Anne M. Gardner, PhD

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EDUCATION

Postdoctoral Research Fellow
National Jewish Center for Immunology, Denver, CO
Mentor, Gary L. Johnson, PhD

- Biochemically analyzed regulatory phosphorylation sites on MEK-1 by designing *in vitro* and *in vivo* kinase assays using purified proteins
- Created assays that were commercially developed and used internationally
- Awarded F32 individual NIH fellowship, ACS, and Cancer League of CO grants

PhD, Dept. of Microbiology and Immunology
Duke University, Durham, NC 1992
Mentor, Yair Argon, PhD
Dissertation Title: Changes in the expression, transport and degradation of immunoglobulin chains during B-cell differentiation.

- Awarded NIH predoctoral training fellowship in Cell and Molecular Biology
- Cell and Molecular Biology Steering Committee, 1986-1990
- Chair, Jim McGuiness Memorial Lecture Committee, 1987-1989

BA, Biology
Cornell University, Ithaca, NY

EMPLOYMENT

Lab Manager
Cornell University Molecular Biology & Genetics, Ithaca, NY 2021-present
B. Frank Pugh, PhD

- Manage a basic research lab investigating the epigenomic regulation of the eukaryotic genome, including training and supervision of technicians and undergraduates. Develop and implement SOPs and workflows. Responsible for IBC, IRB, EHS compliance, maintaining budgets, and assisting with grant applications and management

Research Associate 2
Ohio State University Wexner Medical Center, Columbus, OH 2017-2021
Kristine Yoder, PhD and Richard Fishel, PhD

- Managed day to day operations of a large research group in Cancer Biology & Genetics
- Implemented new techniques to advance research directions and contributed to publications in human mismatch repair research and retroviral integration research by production of recombinant nucleosome substrates, designing fluorescently labeled DNA constructs for FRET assays to analyze protein:protein and protein:DNA interactions in single molecule microscope setups, and developing recombinant protein purification schemes

Scientist
Miami Valley Biotech, Dayton, OH 2009-2017

- Launched a biotech company to supply proteins and antibodies to the research community

- Developed a purification scheme to increase the yield 10-fold of recombinant proteins, >95% pure, up to 92% heme content
- Responsible for rabbit anti-sera production from antigen design/purification through quality control of finished product

Research Associate
Children's Hospital Research Foundation, Cincinnati, OH 1999-2006

- Used site directed mutagenesis to test the roles of conserved amino acids in enzyme catalysis. Performed kinetic analysis, spectrophotometric and structural studies
- Used a bioinformatics approach to identify and clone a novel reductase system
- Published 12 articles in peer reviewed journals, invited seminar speaker at national and local symposia

PUBLICATIONS

Gardner AM, Gardner PR. Dioxygen and glucose force motion of the electron-transfer switch in the iron(III) flavohemoglobin-type nitric oxide dioxygenase. J Inorg Biochem. 2023 Aug;245:112257. doi: 10.1016/j.jinorgbio.2023.112257. Epub 2023 May 16. PMID: 37229820.

Palmieri D, Javorina A, Siddiqui J, Gardner A, Fries A, Chapleau RR, Starr C, Fishel R, Miles WO. Mass COVID-19 patient screening using UvsX and UvsY mediated DNA recombination and high throughput parallel sequencing. Sci Rep. 2022 Mar 8;12(1):4082. doi: 10.1038/s41598-022-08034-1. PMID: 35260723; PMCID: PMC8902726.

Kotlar RM, Jones ND, Senavirathne G, Gardner AM, Messer RK, Tan YY, Rabe AJ, Fishel R, Yoder KE. Retroviral prototype foamy virus intasome binding to a nucleosome target does not determine integration efficiency. J Biol Chem. 2021 Mar 17;296:100550. doi: 10.1016/j.jbc.2021.100550. PMCID: PMC8050864.

Gardner AM, Gardner PR. Allostery in the nitric-oxide dioxygenase mechanism of flavohemoglobin. J Biol Chem. 2020 Dec 11:jbc.RA120.016637. doi: 10.1074/jbc.RA120.016637. PMID: 33310705.

Mackler RM, Jones ND, Gardner AM, Lopez MA Jr, Howard CJ, Fishel R, Yoder KE. Nucleosome DNA unwrapping does not affect prototype foamy virus integration efficiency or site selection. PLoS One. 2019 Mar 13;14(3):e0212764. doi: 10.1371/journal.pone.0212764. PMID: 30865665; PMCID: PMC6415784.

Gardner AM, Cook MR, Gardner PR. Nitric-oxide dioxygenase function of human cytoglobin with cellular reductants and in rat hepatocytes. J Biol Chem. 2010 Jul 30;285(31):23850-7. doi: 10.1074/jbc.M110.132340. Epub 2010 May 27. PMID: 20511233; PMCID: PMC2911317.

