BIOGRAPHICAL SKETCH

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NAME: FINN, M.G.

eRA COMMONS USER NAME (credential, e.g., agency login): mgfinn

POSITION TITLE: Professor, School of Chemistry & Biochemistry

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	COMPLETION DATE MM/YYYY	FIELD OF STUDY
California Inst. of Technology, Pasadena, CA	BS	06/1980	Chemistry
Massachusetts Inst. of Tech., Cambridge, MA	PHD	01/1986	Inorganic Chemistry

A. Personal Statement

My laboratory specializes in the creation of molecular, nanoparticle, and analytical tools for the generation and study of molecular function. Our current interests include the use of virus-like particles as immunogenic platforms for vaccine development, polyvalent reagents for cell targeting, and containers for multi-enzyme catalysis; the discovery and development of click reactions for organic and materials synthesis; advanced linker technologies in drug targeting; and the use of evolution for the discovery of chemical function. The present application continues collaborations with the New York Structure Biology Center on the structures of virus-like particle variants.

1. Polonskaya Z, Savage PB, Finn MG, Teyton L. High-affinity anti-glycan antibodies: challenges and strategies. Curr. Opin. Immunol. 2019; 59:65-71, PMC6774850.
2. Polonskaya Z, Deng S, Sarkar A, Kain L, Comellas-Aragones M, McKay CS, Kaczanowska K, Holt M, McBride R, Palomo V, Self KM, Taylor S, Irimia A, Mehta SR, Dan JM, Brigger M, Crotty S, Schoenberger SP, Paulson JC, Wilson IA, Savage PB, Finn MG, Teyton L. T cells control the generation of nanomolar-affinity anti-glycan antibodies. J Clin Invest. 2017;127:1491-1504, PMC5373877.
3. Zhao L, Kopylov M, Potter CS, Carragher B, Finn MG. Engineering the PP7 Virus Capsid as a Peptide Display Platform. ACS Nano, 2019; 13:4443-4454, PMC6991139.
4. Fiedler JD, Higginson C, Hovlid ML, Kislukhin AA, Castillejos A, Manzenrieder F, Campbell MG, Voss NR, Potter CS, Carragher B, Finn MG. Engineered Mutations Change the Structure and Stability of a Virus-Like Particle. Biomacromolecules, 2012; 13:2339-2348, PMC3432585.

B. Positions and Honors

Positions and Employment

1986 - 1988	NIH Postdoctoral Fellow, Stanford University, Stanford, CA
1988 - 1994	Assistant Professor of Chemistry, University of Virginia, Charlottesville, VA
1994 - 1998	Associate Professor of Chemistry, University of Virginia, Charlottesville, VA
1996 - 1997	University of Virginia Sesquicentennial Associate, sabbatical leave in the laboratories of Profs. R. A. Lerner and C.F. Barbas, III, The Scripps Research Institute, La Jolla, CA
1998 - 2008	Associate Professor, Dept. of Chemistry and The Skaggs Institute for Chemical Biology, The Scripps Research Institute, La Jolla, CA
2008 - 2013	Professor, Department of Chemistry and The Skaggs Institute for Chemical Biology, The Scripps Research Institute, La Jolla, CA
2013 -	Professor, School of Chemistry & Biochemistry, Georgia Institute of Technology, Atlanta, GA
2013 -	Professor, School of Biology, Georgia Institute of Technology, Atlanta, GA

Other Experience and Professional Memberships

2007 -	Editorial Board Member, Bioconjugate Chemistry
2007 - 2012	Chair, Graduate Admissions, The Scripps Research Institute
2008 - 2012	Academic Advisor for Chemical Biology, The Scripps Research Institute
2010 -	Editor-in-Chief, *ACS Combinatorial Science*
2013 -	Steering Committee, Georgia Tech ImmunoEngineering Center, Georgia Institute of Technology
2014 -	Chair, School of Chemistry & Biochemistry, Georgia Institute of Technology
2015 - 2016	Director, Center for Pediatric Nanomedicine, Georgia Institute of Technology
2016 -	Chief Scientific Officer, Children's Healthcare of Atlanta Pediatric Technology Center

Honors

1977	Caltech Eastman Kodak Scholar, California Institute of Technology
1986	NIH Postdoctoral Fellowship, Stanford University (J.P. Collman)
1992	Junior Faculty Research Award, American Cancer Society
1998	National Professor of the Year, Alpha Phi Foundation
2002	Interdisciplinary Science Award, David & Lucille Packard Foundation
2011	Outstanding Mentor Award, The Scripps Research Institute
2012	Humboldt Research Award, Alexander von Humboldt Foundation
2015	Children's Research Scholar, Children's Healthcare of Atlanta
2017	Arthur C. Cope Scholar Award, American Chemical Society
2017	James A. Carlos Family Chair for Pediatric Technology

C. Contribution to Science

1. Click chemistry bioconjugation. After helping to codify the concepts of "click chemistry," we have focused most intensively on the mechanism and use of the copper-catalyzed azide-alkyne cycloaddition reaction in bioconjugation and materials science, and on the development of highly reliable ligation reactions that also allow for controlled release.

