and the Case for Causal Endotypes in the Preclinical Period"
208. Lupus 21st Century Meeting; September 22, 2022; Tucson AZ; Invited Lecture "Complement Therapeutics: Current Status and Evolving Relevance to Lupus"
209. St. Louis Rheumatology Association; November 30, 2022; St. Louis MO; Invited Lecture "Complement Therapeutics for the Rheumatologist, and Beyond"
210. Washington University School of Medicine Division of Rheumatology; December 1, 2022; Krock Invited Grand Rounds Speaker "Rheumatoid Arthritis and the Case for Causal Mucosal Endotypes in the Preclinical Period"
211. NIEHS (National Institute of Environmental Health Sciences); December 13, 2022; Durham NC; Distinguished Lectureship "The Environmental Drivers of Preclinical Rheumatoid Arthritis"
212. NYU Seminar in Advanced Rheumatology; March 16, 2023; New York City, NY; Weissmann Lectureship Keynote "Rheumatoid Arthritis and the Case for Causal Mucosal Endotypes in the Preclinical Period"
213. Advances in Targeted Therapies Meeting; March 24, 2023; Nice, France; Invited Speaker "The Case for Causal Mucosal Drivers in Individuals At-Risk for Rheumatoid Arthritis"
214. 15th International Conference on Complement Therapeutics; May 30, 2023; Chania, Greece; Invited Speaker "RNA Profiling and Protein Expression Studies in the Synovium of Patients with Rheumatoid Arthritis and Post-Traumatic Knee Injury Identify Causal Pathogenic Mechanisms for Complement Activation in Both Diseases"
215. EULAR 2024 Risk Factors for RA Study Group; June 2, 2023; Milan, Italy; Invited Speaker "Are There Distinct Mucosal Endotypes that Initiate and Drive Pre-RA Evolution"
216. Gates Summer Internship Program; August, 2023; Denver, CO; Keynote Speaker "Living in the 'Tidal Pool' at the Intersection of Academy Discovery Research and Patient Impact"
217. Centre for Experimental Medicine and Rheumatology, William Harvey Research Institute, Medicine and Rheumatology, Queen Mary University; August 30, 2023; London, UK; Invited Speaker "Preclinical Rheumatoid Arthritis: Biomarker, Omics and Mucosal Studies of At-Risk Individuals"
218. 15th International Forum on Rheumatoid Arthritis Virtual Conference; September 16, 2023; Invited Speaker "Reflections on the Evolving Therapeutic Landscape in Rheumatoid Arthritis Prevention"
219. Keystone Symposia on Systemic Autoimmune and Autoinflammatory Diseases; February 9, 2024; Breckenridge, CO; Invited Speaker "Preclinical Pathogenesis and Prevention of Rheumatoid Arthritis"
220. University of Massachusetts Chan Medical School Department of Medicine Grand Rounds; March 28, 2024; Worcester, MA; Invited Speaker "Emerging Opportunities in Rheumatoid Arthritis: The Study of At-Risk Individuals Informs the Pathway to Prevention"
221. University of Massachusetts Chan Medical School Division of Rheumatology Grand Rounds; March 29, 2024; Worcester, MA; Invited Speaker "Complement Therapeutics for the Rheumatologist, and Beyond"
222. UCSD/UCLA/Cedars Sinai MARC Virtual Seminar Series; April 4, 2024; Invited Speaker "Complement Therapeutics for the Rheumatologist and Beyond – With a Focus on Lupus"

223. Rheumatoid Arthritis Research Summit; April 12, 2024; New York, NY; Invited Speaker "Preclinical Rheumatoid Arthritis and Prevention: It's Time for "NextGen" Therapeutic Trials – But What Are the Right Targets?"
224. DOM REACH Program: Innovation and Entrepreneurship; May 21, 2024; Aurora, CO; Invited Speaker "The Long and Winding Road to Patient Impact"
225. Ninth Annual Colton Center Symposium: Advances in Autoimmunity; June 7, 2024; New York, NY; Keynote Speaker "The Search for Drivers and Therapeutic Targets in Pre-Rheumatoid Arthritis"
226. SPARK/REACH Educational Conference; June 26, 2024; Aurora, CO; Invited Speaker "Effective Management of Faculty and Trainee Conflict of Interest in Individual Commercialization Efforts: Overview, Case Studies and Discussion"
227. 26th Asia-Pacific League of Associations for Rheumatology Congress; August 23, 2024; Singapore; Invited Speaker "Basic Science Update for RA: Recent Insights into the Pathogenic Mechanisms in Disease Throughout Its Natural History"
228. CCTSI K12 Scholars Program; September 27, 2024; Aurora, CO; Invited Speaker "Information and Opportunities in Innovation, Intellectual Property Generation and Commercialization for the Early Career Academic"
229. 16th International Forum on Rheumatoid Arthritis; October 18, 2024; Bamberg, Germany; Invited Speaker "Lessons from Hydroxychloroquine in StopRA and Implications for Next Generation Prevention Strategies"
230. University of Iowa Idiopathic Pulmonary Fibrosis and Complement Conference; November 22, 2024; Iowa City, IA; Invited Speaker "Complement Therapeutics: Now and Into the Future"
231. Mayo College of Medicine and Science Frontiers in Immunity and Inflammation Virtual Seminar Series; December 9, 2024; Invited Speaker ""Complement Therapeutics for the Rheumatologist and Beyond"