Gardner PR, Gardner AM, Brashear WT, Suzuki T, Hvitved AN, Setchell KD, Olson JS. Hemoglobins dioxygenate nitric oxide with high fidelity. J Inorg Biochem. 2006 Apr;100(4):542-50. doi: 10.1016/j.jinorgbio.2005.12.012. Epub 2006 Jan 24. PMID: 16439024.

Helmick RA, Fletcher AE, Gardner AM, Gessner CR, Hvitved AN, Gustin MC, Gardner PR. Imidazole antibiotics inhibit the nitric oxide dioxygenase function of microbial flavohemoglobin. Antimicrob Agents Chemother. 2005 May;49(5):1837-43. doi: 10.1128/AAC.49.5.1837-1843.2005. PMID: 15855504; PMCID: PMC1087630.

Hallstrom CK, Gardner AM, Gardner PR. Nitric oxide metabolism in mammalian cells: substrate and inhibitor profiles of a NADPH-cytochrome P450 oxidoreductase-coupled microsomal nitric oxide dioxygenase. Free Radic Biol Med. 2004 Jul 15;37(2):216-28. doi: 10.1016/j.freeradbiomed.2004.04.031. PMID: 15203193.

Gardner PR, Gardner AM, Hallstrom CK. Dioxygen-dependent metabolism of nitric oxide. Methods Mol Biol. 2004;279:133-50. doi: 10.1385/1-59259-807-2:133. PMID: 15199242.

Gardner AM, Gessner CR, Gardner PR. Regulation of the nitric oxide reduction operon (norRVW) in Escherichia coli. Role of NorR and sigma54 in the nitric oxide stress response. J Biol Chem. 2003 Mar 21;278(12):10081-6. doi: 10.1074/jbc.M212462200. Epub 2003 Jan 15. PMID: 12529359.

Gardner AM, Helmick RA, Gardner PR. Flavorubredoxin, an inducible catalyst for nitric oxide reduction and detoxification in Escherichia coli. J Biol Chem. 2002 Mar 8;277(10):8172-7. doi: 10.1074/jbc.M110471200. Epub 2001 Dec 18. PMID: 11751865.

Pathania R, Navani NK, Gardner AM, Gardner PR, Dikshit KL. Nitric oxide scavenging and detoxification by the Mycobacterium tuberculosis haemoglobin, HbN in Escherichia coli. Mol Microbiol. 2002 Sep;45(5):1303-14. doi:10.1046/j.1365-2958.2002.03095.x. PMID: 12207698.

Gardner AM, Gardner PR. Flavohemoglobin detoxifies nitric oxide in aerobic, but not anaerobic, Escherichia coli. Evidence for a novel inducible anaerobic nitric oxide-scavenging activity. J Biol Chem. 2002 Mar 8;277(10):8166-71. doi:10.1074/jbc.M110470200. Epub 2001 Dec 18. PMID: 11751864.

Gardner PR, Martin LA, Hall D, Gardner AM. Dioxygen-dependent metabolism of nitric oxide in mammalian cells. Free Radic Biol Med. 2001 Jul 15;31(2):191-204. doi: 10.1016/s0891-5849(01)00569-x. PMID: 11440831.

Gardner PR, Gardner AM, Martin LA, Dou Y, Li T, Olson JS, Zhu H, Riggs AF. Nitric-oxide dioxygenase activity and function of flavohemoglobins. Sensitivity to nitric oxide and carbon monoxide inhibition. J Biol Chem. 2000 Oct 13;275(41):31581-7. doi: 10.1074/jbc.M004141200. PMID: 10922365.

Gardner AM, Martin LA, Gardner PR, Dou Y, Olson JS. Steady-state and transient kinetics of Escherichia coli nitric-oxide dioxygenase (flavohemoglobin). The B10 tyrosine hydroxyl is essential for dioxygen binding and catalysis. J Biol Chem. 2000 Apr 28;275(17):12581-9. doi: 10.1074/jbc.275.17.12581. PMID: 10777548.

Gardner PR, Gardner AM, Martin LA, Salzman AL. Nitric oxide dioxygenase: an enzymic function for flavohemoglobin. Proc Natl Acad Sci U S A. 1998 Sep 1;95(18):10378-83. doi: 10.1073/pnas.95.18.10378. PMID: 9724711; PMCID: PMC27902.

Widmann C, Johnson NL, Gardner AM, Smith RJ, Johnson GL. Potentiation of apoptosis by low dose stress stimuli in cells expressing activated MEK kinase 1. Oncogene. 1997 Nov 13;15(20):2439-47. doi: 10.1038/sj.onc.1201421. PMID: 9395240.

Vaillancourt RR, Gardner AM, Kazlauskas A, Johnson GL. The kinase-inactive PDGF beta-receptor mediates activation of the MAP kinase cascade via the endogenous PDGF alpha-receptor in HepG2 cells. Oncogene. 1996 Jul 4;13(1):151-9. PMID: 8700541.

Gardner AM, Johnson GL. Fibroblast growth factor-2 suppression of tumor necrosis factor alpha-mediated apoptosis requires Ras and the activation of mitogen-activated protein kinase. J Biol Chem. 1996 Jun 14;271(24):14560-6. doi: 10.1074/jbc.271.24.14560. PMID: 8662985.

Johnson NL, Gardner AM, Diener KM, Lange-Carter CA, Gleavy J, Jarpe MB, Minden A, Karin M, Zon LI, Johnson GL. Signal transduction pathways regulated by mitogen-activated/extracellular response kinase kinase kinase induce cell death. J Biol Chem. 1996 Feb 9;271(6):3229-37. doi: 10.1074/jbc.271.6.3229. PMID: 8621725.

Winston BW, Lange-Carter CA, Gardner AM, Johnson GL, Riches DW. Tumor necrosis factor alpha rapidly activates the mitogen-activated protein kinase (MAPK) cascade in a MAPK kinase kinase-dependent, c-Raf-1-independent fashion in mouse macrophages. Proc Natl Acad Sci U S A. 1995 Feb 28;92(5):1614-8. doi: 10.1073/pnas.92.5.1614. PMID: 7878028; PMCID: PMC42570.

Vaillancourt RR, Gardner AM, Johnson GL. B-Raf-dependent regulation of the MEK-1/mitogen-activated protein kinase pathway in PC12 cells and regulation by cyclic AMP. Mol Cell Biol. 1994 Oct;14(10):6522-30. doi: 10.1128/mcb.14.10.6522. PMID: 7935374; PMCID: PMC359182.

Franklin RA, Tordai A, Patel H, Gardner AM, Johnson GL, Gelfand EW. Ligation of the T cell receptor complex results in activation of the Ras/Raf-1/MEK/MAPK cascade in human T lymphocytes. J Clin Invest. 1994 May;93(5):2134-40. doi: 10.1172/JCI117209. PMID: 8182145; PMCID: PMC294346.

Johnson GL, Gardner AM, Lange-Carter C, Qian NX, Russell M, Winitz S. How does the G protein, Gi2, transduce mitogenic signals? J Cell Biochem. 1994 Apr;54(4):415-22. doi: 10.1002/jcb.240540408. PMID: 8014190.

Tordai A, Franklin RA, Patel H, Gardner AM, Johnson GL, Gelfand EW. Cross-linking of surface IgM stimulates the Ras/Raf-1/MEK/MAPK cascade in human B lymphocytes. J Biol Chem. 1994 Mar 11;269(10):7538-43. PMID: 8125975.

Gardner AM, Vaillancourt RR, Lange-Carter CA, Johnson GL. MEK-1 phosphorylation by MEK kinase, Raf, and mitogen-activated protein kinase: analysis of phosphopeptides and regulation of activity. Mol Biol Cell. 1994 Feb;5(2):193-201. doi: 10.1091/mbc.5.2.193. PMID: 8019005; PMCID: PMC301025.

Gardner AM, Lange-Carter CA, Vaillancourt RR, Johnson GL. Measuring activation of kinases in mitogen-activated protein kinase regulatory network. Methods Enzymol. 1994;238:258-70. doi: 10.1016/0076-6879(94)38024-4. PMID: 7799792.

Winitz S, Russell M, Qian NX, Gardner A, Dwyer L, Johnson GL. Involvement of Ras and Raf in the Gi-coupled acetylcholine muscarinic m2 receptor activation of mitogen-activated protein (MAP) kinase kinase and MAP kinase. J Biol Chem. 1993 Sep 15;268(26):19196-9. PMID: 8396128.

Gardner AM, Vaillancourt RR, Johnson GL. Activation of mitogen-activated protein kinase/extracellular signal-regulated kinase kinase by G protein and tyrosine kinase oncoproteins. J Biol Chem. 1993 Aug 25;268(24):17896-901. PMID: 8394352.

Lange-Carter CA, Pleiman CM, Gardner AM, Blumer KJ, Johnson GL. A divergence in the MAP kinase regulatory network defined by MEK kinase and Raf. Science. 1993 Apr 16;260(5106):315-9. doi: 10.1126/science.8385802. PMID: 8385802.

Gardner AM, Aviel S, Argon Y. Rapid degradation of an unassembled immunoglobulin light chain is mediated by a serine protease and occurs in a pre-Golgi compartment. J Biol Chem. 1993 Dec 5;268(34):25940-7. PMID: 8245027.

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Stockdale AM, Dul JL, Wiest DL, Digel M, Argon Y. The expression of membrane and secreted immunoglobulin during the in vitro differentiation of the murine B cell lymphoma CH12. J Immunol. 1987 Nov 15;139(10):3527-35. PMID: 3500220.

Note: I formerly published under Anne M Stockdale.