    a. Geng Z, Finn MG, Thiabicyclononane-based Antimicrobial Polycations. J. Am. Chem. Soc. 2017; 139:15401-15406, PMID 29052422

    b. Sanhueza CA, Baksh MM, Thuma B, Roy MD, Dutta S, Préville C, Chrunyk BA, Beaumont K, Dullea R, Ammirati M, Liu S, Gebhard D, Finley JE, Salatto CT, King-Ahmad A, Stock I, Atkinson K, Reidich B, Lin W, Kumar R, Tu M, Menhaji-Klotz E, Price DA, Liras S, Finn MG, Mascitti V. Efficient Liver Targeting by Polyvalent Display of a Compact Ligand for the Asialoglycoprotein Receptor. J Am Chem Soc. 2017; 139(9):3528-3536. PMID: 28230359.

    c. Hong V, Presolski SI, Ma C, Finn MG. Analysis and optimization of copper-catalyzed azide-alkyne cycloaddition for bioconjugation. Angew Chem Int Ed Engl. 2009; 48(52):9879-9883. PMC3410708.

    d. Kolb HC, Finn MG, Sharpless KB. Click Chemistry: Diverse Chemical Function from a Few Good Reactions. Angew Chem Int Ed Engl. 2001; 40(11):2004-2021. PMID: 11433435.

2. Virus particles as molecular building blocks. We were the first to show that icosahedral virus particles can be modified in a rational and effective manner using the techniques of organic chemistry – in other words, that virions can be considered reasonable starting materials for chemical operations. This extends the techniques of organic chemistry to objects in the nanochemical size range, and allows us to bring varied and sophisticated functional molecules to the surface and interior of the virus structures. Furthermore, since viruses can be manipulated genetically, we have shown that the combination of molecular biology and chemistry provides powerful ways to tailor virus particles for desired applications. The most important of these applications involves the use of viruses to present functional groups in polyvalent patterns to cells and biological systems. Current applications are focused on immunology and cellular targeting and avoidance.

a. Fiedler JD, Fishman MR, Brown SD, Lau J, Finn MG. Multifunctional Enzyme Packaging and Catalysis in the Qβ Protein Nanoparticle. Biomacromolecules 2018; 19:3945-3957. PMID: 30160482.
b. Fiedler JD, Brown SD, Lau J, Finn MG. RNA-Directed Packaging of Enzymes within Virus-Like Particles. Angew. Chem. Int. Ed. 2010, 49:9648-9651, PMC3060796.
c. Kaltgrad E, Sen Gupta S, Punna S, Huang C-Y, Chang A, Wong C-H, Finn MG, Blixt O. Anti-Carbohydrate Antibodies Elicited by Polyvalent Display on a Viral Scaffold. ChemBioChem 2007, 8:1455-1462, PMID 17676704.
d. Wang Q, Lin T, Tang L, Johnson JE, Finn MG. Icosahedral virus particles as addressable nanoscale building blocks. Angew Chem Int Ed Engl. 2002, 41:459-462, PMID 12491378.

3. Controlled bond cleavage. We have pioneered the use of two small organic motifs for the reliable formation of connecting bonds and the control of their subsequent fragmentation under mild conditions. With the proper choice of motif and substitution pattern, we can reliably vary the rates of bond scission over a range of more than 10^6, allowing us to program disconnections at time frames from minutes to years. In addition to the fundamental physical organic chemistry of these reactions, we focus on applications to drug delivery from molecular and materials carriers.

a. Higginson CJ, Eno MR, Khan S, Cameron MD, Finn MG Albumin-Oxanorbornadiene Conjugates Formed ex Vivo for the Extended Circulation of Hydrophilic Cargo. ACS Chem. Biol. 2016, 11:2320-2327, PMC5523132.
b. Higginson CJ, Kim SY, Peláez-Fernández M, Fernández-Nieves A, Finn MG. Modular Degradable Hydrogels Based on Thiol-reactive Oxanorbornadiene Linkers. J. Am. Chem. Soc 2015, 137:4984-4987, PMC4415036.
c. Kislukhin AA, Higginson CJ, Hong VP, Finn MG. Degradable Conjugates from Oxanobornadiene Reagents. J. Am. Chem. Soc. 2012, 134:6491-6497, PMC3432588.
d. Geng Z, Garren M, Finn MG. Thiabicyclononane-based Hyperbranched Polycations for Low-Dose Oligonucleotide Delivery. Chem. Mater. 2018, 30:8164-8169.

