

## **Gillian M. Air, Ph.D.**

Associate Dean, Graduate College  
George Lynn Cross Research Professor  
Department Biochemistry and Molecular Biology  
College Medicine  
University of Oklahoma Health Sciences Center

### **Contact Information:**

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### **Education:**

1967: B.S. (Honors), Biochemistry, University of Sydney, Australia

1971: Ph.D., Biochemistry, University New South Wales, Australia

1970-1973: Belt Post-Doctoral Fellow, MRC Laboratory of Molecular Biology, England

### **Academic Appointments:**

1973–1976: Scientific Staff, MRC Laboratory of Molecular Biology, Cambridge, England

1977–1981: Scientific Staff, John Curtin School of Med. Research, Australian Nat'l University

1982–1985: Assoc. Professor, Department of Microbiology, University of Alabama at Birmingham

1985–1995: Director, Protein Analysis & Peptide Synthesis Core Facility, UAB

1985–1996: Professor, Department of Microbiology, University of Alabama at Birmingham

1996-present: Professor, Department of Biochemistry & Molecular Biology, Univ. of Oklahoma Health Sciences Center

1997–2006: Director, Graduate Program in Biochemistry & Molecular Biology, OUHSC

2001–2005: Edith Kinney Gaylord Presidential Professorship

2007-present: George Lynn Cross Professor

2014-present: Associate Dean, Graduate College OUHSC

2016-2018: Interim Chair, Biochemistry & Molecular Biology, OUHSC

### **Awards and Honors:**

1970–1973: Beit Memorial Fellow

1977–1979: Queen Elizabeth II Fellow

1991–2001: NIH Merit Award

2001: Elected Fellow of AAAS

2017: Rosalind Kornfeld Lifetime Achievement Award, Society for Glycobiology

**Other Experience and Professional Memberships:**

1991-1995: Member, Experimental Virology Study Section, NIH  
1998- 2001: Member, Biophysical Chemistry Study Section (BBCB), NIH  
2000: NIAID review panel, Challenge grants for influenza vaccines  
2003: NIAID review panel Vaccines, Adjuvants, Therapeutics & Diagnostics for Biodefense  
2003: NIAID Review Panel Biodefense and Emerging Infectious Diseases  
2003: NIH Special Emphasis Panel: Hepatitis C.  
2003: NIH Vaccine-06 Study Section (SARS)  
2004: NIAID Review Panel “Translational research on human immunology”  
2005: NIAID Review Panel: Assays for Influenza Therapeutics  
2006: CDC Grant Review Panel for influenza (Chair)  
2007: NIAID Grant Review committee for pandemic influenza (Chair)  
2009: NIAID Grant review panel, Influenza P01 (Chair)  
2005-2009: Member, NIH Vaccines for Microbial Diseases (VMD) Study Section  
2010: 2 NIAID Review Panels: Modeling Immunity for Biodefense, P01 on B cell responses  
2011: 2 NIAID Review panels; P01s on flu B cell responses, B cell memory  
1988–2012: Editorial Board “Virology”  
2012: NIH Immunology Reviewer Conflicts study section.  
2013: FDA Site visit of DNA virus laboratory  
2013: NIH CSR Virology Reviewer Conflicts study section  
2013: NIAID Immune Mechanisms of Virus Control (U19) review panel  
2013: NIAID Immune Epitope Database contracts review panel (co-Chair)  
2013: FDA Site Visit Hepatitis Laboratory (Chair)  
2014: NIAID Development of vaccine formulations contracts review panel  
2007-2015: Editorial Board, Journal of Virology  
2006-present: Advisory Board, Associate Editor, BMC Virology Journal  
2007-present: Scientific Working Group, BioHealthBase/Influenza Research Database, NIAID.  
2008-2012: Subgroup leader for “Microorganism recognition of host glycans”, Consortium for Functional Glycomics Anchor  
2010-2013: Scientific Advisory Board, St Jude Center of Excellence for Influenza Research and Surveillance  
2011-2015: Member, FDA Vaccines and Related Biological Products Advisory Committee  
2013-2021: Secretary, Medical Sciences Section, AAAS  
  
June 2019: Reviewer, Fellowships, Immunology, NIH, Chevy Chase, MD  
  
April 2019: Reviewer, CIVIC Component A Review Panel, NIAID, Bethesda, MD  
  
March 2019: Reviewer, Wellcome Trust India Alliance Fellowships, Wellcome Trust and Indian Government

**Research Support:**

Current:

- 2013-2023: NIH P20GM103648 "Oklahoma Center for Respiratory and Infectious Diseases", COBRE, Sponsored by NIGMS/Oklahoma State University, Federal, Awarded: \$23,000.00, Role: Site PI
- 2012-2022: NIH 1P20GM103640-01, "Oklahoma Center of Biomedical Research Excellence in Structural Biology", COBRE, Sponsored by NIH/OU, Federal, Awarded: \$486,589.00, Role: Site PI

Past:

- 2014-2021 : HHS N272201400026C contract to Digital Infuzion Inc, CEIRS Influenza Data Processing and Coordinating Center (DPCC), Role: PI
- 2008-2014: NIH R01 AI050933, "Human & mouse antibodies against influenza", Awarded: \$1,225,000, Role: PI
- 2009-2012: OCAST HR09-001, "Role of glycans in the pathogenesis of paramyxoviruses", Awarded: \$135,000, Role: PI
- 2005-2011: HHS N266200500026C," Responses to influenza vaccination in lupus patients", Awarded: \$400,000, Role: PI
- 2005 –2010: NIH R01 AI-62950-03," New Influenza A Neuraminidase Inhibitors for Biodefense", Awarded, \$340,000, Role: Subcontractor

**Selected Publications:**

1. Feng J, Gulati U, Zhang X, Keitel WA, Thompson DM, James JA, Thompson LF, Air GM. Antibody quantity versus quality after influenza vaccination. *Vaccine*. 2009;27(45):6358-62. Epub 2009/10/21. doi: 10.1016/j.vaccine.2009.06.090. PubMed PMID: 19840673; PubMed Central PMCID: PMC2765411.
2. Air GM, Brouillette WJ. Influenza virus antiviral targets. In: LaFemina R, editor. *Antiviral Res*. Washington, DC: ASM Press; 2009. p. 187-207.
3. Air GM, Feng J, Chen T, Joachims ML, James JA, Thompson LF. Individual antibody and T cell responses to vaccination and infection with the 2009 pandemic swine-origin H1N1 influenza virus. *J Clin Immunol*. 2011;31(5):900-12. Epub 2011/07/07. doi: 10.1007/s10875-011-9563-1. PubMed PMID: 21732013; PubMed Central PMCID: PMC3197711.
4. Tappert MM, Smith DF, Air GM. Fixation of oligosaccharides to a surface may increase the susceptibility to human parainfluenza virus 1, 2, or 3 hemagglutinin-neuraminidase. *J Virol*. 2011;85(23):12146-59. Epub 2011/09/16. doi: 10.1128/JVI.05537-11. PubMed PMID: 21917945; PubMed Central PMCID: PMC3209406.
5. Gulati U, Wu W, Gulati S, Kumari K, Waner JL, Air GM. Mismatched hemagglutinin and neuraminidase specificities in recent human H3N2 influenza viruses. *Virology*. 2005;339(1):12-20. Epub 2005/06/14. doi: 10.1016/j.virol.2005.05.009. PubMed PMID: 15950996.

6. Venkatramani L, Bochkareva E, Lee JT, Gulati U, Graeme Laver W, Bochkarev A, Air GM. An epidemiologically significant epitope of a 1998 human influenza virus neuraminidase forms a highly hydrated interface in the NA-antibody complex. *J Mol Biol.* 2006;356(3):651-63. Epub 2005/12/31. doi: 10.1016/j.jmb.2005.11.061. PubMed PMID: 16384583.
7. Wrammert J, Smith K, Miller J, Langley WA, Kokko K, Larsen C, Zheng NY, Mays I, Garman L, Helms C, James J, Air GM, Capra JD, Ahmed R, Wilson PC. Rapid cloning of high-affinity human monoclonal antibodies against influenza virus. *Nature.* 2008;453(7195):667-71. Epub 2008/05/02. doi: 10.1038/nature06890. PubMed PMID: 18449194; PubMed Central PMCID: PMC2515609.
8. Gulati S, Smith DF, Air GM. Deletions of neuraminidase and resistance to oseltamivir may be a consequence of restricted receptor specificity in recent H3N2 influenza viruses. *Virology.* 2009;6:22. Epub 2009/02/17. doi: 10.1186/1743-422X-6-22. PubMed PMID: 19216793; PubMed Central PMCID: PMC2649058.
9. Air GM. The Role of Carbohydrates in Viral Infections. In: Wang B, Boons G-J, editors. *Carbohydrate Recognition: Biological Problems, Methods, and Applications.* Hoboken, New Jersey: John Wiley & Sons; 2011. p. 65-92.
10. Air GM. Influenza neuraminidase (Review). *Influenza Other Respi Viruses.* 2011. Epub 2011/11/17. doi: 10.1111/j.1750-2659.2011.00304.x. PubMed PMID: 22085243 NIHMSID 330923.
11. Crowe SR, Merrill JT, Vista ES, Dedeke AB, Thompson DM, Stewart S, Guthridge JM, Niewold TB, Franek BS, Air GM, Thompson LF, James JA. Influenza vaccination responses in human systemic lupus erythematosus: impact of clinical and demographic features. *Arthritis Rheum.* 2011;63(8):2396-406. Epub 2011/05/21. doi: 10.1002/art.30388. PubMed PMID: 21598235; PubMed Central PMCID: PMC3149742.
12. Nguyen AT, Feasley CL, Jackson KW, Nitz TJ, Salzwedel K, Air GM, Sakalian M. The prototype HIV-1 maturation inhibitor, bevirimat, binds to the CA-SP1 cleavage site in immature Gag particles. *Retrovirology.* 2011;8:101. PubMed Central PMCID: PMC3267693.
13. Tappert MM, Smith DF, Air GM. Fixation of oligosaccharides to a surface may increase the susceptibility to human parainfluenza virus 1, 2, or 3 hemagglutinin-neuraminidase. *J Virol.* 2011;85(23):12146-59. PubMed Central PMCID: PMC3209406.
14. Couch RB, Decker WK, Utama B, Atmar RL, Niño D, Feng JQ, Halpert MM, Air GM. Evaluations for in vitro correlates of immunogenicity of inactivated influenza A H5, H7 and H9 vaccines in humans. *PLoS One.* 2012;7(12):e50830. PubMed Central PMCID: PMC3519816.
15. Noronha JM, Liu M, Squires RB, Pickett BE, Hale BG, Air GM, Galloway SE, Takimoto T, Schmolke M, Hunt V, Klem E, Garcia-Sastre A, McGee M, Scheuermann RH. Influenza virus sequence feature variant type analysis: evidence of a role for NS1 in influenza virus host range restriction. *J Virol.* 2012;86(10):5857-66. PubMed Central PMCID: PMC3347290.

16. Popova L, Smith K, West AH, Wilson PC, James JA, Thompson LF, Air GM. Immunodominance of Antigenic Site B over Site A of Hemagglutinin of Recent H3N2 Influenza Viruses. *PLoS One*. 2012;7(7):e41895. PubMed Central PMCID: PMC3405050.
17. Venkatramani L, Johnson ES, Kolavi G, Air GM, Brouillette WJ, Mooers BH. Crystal structure of a new benzoic acid inhibitor of influenza neuraminidase bound with a new tilt induced by overpacking subsite C6. *BMC Struct Biol*. 2012;12:7. PubMed Central PMCID: PMC3416664.
18. Yu Y, Mishra S, Song X, Lasanajak Y, Bradley KC, Tappert MM, Air GM, Steinhauer DA, Halder S, Cotmore S, Tattersall P, Agbandje-McKenna M, Cummings RD, Smith DF. Functional glycomic analysis of human milk glycans reveals the presence of virus receptors and embryonic stem cell biomarkers. *J Biol Chem*. 2012;287(53):44784-99. PubMed Central PMCID: PMC3531791.
19. Gulati S, Smith DF, Cummings RD, Couch RB, Griesemer SB, St George K, Webster RG, