

Damian C. Ekiert

www.bhabhaekiertlab.org

NYU School of Medicine

Departments of Cell Biology and Microbiology

450 E. 29th St, Rm 903, New York, NY 10016

damian.ekiert@ekiertlab.org / (415) 823-0058

EDUCATION

The Scripps Research Institute, La Jolla, CA

Ph.D., Chemical and Biological Sciences, 2006-2011

Thesis: Structural Basis of Influenza Virus Inhibition by Broadly Neutralizing Antibodies

Mentor: Ian A. Wilson

University of Chicago, Chicago, IL

B.A., Biology, 2005

PROFESSIONAL POSITIONS

Associate Professor: 2022 – present

New York University School of Medicine, New York, NY

Departments of Cell Biology and Microbiology

Assistant Professor: 2017 – 2022

New York University School of Medicine, New York, NY

Departments of Cell Biology and Microbiology

Post-Doctoral Fellow: 2012 – 2016

University of California – San Francisco, San Francisco, CA

Mentors: Jeffery Cox and Ron Vale

LEADERSHIP AND SERVICE

- BioRxiv Affiliate (Screening ~400 manuscripts/year; 2020-present)
- Acting Director, X-ray Crystallography Shared Instrumentation Lab (2019-present)
- NYU Vilcek PhD Program Admissions Committee (2019-present)
- PhD Applicant Review Committee, Microbiology and Immunology PhD Training Program (2018-present)
- PhD Applicant Review Committee, Biochemistry and Molecular Biophysics PhD Training Program (2017-present)
- Organizer, Biochemistry and Molecular Biophysics WIP Seminar Series (2018-2022)
- Session co-organizer, American Society for Cell Biology (2021)
- Chair/Member 7 PhD Student Thesis Committees
- Ad-hoc Reviewer, University of Birmingham, UK, faculty promotion review (2021)
- Ad-hoc Reviewer, Biotechnology and Biological Sciences Research Council, UK, grant review (2018)
- Ad-hoc Reviewer, National Medical Research Council, Ministry of Health, Singapore, grant review (2018)

- Ad-hoc Reviewer, Netherlands Organisation for Scientific Research, grant review (2018)

TEACHING AND OUTREACH

- *NYU-Science Immersion Program* (research exposure and mentoring program for community college students from under-represented backgrounds; Co-founder and organizer; 2020-present)
- *Peer Review in the Life Sciences* (Co-director and Instructor; Spring 2023, 2021, 2022)
- *Fundamentals of Microbiology* (Instructor; Spring 2023, 2021)
- *Molecular Virology* (Instructor; Spring 2022, 2020)
- *Grant Writing for Scientists* (Instructor; Spring 2022, 2019, 2018)
- *Single particle Cryo EM course*, National Center for Cryo EM Access and Training, NCCAT (Instructor; Spring 2023, 2022, 2021, 2020, 2019)
- *Biochemical and Biophysical Methods*, Rockefeller University (Instructor; 2021)
- *Scientific Integrity and Responsible Conduct in Research* (Discussion Leader, Fall 2022, 2021, 2020, 2019)
- *Independent study in Microbiology* (Spring 2020)
- *Molecular Mechanisms in Biology* (Instructor; Fall 2019, 2018)
- *Tutorial in Cell Biology* (Spring 2017)

HONORS AND AWARDS

2017	Whitehead Fellowship, New York University
2014	Influenza Award for Young Scientists (10,000 €, European Scientific Working Group on Influenza)
2012	Rosalind Franklin Young Investigator Award Argonne National Laboratory, Advanced Photon Source

FUNDING

NIGMS R35 MIRA	2018 - 2023
Open Philanthropy Project	2019 - 2022
Colton Center for Autoimmunity	2018 - 2021
Whitehead Fellowship	2017 - 2018
Damon Runyon Post-doctoral Fellow	2012 - 2016
Fellow, TSRI Molecular Evolution Training Program	2009 - 2011
Fellow, ARCS Foundation	2008 - 2011
Fellow, J.M. Rubin Foundation	2001 - 2005

PRESENTATIONS

2022

- American Crystallographic Association Annual Meeting, Portland OR
- ACSB/EMBO Meeting, Washington, DC
- Flatiron Institute, New York, NY
- University of Toronto, Toronto, Canada

2021

- Max Planck Institute for Infection Biology, Berlin, Germany
- University of Graz, Graz, Austria
- University of Connecticut, Storrs, CT
- Pace University, New York, NY

2020

- University of California, San Francisco, CA, USA
- American Crystallographic Association Annual Meeting
- Keystone Symposia on Tuberculosis: Science Aimed at Ending the Epidemic

2019

- Keystone Symposium on Tuberculosis: Mechanisms, Pathogenesis and Treatment, Banff, Canada
- GRC Mechanisms of Membrane Transport, New London, NH
- ACSB/EMBO Meeting, Washington, DC

2018

- Goethe-Universität Frankfurt, Frankfurt, Germany
- City College of New York / Advanced Science Research Center, New York, NY, USA
- Bacterial Cell Surfaces Gordon Conference, Mt Snow, VT, USA
- Structural biology symposium, National Tsing Hua University, Taiwan
- 23rd Biophysics Conference, Taiching, Taiwan
- 6th annual OU Symposium on Structural Biology, Norman, OK, USA

2017

- Mount Sinai School of Medicine, New York, NY, USA
- University of Birmingham, Birmingham, UK

Pre-2017

- American Society for Cell Biology Annual Meeting, San Francisco, CA, USA
 - Department of Cell Biology, University of California, Davis, CA, USA
 - Weill-Cornell School of Medicine, New York, NY, USA
 - Columbia University College of Physicians and Surgeons, New York, NY, USA
 - NYU School of Medicine, New York, NY, USA
 - Broad Institute & Massachusetts Institute of Technology, Cambridge, MA, USA
 - Harvard University, Cambridge, MA, USA
 - Bay Area Microbial Pathogenesis Symposium, San Francisco, CA, USA
 - European Scientific Working Group on Influenza Conference, Riga, Latvia
 - Annual Meeting of the Biophysical Society, San Francisco, CA, USA
 - Bay Area Microbial Pathogenesis Symposium, San Francisco, CA, USA
 - Crucell (now part of Johnson & Johnson), Leiden, The Netherlands
 - European Symposium of the Protein Society, Stockholm, Sweden
 - 2nd International Young Researcher Seminar in Zoonosis Control, Hokkaido University, Sapporo, Japan
 - Annual Symposium of the Protein Society, San Diego, CA, USA
 - Antibody Engineering at the Annual Meeting of the Antibody Society, San Diego, CA, USA
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PUBLICATIONS

* These authors contributed equally to this work.

‡ Corresponding author

1. Bermeo S, Favor A, Chang YT, Norris A, Boyken SE, Hsia Y, Haddox HK, Xu C, Brunette TJ, Wysocki V, Bhabha G, **Ekiert DC**, Baker D[‡]. *De novo* design of obligate ABC heterotrimeric proteins. Under review. (2022).
2. Edman NI, Redler RL, Phal A, Schlichthaerle T, Srivatsan SR, Etemadi A, An S, Favor A, Ehnes D, Li Z, Praetorius F, Gordon M, Yang W, Coventry B, Hicks DR, Cao L, Bethel N, Heine P, Murray A, Gerben S, Carter L, Miranda M, Negahdari B, Lee S, Trapnell C, **Ekiert DC**, Schlessinger J, Shendure J, Bhabha G, Ruohola-Baker H, Baker D[‡]. FGF receptor activation using designed cyclic oligomeric assemblies. Under review. (2022).
3. Wu K, Bai H, Chang YT, Redler R, Sheffler W, Brunette TJ, Hicks DR, McNally K, Broerman A, Goresnik I, DeWitt M, Chow CM, Shen Y, Stewart L, Derivery E, Silva DA, Bhabha G, **Ekiert DC**, Baker D[‡]. *De novo* design of modular peptide binding proteins by superhelical matching Under review. (2022).
4. Gang SS, Grover M, Reddy KC, Raman D, Chang YT, **Ekiert DC**, Barkoulas M, Troemel ER[‡]. A pals-25 gain-of-function allele triggers systemic resistance against natural pathogens of *C. elegans*. **P**Under review. (2022).
5. Murareanu BM, Antao NV, Zhao W, Dubuffet A, El Alaoui H, Knox J, **Ekiert DC**, Bhabha G, Roy PJ; Reinke AW[‡]. High-throughput small molecule screen identifies inhibitors of microsporidia invasion and proliferation in *C. elegans*. **Nat Commun**. In press. (2022).
6. Giacometti SI, MacRae MR, Dancel-Manning K, Bhabha G[‡], **Ekiert DC**[‡]. Lipid transport across bacterial membranes. **Annu Rev Cell Dev Biol**. Epub ahead of print. (2022). PMID: 35850151.
7. **Ekiert DC**[‡], Coudray N, Bhabha G. Structure and mechanism of the bacterial lipid ABC transporter, MlaFEDB. **Curr Opin Struct Biol**. 76:102429. (2022).
8. Jaroenlak P, Usmani M, **Ekiert DC**[‡], Bhabha G[‡]. "Mechanics of Microsporidian Polar Tube Firing". Chapter in: *Microsporidia: Current Advances in Biology*. 2022;114:215-245. PMID: 35544005
9. Vieni C, Coudray N, Isom GL, Bhabha G[‡], **Ekiert DC**[‡]. Role of Ring6 in the function of the *E. coli* MCE protein LetB. **BioRxiv**. Oct 1 (2021). doi: 10.1101/2021.09.30.462657 **J Mol Biol**. 2022 Apr 15;434(7):167463. PMID: 35077766
10. Perelman SS, James DBA, Boguslawski KM, Nelson CW, Ilmain JK, Zwack EE, Prescott RA, Mohamed A, Tam K, Chan R, Narechania A, Pawline MB, Vozhilla N,

Moustafa AM, Kim SY, Dittmann M, **Ekiert DC**, Bhabha GB, Shopsin B, Planet PJ, Koralov SB, Torres VJ[‡]. Genetic variation of staphylococcal LukAB toxin determines receptor tropism.

Nature Microbiology. 6(6):731-745 (2021). PMID: 33875847.

11. Santarossa CC, Mickolajczyk K, Steinman JB, Urnavicius L, Chen N, Fukase Y, Hirata Y, Coudray N, **Ekiert DC**, Bhabha G[‡], Kapoor TM[‡]. Targeting Allostery in the Dynein Motor Domain with Small Molecule Inhibitors.
BioRxiv. Sept 22 (2020). doi: 10.1101/2020.09.22.308700.
Cell Chemical Biology. S2451-9456(21)00217-8 (2021). PMID: 34015309.
12. Hsia Y*, Mout R*, Sheffler W, Edman NI, Vulovic I, Park YJ, Redler RL, Bick MJ, Bera AK, Courbet A, Kang A, Brunette TJ, Nattermann U, Tsai E, Saleem A, Chow CM, **Ekiert DC**, Bhabha G, Veessler D, Baker D[‡]. Hierarchical design of multi-scale protein complexes by combinatorial assembly of oligomeric helical bundle and repeat protein building blocks.
BioRxiv. July 27 (2020). doi: 10.1101/2020.07.27.221333.
Nature Communications. 12(1):2294 (2021). PMID: 33863889.
13. Thomas C, Aller SG, Beis K, Carpenter EP, Chang G, Chen L, Dassa E, Dean M, Duong Van Hoa F, **Ekiert D**, Ford R, Gaudet R, Gong X, Hamdoun A, Holland IB, Huang Y, Kahne DK, Kato H, Koronakis V, Koth CM, Lee Y, Lewinson O, Lill R, Martinoia E, Murakami S, Pinkett HW, Poolman B, Rosenbaum D, Sarkadi B, Schmitt L, Schneider E, Shi Y, Shyng S, Slotboom DJ, Tajkhorshid E, Tieleman DP, Ueda K, Váradi A, Wen P, Yan N, Zhang P, Zheng H, Zimmer J, Tampé R[‡].
Structural and functional diversity calls for a new classification of ABC transporters.
FEBS Letters. 594:3767-3775 (2020). PMID: 32978974
14. Coudray N*, Isom GL*, MacRae MR*, Saiduddin MN, Bhabha G[‡], **Ekiert DC**[‡]. Structure of bacterial phospholipid transporter MlaFEDB with substrate bound.
BioRxiv. June 2 (2020). doi: 10.1101/2020.06.02.129247.
eLife. 9:e62518 (2020). PMID: 33236984
15. Kolich L*, Chang Y*, Coudray N*, Giacometti SI, MacRae MR, Isom GL, Teran EM, Bhabha G, **Ekiert DC**[‡]. Structure of MlaFB uncovers novel mechanisms of ABC transporter regulation.
BioRxiv. April 28 (2020). doi: 10.1101/2020.04.27.064196.
eLife. 9:e60030 (2020). PMID: 32602838
16. Jaroenlak P, Cammer M, Davydov A, Sall J, Usmani M, Liang F, **Ekiert DC**[‡], Bhabha G[‡]. 3-dimensional organization and dynamics of the Microsporidian polar tube invasion machinery.
BioRxiv. April 4 (2020). doi: 10.1101/2020.04.03.024240.
PLoS Pathogens. 16(9):e1008738 (2020). PMID: 32946515
17. Fichtner ML*, Vieni C*, Redler RL, Kolich L, Jiang R, Takata K, Stathopoulos P, Suarez P, Nowak RJ, Burden SJ, **Ekiert DC**[‡], O'Connor SC[‡]. Self-antigen driven affinity maturation is required for pathogenic monovalent IgG4 autoantibody development.
BioRxiv. March 15 (2020). doi: 10.1101/2020.03.14.988758.
J Ex Med. 217(12):e20200513 (2020). PMID: 32820331
18. Isom GL, Coudray N, MacRae MR, McManus CT, **Ekiert DC**[‡], Bhabha G[‡]. LetB

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BioRxiv. August 28 (2019). doi: 10.1101/748145.

Cell. 181:653–664 (2020). PMID: 32359438

19. † **Ekiert DC***, Bhabha G*, Isom GL, Greenan G, Ovchinnikov S, Henderson IR, Cox JS, Vale RD. Architectures of lipid transport systems for the bacterial outer membrane. *BioRxiv*. July 18 (2016). doi: 110.1101/064360.
Cell. 169(2):273-285 (2017). PMID: 28388411
20. Brunette TJ, Parmeggiani F, Huang PS, Bhabha G, **Ekiert DC**, Tsutakawa SE, Hura GL, Tainer JA, Baker D. Exploring the repeat protein universe through computational protein design.
Nature. 528(7583):580-4 (2015). PMID: 26675729
21. † **Ekiert DC**, Cox JS. Structure of a PE-PPE-EspG complex from *Mycobacterium tuberculosis* reveals molecular specificity of ESX protein secretion.
Proc Natl Acad Sci U S A. 111(41):14758-63 (2014). PMID: 25275011
22. Liu Y, Zhang X, Tan YL, Bhabha G, **Ekiert DC**, Kipnis Y, Bjelic S, Baker D, Kelly JW. De novo-designed enzymes as small-molecule-regulated fluorescence imaging tags and fluorescent reporters.
J Am Chem Soc. 136(38):13102-5 (2014). PMID: 25209927
23. Liu Y, Tan YL, Zhang X, Bhabha G, **Ekiert DC**, Genereux JC, Cho Y, Kipnis Y, Bjelic S, Baker D, Kelly JW. Small molecule probes to quantify the functional fraction of a specific protein in a cell with minimal folding equilibrium shifts.
Proc Natl Acad Sci U S A. 111(12):4449-54 (2014). PMID: 24591605
24. Friesen RH, Lee PS, Stoop EJ, Hoffman RM, **Ekiert DC**, Bhabha G, Yu W, Juraszek J, Koudstaal W, Jongeneelen M, Korse HJ, Ophorst C, Brinkman-van der Linden EC, Throsby M, Kwakkenbos MJ, Bakker AQ, Beaumont T, Spits H, Kwaks T, Vogels R, Ward AB, Goudsmit J, Wilson IA. A common solution to group 2 influenza virus neutralization.
Proc Natl Acad Sci U S A. 111(1):445-50 (2014). PMID: 24335589
25. Bhabha G, **Ekiert DC**, Jennewein M, Zmasek CM, Tuttle LM, Kroon G, Dyson HJ, Godzik A, Wilson IA, Wright PE. Divergent evolution of protein conformational dynamics in dihydrofolate reductase.
Nat Struct Mol Biol. 20(11):1243-9 (2013). PMID: 24077226
26. Wang F*, **Ekiert DC***, Ahmad I, Yu W, Zhang Y, Bazirgan O, Torkamani A, Raudsepp T, Mwangi W, Criscitiello MF, Wilson IA, Schultz PG, Smider VV. Reshaping antibody diversity.
Cell. 153(6):1379-93 (2013). PMID: 23746848
27. Dreyfus C, **Ekiert DC**, Wilson IA. Structure of a classical broadly neutralizing stem antibody in complex with a pandemic H2 influenza virus hemagglutinin.
J Virol. 87(12):7149-54 (2013). PMID: 23552413
28. Tsibane T*, **Ekiert DC***, Krause JC*, Martinez O, Crowe JE Jr, Wilson IA, Basler CF. Influenza human monoclonal antibody 1F1 interacts with three major antigenic sites and residues mediating human receptor specificity in H1N1 viruses.
PLoS Pathog. 8(12):e1003067 (2012). PMID: 23236279

29. Lee PS, Yoshida R, **Ekiert DC**, Sakai N, Suzuki Y, Takada A, Wilson IA. Heterosubtypic antibody recognition of the influenza virus hemagglutinin receptor binding site enhanced by avidity.
Proc Natl Acad Sci U S A. 109(42):17040-5 (2012). PMID: 23027945
30. **Ekiert DC***, Kashyap AK*, Steel J, Rubrum A, Bhabha G, Khayat R, Lee JH, Dillon MA, O'Neil RE, Faynboym AM, Horowitz M, Horowitz L, Ward AB, Palese P, Webby R, Lerner RA, Bhatt RR, Wilson IA. Cross-neutralization of influenza A viruses mediated by a single antibody loop.
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31. Buck-Koehntop BA, Stanfield RL, **Ekiert DC**, Martinez-Yamout MA, Dyson HJ, Wilson IA, Wright PE. Molecular basis for recognition of methylated and specific DNA sequences by the zinc finger protein Kaiso.
Proc Natl Acad Sci U S A. 109(38):15229-34 (2012). PMID: 22949637
32. Schneemann A, Speir JA, Tan GS, Khayat R, **Ekiert DC**, Matsuoka Y, Wilson IA. A virus-like particle that elicits cross-reactive antibodies to the conserved stem of influenza virus hemagglutinin.
J Virol. 86(21):11686-97 (2012). PMID: 22896619
33. Dreyfus C, Laursen NS, Kwaks T, Zuijdgeest D, Khayat R, **Ekiert DC**, Lee JH, Metlagel Z, Bujny MV, Jongeneelen M, van der Vlugt R, Lamrani M, Korse HJ, Geelen E, Sahin Ö, Sieuwerts M, Brakenhoff JP, Vogels R, Li OT, Poon LL, Peiris M, Koudstaal W, Ward AB, Wilson IA, Goudsmit J, Friesen RH. Highly conserved protective epitopes on influenza B viruses.
Science. 337(6100):1343-8 (2012). PMID: 22878502
34. Nycholat CM, McBride R, **Ekiert DC**, Xu R, Rangarajan J, Peng W, Razi N, Gilbert M, Wakarchuk W, Wilson IA, Paulson JC. Recognition of sialylated poly-N-acetylactosamine chains on N- and O-linked glycans by human and avian influenza A virus hemagglutinins.
Angew Chem Int Ed Engl. 51(20):4860-3 (2012). PMID: 22505324
35. **Ekiert DC**, Wilson IA. Broadly neutralizing antibodies against influenza virus and prospects for universal therapies.
Curr Opin Virol. 2(2):134-41 (2012). PMID: 22482710
36. Wei CJ*, **Ekiert DC***, Nabel GJ, Wilson IA. "New approaches to vaccination". In *Textbook of Influenza*. Ed. Webster RG, Lamb RA, Monto AS, Braciale TJ. Oxford: Wiley-Blackwell, 2012.
37. **Ekiert DC***, Friesen RHE*, Bhabha G, Kwaks T, Jongeneelen M, Yu W, Ophorst C, Cox F, Korse HJWM, Brandenburg B, Vogels R, Brakenhoff JPJ, Kompier R, Koldijk MH, Cornelissen LAHM, Poon LLM, Peiris M, Koudstaal W, Wilson IA, and Goudsmit J. A highly conserved neutralizing epitope on group 2 influenza viruses.
Science. 333:843-50 (2011). PMID: 21737702
38. Fleishman SJ*, Whitehead TA*, **Ekiert DC***, Dreyfus C, Corn JE, Strauch EM, Wilson IA, Baker D. Computational design of proteins targeting the conserved stem region of influenza hemagglutinin.
Science 332:816-21 (2011). PMID: 21566186
39. Bhabha G, Lee J, **Ekiert DC**, Gam J, Wilson IA, Dyson HJ, Benkovic SJ, Wright PE. A

dynamic knockout reveals that conformational fluctuations influence the chemical step of enzyme catalysis.

Science. 332:234-8 (2011). PMID: 21474759

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MBio. 8;2. pii: e00345-10 (2011). PMID: 21304166
 41. Wang TT, Tan GS, Hai R, Pica N, Ngai L, **Ekiert DC**, Wilson IA, García-Sastre A, Moran TM, Palese P. Vaccination with a synthetic peptide from the influenza virus hemagglutinin provides protection against distinct viral subtypes.
Proc Natl Acad Sci USA. 107:18979-84 (2010). PMID: 20956293
 42. Xu R*, **Ekiert DC***, Krause JC, Hai R, Crowe JE Jr, Wilson IA. Structural basis of preexisting immunity to the 2009 H1N1 pandemic influenza virus.
Science 328:357-60 (2010). PMID: 20339031
 43. **Ekiert DC**, Wilson IA. "Attachment and entry: Receptor recognition in Viral Pathogenesis".
In Structural Virology. Ed. Agbandje-McKenna M., McKenna R. Cambridge: Royal Society of Chemistry, 2010. 220-242.
 44. **Ekiert DC**, Bhabha G, Elsliger MA, Friesen RH, Jongeneelen M, Throsby M, Goudsmit J, Wilson IA. Antibody recognition of a highly conserved influenza virus epitope.
Science 324:246-51 (2009). PMID: 19251591
 45. Simon GC, Schonteich E, Wu CC, Piekny A, **Ekiert D**, Yu X, Gould GW, Glotzer M, Prekeris R. Sequential Cyk-4 binding to ECT2 and FIP3 regulates cleavage furrow ingression and abscission during cytokinesis.
EMBO J. 27:1791-803 (2008). PMID: 18511905
 46. Matic I, **Ekiert D**, Radman M, Kohiyama M. Generation of DNA-free Escherichia coli cells by 2-aminopurine requires mismatch repair and nonmethylated DNA.
J Bacteriol. 188:339-42 (2006). PMID: 16352851
 47. Strauss B, Kelly K, **Ekiert D**. Cytochrome oxidase deficiency protects Escherichia coli from cell death but not from filamentation due to thymine deficiency or DNA polymerase inactivation.
J Bacteriol. 187:2827-35 (2005). PMID: 15805529
 48. Strauss B, Kelly K, Dincman T, **Ekiert D**, Biesieda T, Song R. Cell death in Escherichia coli dnaE(Ts) mutants incubated at a nonpermissive temperature is prevented by mutation in the cydA gene.
J Bacteriol. 186:2147-55 (2004). PMID: 15028700
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