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

NIH/NCI (R01CA247484) Thomas (PI) 04/01/2020–03/31/2025
Lymph node-targeted multistage chemoimmunotherapy for lymphoma
This program focuses on the delivery of immunomodulatory agents to draining lymph nodes with polymer nanoparticles equipped with programmable cleavable linkages. We aim to analyze the influence of sentinel lymph node drug targeting on the efficacy of lymphoma immunotherapy.
Role: Multi-PI Overlap: none

NIH/NIAID (1 R21AI152528) Finn (PI) 06/01/2020–05/31/2022
Strategies for generating high affinity antibodies against Gram negative bacteria
Multiple factors will be optimized in this program to elicit protective anti-carbohydrate immune response against pathogen-specific glycans of *Pseudomonas aeruginosa* and *Burkholderia cepacia*.
Role: PI Overlap: none

NIH/NIAID (1 R01AI148382) Melikian (PI) 11/1/2019–10/31/2024
Molecular Interactions of HIV-1 with the Nuclear Pore Complex
In this program, the Finn laboratory serves as synthetic chemistry support for the creation of probe reagents (fluorescent and heavy-element labeling reagents, small-molecule crosslinking agents) to explore the interactions of the HIV capsid with the nuclear pore complex, for the purpose of uncovering the molecular mechanisms by which the virus delivers its genomic cargo to infected cells.
Role: PI Overlap: none

Centers for Disease Control (75D30119P05589) Finn (PI) 08/29/2019 - 08/28/2020
Development of Anti-Pertussis Antibodies
This collaborative program with the CDC seeks to generate high-affinity antibodies to various protein and carbohydrate components of the *Bordatella pertussis* bacterium
Role: PI Overlap: none

Office of Naval Research N00014-19-S-F005 Ramprasad (PI) 05/01/2020-04/30/2022
Information Driven Design of Resilient and Depolymerizable Polymers
In this MURI program, we are part of a team developing high-performance materials that can be broken down and reformulated on demand.
Role: Project PI Overlap: none

NIH/NIAID (1 R01AI148740) Gumbart (PI) 05/06/2020–04/30/2025
Altering Hepatitis B Virus assembly through pharmacological intervention
In this program, we act as a purely synthetic chemistry laboratory, preparing variants of known and new small molecules to influence hepatitis B capsid assembly.
Role: co-PI

Pfizer Inc. Finn (PI) 11/15/2018-11/14/2020
DNA-Encoded Peptide Libraries for Endosomal Escape
In this program, we seek to discover novel molecules that promote the non-toxic translocation of molecular cargo from endosomes to the cytoplasm of mammalian cells. It is a collaboration with researchers at Pfizer and at The Scripps Research Institute in Jupiter, Florida.
Role: PI Overlap: none

NIH (1R01 AI139748) Teyton (PI) 09/01/2018 - 08/30/2022
Development of the Next Generation of Conjugate Vaccines
This program combines several design features based on virus-like particle presentation of antigens and molecular adjuvants to elicit high-affinity and high-specificity antibody responses to carbohydrates.
Role: Multi-PI Overlap: none

EM02529.EMRE TO-30, ExxonMobil Lively (PI) 09/16/2017 - 09/16/2020
Developing New Polymer and Carbon Materials with Scalable Membrane Morphologies for the Separation of Hydrocarbon Liquid Mixtures
This program seeks to develop new polymeric membranes using pre- and post-polymerization crosslinking and modifications that are amenable to hollow-fiber spinning and subsequent application to hydrocarbon separation by reverse and forward osmosis.
Role: Co-Investigator Overlap: none

EM02529.EMRE TO-33, ExxonMobil Lively (PI) 04/01/2018 - 08/31/2020
Developing Amine/Microporous Polymer Hybrid Sorbents Into Structured Contactors for CO_2 Recovery and Concentration from Dilute Sources
This program uses click chemistry methods to make new porous polymer materials for carbon dioxide absorption and release.
Role: Co-Investigator Overlap: none

HDTRA11810029, Heemstra (PI) 03/23/2018-03/22/2021
Synthetic AChE Function Using Organophosphate-Resistant Protein-nucleic Acid Conjugates
Here we aim to create catalytic protein nanoparticles containing modular substrate-binding, release, and hydrolytic components for the enhanced passivation of neurotoxins *in vivo.*
Role: Co-Investigator Overlap: none

Recent Completed Research Support
Centers for Disease Control (75D30118P03411) Finn (PI) 09/30/2018 - 09/29/2019
Development of Aptamers and Virus-like Particle Conjugates for Peptide Toxins

This collaborative program with the CDC targets the development of DNA aptamers for the selective and high-affinity recognition of peptide toxins of importance in environmental contamination.
Role: Co-Investigator Overlap: none

Centers for Disease Control (75D30118P03411) Finn (PI) 09/30/2018-09/29/2019
Virus-Like Particle Amanitin and Microcystin Conjugates and Microcystin-Specific Aptamers
Here we use techniques of molecular evolution (DNA SELEX and immune response) to develop high-affinity and selective binders of toxic environmental contaminants.
Role: PI Overlap: none

1727079, NSF Finn (PI) 03/15/17 - 08/31/18
Innovation Corps Team Program
This program funds customer discovery and business training to a team headed by a graduate student, in our case for the development of vaccines against neglected tropical diseases. Role: PI

1R01 GM101421, NIH/NIGMS Finn (PI) 08/01/16 - 07/31/18
Genetic and Chemically Programmed Nanoparticles for Prodrug Therapy
The selective conversion of safe “prodrugs” to highly toxic molecules in the vicinity of diseased cells is an exciting way to eradicate those cells while minimizing damage to healthy tissue in the body. The goal of this program is to develop nanoparticles stuffed with prodrug-activating enzymes that can be efficiently targeted to cancer cells, as a new and practical way to realize the promise of this therapeutic approach. Role: PI

Merck, Sharpe & Dohme Finn (PI) 04/01/16-03/31/18
Immunology and Chemical Biology
A new method for stimulating the immune response to protein-based vaccines will be tested, along with various synthetic strategies for the construction of multicomponent functional nanostructures useful in cell targeting and delivery. Role: PI

EM02529.EMRE TO-18, ExxonMobil Lively (PI) 09/01/14 - 09/20/17
Hydrocarbon Reverse Osmosis
This project will develop novel materials for the purification of hydrocarbon mixtures by reverse osmosis. Role: Co-Investigator

P50 GM103368, NIH/NIGMS Olson (PI) 09/01/14 - 08/31/17
HIV Macromolecular Interactions and Impact on Viral Evolution of Drug Resistance
This program seeks to develop structural insights into the components of HIV that undergo change in response to drug therapy; our subcontract role is to provide compounds active against HIV protease and integrase in novel ways, and to analyze biomolecular interactions by backscattering interferometry. Role: Co-Investigator

1R21 AI119971-01, NIH/NIAID Havran (PI) 07/02/15 - 06/30/17
Mechanism-Based Wound Healing by Activation of gamma delta T Cells
Degradable hydrogels will be developed for the topical release of protein agonists of $\gamma\delta$ T cells, the major immune cell in the skin, to test the hypothesis that controlled activation of these cells will be a major aid to wound healing. Optimization of function will include the manipulation of protein derivatization site, hydrogel properties, and formulation. This is a collaborative project with Prof. Wendy Havran of Scripps. Role: Co-Investigator

BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Goldstein, Jason Marc	Team Lead, Immunodiagnostic Development Team, Reagent and Diagnostic Services Branch/Division of Scientific Resources/ NCEZID/CDC

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Elan Pharmaceuticals	Post-Doctoral	2001-2005	Neurobiology
University of Georgia	Ph.D.	1997-2001	Infectious Disease
University of Georgia	B.S.	1992-1996	Protein Biochemistry

A. Positions and Honors

Positions and Employment

1994 Howard Hughes Undergraduate Internship, University of Georgia, Athens, GA
1997-2001 Department of Biochemistry, University of Georgia, Athens, GA
2001-2003 Post-Doctoral Fellowship, Scientist, Elan Pharmaceuticals, South San Francisco,
2004-2006 Scientist, Elan Pharmaceuticals, South San Francisco, CA
2006-present Team Lead Immunodiagnostic Development Team/Reagent and Diagnostic Services Branch/ Division Scientific Resources/ NCEZID/CDC Atlanta, GA

Other Experience and Professional Memberships

2012-present SEASR (Southeastern Shared Resource Member for Core Facilities)/ABRF (Association Biomolecular Core Facilities)
2008 American Association of Medical Instrumentation
2007 -2008 American Society for Quality
2004-2008 Society for Neuroscience
1998-2000 American Society for Microbiology

Honors

2015 CDC & ATSDR Recognition Award for Excellence in Laboratory Research Laboratory
2015 NCEZID Recognition Award for Preparedness for Lyme Disease Through Improvements in Diagnostics
2000 Award from the Abteilung fur Klinishe Chemie und Klinische Biochemie to attend "19th Winter School on Proteinases and Their Inhibitors - Recent Developments" in Tiers, Italy.
1999 Travel Grant award from the American Society of Biochemistry and Molecular Biology to attend "ASBMB General Meeting" in San Francisco, CA
1998 American Society for Microbiology Sustaining Member Travel Grant to attend the 97th ASM General Meeting in Miami Beach, Fl.
1994 Howard Hughes Fellowship for Undergraduate Research at University of Georgia
1993-1996 Deans List, Franklin College of Arts and Sciences, University of Georgia
1996 Phi Beta Kappa, University of Georgia
1995 Presidential Scholar, University of Georgia

B. Work Experience

January 2006 – present
Reagent and Diagnostic Services Branch
Division of Scientific Resources
National Center for Emerging Zoonotic Infectious Diseases
Centers for Disease Control and Prevention, Atlanta, Ga

Protein Production and Analytical Team (2006-2008)
Protein Science Team (2008-2011)
Immunochemistry and Cellular Development Team (2012- 2015)
Immunodiagnostic Development Team (2016-present)

Production and development of reagents (protein and antibody) involved in bioterrorism preparedness and infectious disease. Acting Team Leader and Lead Scientist of a protein biochemistry laboratory dedicated to the production and analysis of antibodies, native proteins and recombinant proteins for various projects assisting CDC labs and Bioterrorism Preparedness Response Laboratory. Develops and manages technicians and most aspects of laboratory function. Implementation of GMP quality systems through close working relationship with QA Department. Production of select agents (biologicals) for inventories of the Laboratory Response Network within a BSL-3 laboratory. As Team Lead of the Immunodiagnostic Development Team (IDD) my Team provides critical reagents used in laboratory and clinical applications. We work closely with Subject Matter Experts (SMEs) to maintain, produce and develop cellular products from the BIOS catalogue. Our laboratories are stewards of numerous lines from proprietary repositories of mammalian cell lines and hybridomas. Immunochemistry skills were used to develop monoclonal antibodies (mAbs), recombinant proteins and native antigens for the immunodiagnostic needs by CDC Programs. These biologics are further characterized utilizing recent technologies and relevant platforms to meet technical challenges of sensitivity and specificity within assay development. The scientific needs of SMEs underscore our urgency to improve and expedite the delivery of these reagents and provide CDC Users with options inside the Agency. Using proven models and methodology from the biotechnology sector the IDD Team has served diagnostic needs of CDC Programs.
Supervisor: Dennis A. Bagarozzi, Jr. Ph.D. Branch Chief, Reagent and Diagnostic Services Branch

March 2004 – December 2005
Elan Pharmaceuticals, South San Francisco, Ca
Associate Scientist and Scientist II

Expression, purification and analysis of the human recombinant alpha IV beta I integrin for crystallization project in Cell Trafficking program. Isolation of gamma secretase complex (Alzheimer disease program) for efforts in high-throughput compound screening. Characterization of the synuclein transgenic mouse model and identification of modified forms of alpha-synuclein from Parkinsons's disease brain. Through biochemical, immune-histological and cellular techniques, a comprehensive analysis of this protein defined post-translational modifications that are relevant to neuropathology.
Supervisors: John Anderson, Ph.D. Principal Scientist, and Sukanto Sinha, Ph.D. Senior Research Fellow.

November 2001- March 2004
Elan Pharmaceuticals, South San Francisco, Ca,
Post-Doctoral Research Fellow

Characterization of a transgenic mouse model expressing human alpha-synuclein in which genetic and clinical data implicate this protein in the etiology of Parkinson's disease and related motor disorders. Through biochemical, immuno-histological and cellular techniques, a comprehensive analysis of this protein occurred to define post-translational modifications that are relevant to neuropathology. Parallel studies have included protein analysis of human brain and cellular models that mimic alpha-synuclein pathologies.
Advisors: Dale Schenk, Ph.D. Chief Scientific Officer, Elan and Tamie Chilcote, Ph.D. Principal Scientist, Elan.

January 1997 - October 2001
University of Georgia, Athens, Ga,
Graduate Student

Purified and characterized novel peptidases from *Streptococcus gordonii* and assessed their implications in bacterial endocarditis. Doctoral Thesis: "Three Novel Aminopeptidases from *Streptococcus gordonii*: Mechanisms for Extracellular Proteases in the Growth and Proliferation of Oral Streptococci". Advisor: Professor James Travis, Ph.D.

June 1994 - April 1996
University of Georgia, Athens, Ga,
Undergraduate Student

Characterized novel proteinases from *Solenopsis invicta* (imported fire ant) and evaluated there contribution to larval ant digestion. Mapped promoter elements associated with the alpha-1 anti-chymotrypsin gene in hepatocytes regulated by inflammatory and acute phase response cytokines. Advisor: Tomek Kordula, Ph.D.

C. Peer-Reviewed Publications

Development and characterization of mouse monoclonal antibodies against Zika virus non-structural glycoprotein 1 (NS1). **J.M. Goldstein**, J. Lee, X. Tang, L.H. Baker, T. Taha, A. Chida, and D.A. Bagarozzi Jr; (2018). **Antibodies** Manuscript in preparation.

Zeptomole per milliliter detection and quantification of edema factor in plasma by LC-MS/MS yields insights into toxemia and the progression of inhalation anthrax. R. C. Lins, A.E. Boyer Z. Kuklenyik, A.R. Woolfitt, **J. Goldstein**, A. R. Hoffmaster, M.Gallegos-Candela, C.E. Leysath, Z. Chen, J.O. Brumlow, C.P. Quinn, D.A. Bagarozzi Jr, S.H. Leppla and J. R. Barr.(2019) **Anal Bioanal Chem** (2019). doi.org/10.1007/s00216-019-01730-4

The molecular mechanism of induction of unfolded protein response by *Chlamydia*. Z.George, Y.Omosun, A. A. Azenabor, **J.Goldstein**, J. Partin, K.Joseph, D.Ellerson, Q.He, F.Eko, M.A. McDonald, M.Reed,P.Svoboda, O.Stuchlik, J.Pohl, E. Lutter, C.Bandea, C. M. Black, J.U. Igietseme, (2019) **Biochemical and Biophysical Research Communications***.* Volume 508, Issue 2, 8 January 2019, Pages 421-429. doi.org/10.1016/j.bbrc.2018.11.034

Molecular Pathogenesis of *Chlamydia* Disease Complications: Epithelial-Mesenchyme Transition and Fibrosis. Joseph U. Igietseme, Yusuf Omosun, Tamas Nagy, Olga Stuchlik, Qing He, James Partin, Kahaliah Joseph, Debra Ellerson, Zenas George, **Jason Goldstein**, Francis O. Eko, Claudiu Bandea, Jan Pohl and Carolyn M. Black (2018). **Infection and Immunity** Vol. 86 no. 1 e00585-17

Novel Graphene-Based Biosensor for Early Detection of Zika Virus Infection. Savannah Afsahi, Mitchell B. Lerner, **Jason M. Goldstein**, Joo Lee, Xiaoling Tang, Dennis A. Bagarozzi, Deng Pan, Lauren Locascio, Amy Walker, Francie Barron, Brett R. Goldsmith (2017). **Biosensors and Bioelectronic** 100, 85-88. doi:10.1016/j.bios.2017.08.051

Phage Display Analysis of Monoclonal Antibody Binding to Anthrax Toxin Lethal Factor**. J. M. Goldstein** , Joo Lee , Xiaoling Tang, Anne E. Boyer, John R. Barr, Dennis A. Bagarozzi Jr. and Conrad P. Quinn Toxins (2017). **Toxins** 9, 221; doi:10.3390/toxins9070221

The salt-sensitive structure and zinc inhibition of *Borrelia burgdorferi* protease BbHtrA. Russell, T. M., Tang, X., **Goldstein, J. M**., Bagarozzi, D. and Johnson, B. J. B. (2015). **Molecular Microbiology**. doi:10.1111/mmi.13251

In vitro growth, cytopathic effects and clearance of monolayers by clinical isolates of *Balamuthia mandrillaris* in human and cell cultures. Yera H, Dupouy-Camet J, Jackson JW, Sriram R, Sweat S[4], **Goldstein JM**, Visvesvara GS. (2015). **Exp Parasitol**. Sep.156: 61-7.

Identification of a Monkeypox virus specific epitope and investigation into its role in heparin binding
L Hughes, **J Goldstein**, J Pohl, JW Hooper, RL Pitts, M Townsend, D Bagarozzi Jr, I Damon, KL Karem (2014). **Virology.** Sept Vol. 464-465: 264-273.

Detection of Anthrax Protective Antigen (PA) using Europium Labeled anti-PA Monoclonal Antibody and Time Resolved Fluorescence. Robyn A. Stoddard [*], Conrad P. Quinn, Jarad M. Schiffer, Anne E. Boyer, **Jason Goldstein**, Dennis Bagarozzi Jr , Stephen D. Soroka, Leslie A. Dauphin, and Alex R. Hoffmaster (2014). **J Immunol Methods** May 22; 408: 78-88.

Prevention of Chlamydia-induced infertility by inhibition of local caspase activity. Joseph U. Igietseme; Yusuf Omosun; James Partin; **Jason Goldstein**; Qing He; Kahaliah Joseph; Debra Ellerson; Uzma Ansari; Francis O. Eko; Claudiu Bandea; Guangming Zhong; Carolyn M. Black (2013). **Journal of Infectious Diseases** Apr; 207(7):1095-104

Conserved C-terminal Charge Exerts a Profound Influence on the Aggregation Rate of Alpha Synuclein.
Katerina Levitan, David Chereau, Samuel I Cohen; Tuomas P Knowles, Christopher M Dobson, Anthony L Fink, PhD; John P Anderson, **Jason M Goldstein,** Glenn L Millhauser (2011) **J Mol. Biol**. Aug 12;411(2):329-33.

Polo-like Kinase 2 (PLK2) Phosphorylates α-Synuclein at Serine 129 in Central Nervous System. Kelly J. Inglis, David Chereau, Elizabeth F. Brigham, San-San Chiou, Susanne Schöbel, Normand L. Frigon, Mei Yu, Russell J. Caccavello, Seth Nelson, Ruth Motter, Sarah Wright, David Chian, Pamela Santiago, Ferdie Soriano, Carla Ramos, Kyle Powell, **Jason M. Goldstein**, Michael Babcock, Ted Yednock, Frederique Bard, Guriqbal S. Basi, Hing Sham, Tamie J. Chilcote, Lisa McConlogue, Irene Griswold-Prenner, and John P. Anderson (2009). **J Biol Chem.** January 30; 284(5): 2598–2602.

Red blood cells are the major source of alpha-synuclein in blood. Robin Barbour, Kristin Kling, John Anderson, Kelly Banducci, Tracy Cole, Linnea Diep, Michael Fox, **Jason M. Goldstein**, Ferdie Soriano, Peter Seubert, and Tamie J. Chilcote (2008). **Neurodegenerative Diseases** 5(2):55-59

Phosphorylation of Ser 129 is the dominant pathological modification of a-synuclein in familial and idiopathic Lewy body disease. John P. Anderson, Donald E. Walker, **Jason M. Goldstein**, Rian de Laat, Kelly Banducci, Russell J. Caccavello, Robin Barbour, Jiping Huang, Kristin Kling, Michael Lee, Linnea Diep, Michael Schlossmacher, Xiaofeng Shen, Tim Chataway, Peter Seubert, Dale Schenk, Sukanto Sinha, Wei Ping Gai and Tamie J. Chilcote (2006).
J. Biol. Chem., Vol. 281, Issue 40, 29739-29752.

Effects of α-Synuclein Immunization in a Mouse Model of Parkinson's Disease. Eliezer Masliah, Edward Rockenstein, Anthony Adame, Michael Alford, Leslie Crews, Makoto Hashimoto, Peter Seubert, Michael Lee, **Jason Goldstein**, Tamie Chilcote, Dora Games, and Dale Schenk (2005). **Neuron** 46: 857-868.

Purification and Characterization of a Novel Extracellular Di/Tri-peptidase (PepV) from *Streptococcus gordonii* FSS2. **Goldstein, J.M.,** Kordula, T., Moon, J.L. Mayo, J. and Travis, J (2005). **Infection and Immunity**; 73(2): 1256-1259.

Purification and Characterization of an Extracellular Arginine Aminopeptidase (RAP) from *Streptococcus gordonii* FSS2. **Goldstein, J.M**., Nelson, D., Kordula, T., Mayo, J. and Travis, J (2002). **Infection and Immunity**. 70(1):836-843.

A Novel Extracellular X-Prolyl Dipeptidyl-Peptidase from *Streptococcus gordonii* FSS2: An Emerging Subfamily of Viridans Streptococcal x-Pro DPPs. **Goldstein, J.M**., Banbula, A, Kordula, T., Mayo, J. and Travis, J. (2001). **Infection and Immunity**. 69(1):5494-5501.

pH Regulated Secretion of a Glyceraldehyde-3-Phosphate Dehydrogenase from *Streptococcus gordonii* FSS2: Purification, Characterization and Cloning of the Gene Encoding this Enzyme. Nelson, D., **Goldstein, J.M.,** Boatright, K., Harty, D.W.S., Cook, S.L., Hickman, P.J., Potempa, J., Travis, J., & Mayo, J.A (2001) **J. Dent. Res.** 80(1):371-377.

Emerging Family of Proline-Specific Peptidases of *Porphyromonas gingivalis*: Purification and Characterization of Serine Dipeptidyl Peptidase, a Structural and Functional Homologue of Mammalian Prolyl Dipeptidyl Peptidase IV. Banbula, A., Bugno, M., **Goldstein, J**., Yen, J., Nelson, D., Travis, J., & Potempa, J. (2000) **Infection and Immunity.** 68: 1176-1182.

Activation of Signal Transducer and Activator of Transcription-3 (STAT3) Expression by Interferon-g and Interleukin-6 in Hepatoma Cells; Kordula, T., Bugno, M., **Goldstein, J**. & Travis, J. (1995) **Biochem.Biophys.Res.Comm**. 216(3): 999-1005.

D. Patents

REGULATING BACILLUS ANTHRACIS LETHAL FACTOR ACTIVITY VIA AN ACTIVATING EPITOPE REGION
US Patent Issued No. 9,845,349 on December 19. 2017

COMPOSITIONS AND METHODS FOR THE DIAGNOSIS AND TREATMENT OF ZIKA VIRUS INFECTION PROVISIONAL FILING FOR NIH REF. NO. E-030-2017/0-US-01; SR REF. 6137CDC-2-PROV

PROVISIONAL APPLICATION FOR MABS TO ZIKV NS-1 PROTEIN; SR-BIO.0132-17 FOR E-030-2017/0-US-01

ALPHA-SYNUCLEIN KINASE; US Patent Issued No. US8148089 B2; April 3, 2012

TRUNCATED FRAGMENTS ALPHA-SYNUCLEIN IN LEWY BODY DISEASE; US Patent Issued No. 7306945 B2; Dec 11, 2017

E. Oral Presentations

"Development of Monoclonal Antibodies Specific for Zika Virus NS1 (Non-Structural Glycoprotein and Envelope Proteins", Zika Virus Diagnostic Meeting, April 14, 2017

"ZIKV Antibody Discovery and a diagnostic development from the ZIKV emergency", November 2016 NCEZID Science Summit Talk

Memorial Day 2016 Senator Roy Blunt (R-MO) with Director Frieden and NCEZID Leadership (Dr. Bell, Dr. Kuhnert) discussing the role of RDSB in the ZIKV Response and future direction of RDSB in terms of immunoassay development for ZIKV antigen detection.

"Next Generation Hybridoma Developments", DSR Governance Board, May 2014

"Technologies for a New Generation of Immunodiagnostics", NCEZID Science Forum Seminar, July 2012

"Development and Production of Biological Reagents in a Quality System", NCPDCID Science Forum, March 2009

F. Posters

"Novel Immunological Assays for Detection of Zika Virus Non-Structural Glycoprotein 1 (NS1)" CDC Laboratory Science Symposium-Atlanta, January 23, 2018

"Novel Immunological Assays for Detection of Zika Virus Non-Structural Glycoprotein 1 (NS1)"NCEZID Science Summit, December 7, 2017

"Development of a Portable and Sensitive Label Free Assay Platform for Infectious Disease Testing" Sixth Global Health Laboratory Forum for Innovative Technologies to Advance Laboratory Science, October 12, 2017

"Development of ZIKV NS1 Novel Monoclonal Antibodies" Protein Engineering Summit CHI Boston, May 1, 2017.

November 2016 NCEZID Science Summit:
"Development and characterization of mouse monoclonal antibodies against Zika virus non-structural GP 1 (NS1)"
"Novel immunological assays for detection of Zika virus non-structural glycoprotein 1 (NS1)"
"Immunofluorescence and Immunohistochemical Studies of Zika Virus Targeting Non-structural Glycoprotein 1 (NS1)"
"Comparison of Zika virus inactivation methods for reagent production"

"Enhanced Hybridoma Development using ClonePix FL and Forte Bio Technology", NCEZID Science Summit 2013

"Monoclonal Abs anti-LF AVR1674/1675 Map to the L2 Domain of Anthrax Lethal Factor Enhancing Activity and FcR Mediated Cytotoxicity *In Vitro",* NCEZID Science Summit 2013

"Monoclonal Abs anti-EF 3C4 Map to the Catalytic Domain of Anthrax Edema Factor and Inhibit Adenylate Cyclase Activity", NCEZID Science Summit 2013

"Prevention of chlamydial-induced infertility by inhibition of local caspase activity" *7th Meeting of the European Society for Chlamydia Research in Amsterdam*, July 1-6th, 2012.

"Characterization of a Monoclonal Antibody Specific to Monkeypox Ortholog of A27L Entry Protein: Specificity is Conferred by a Single Amino Acid Difference Within the Heparin Binding Site" *ICAAC (international conference on antimicrobial agents and infectious diseases in San Francisco*, September 9-12, 2012.

"Zeptomolar Quantification of Anthrax Edema Factor by LC ESI-MS/MS- adenylate cyclase activity enhancement by monoclonal antibodies" *10th ASM Biodefense and Emerging Diseases in Washington DC*, February 26-29, 2012.

"High Affinity Peptides to *Bacillus anthracis* Lethal Factor mAb by Phage Display Selection", NCEZID Scientific Symposium at CDC Atlanta, October 1, 2012.

"Epitope Mapping of *B. anthracis* PA by High Affinity Peptide Phage Display" at the Georgia Research Alliance Roundtable, April 2011

"Quality Assurance services and technologies available from the Branch and Protein Science Team to CDC labs and GRA laboratories." Georgia Research Alliance CDC Roundtable, February 2010

"Development and Production of Protein Reagents for Infectious Disease Research and Diagnostics", LRN Annual Meeting, Orlando FL; March 2008

G. Technical Skills:

Protein Chemistry:

- Protein purification, characterization, and enzymology
- High performance liquid chromatography- derivatization of amino acids, proteolytic cleavage specificity, peptide mapping, internal sequence determination, and kinetic constant determination

•Liquid chromatography techniques including hydrophobic, affinity, ion-exchange, isoelectric focusing, size exclusion, affinity-tagged and immune-affinity chromatography
•Routine analysis with AKTA Explorer, AKTA FPLC, AKTA Prime and Agilent HPLC systems
•Label-free protein interaction analysis (BLI and SPR)
•Phage display technology for elucidation of linear peptides for mAb epitope mapping

Analytical:
•1-D SDS-PAGE Electrophoresis - native, gradient, peptide, sequencing and zymography, preparative, and electroelution
•2-D PAGE Electrophoresis - Criterion and DALT (large format) systems. Proteomic and immunochemical analyses
•Enzymatic assays: chromogenic, fluorogenic and protein substrate and inhibitor kinetic determination. Scanning densitometry and computer aided quantitation.
•Amino acid and protein sequence analysis. Development of novel two-enzyme assays to detect aminopeptidase activities. Subcellular localization: density gradient analysis of synaptic vesicle and endosomes
•Sequential protein extractions: development of salt and detergent buffer systems for analysis of proteins from healthy and Parkinson's disease brains

LC-MS:
•Mass Spectroscopy on peptides and proteins (MALDI-TOF)
•Nanospray in-line and direct infusion HPLC-MS and MS-MS

Immunological:
•ELISA for quantification and binding studies
•Immunoblotting and immunoprecipitation experiments
•Epitope mapping and Ab characterization, RIA and competition assays
•Immunohistochemical analysis (IF) of transgenic mouse brain
•Hybridoma fusion, selection and screening for novel mAb clones
•RT-PCR Sequencing of Ig CDR genes and analysis for hypervariable residues in contribution to epitope binding

Microbiological:
•Growth, storage, and maintenance of aerobic and facultative anaerobic bacterial strains in liquid and solid media
•Fermentation cultures (batch and pH controlled conditions)
•Respirator training and routine culturing of *Brucella* spp. in a select agent BSL-3

Molecular Biology:
•Experience in several standard molecular techniques including DNA isolation, recombinant protein expression transformations, sequencing, PCR and Southern blotting

H. Managerial Experience

Management of 7 Biologists (Title 5 and Title 42) in the DSR/RDSB/Team (ICD/SPSB/DSR) (4/2012-current)

Management of three Research Assistants and programs within the Protein Production and Analytical Team of the PAC Laboratories (DSR OD/NCPDCID/CCID and BB/DSR/NCEZID) (6/2006-3/2012)

Supervisor of Senior Research Associate at Elan (2004-2005)

Teaching: Directed research for six undergraduate students from 1998 to 2001
Instructor for sections of undergraduate skills lab (BCH 4030/6030) during the 2000-2001 term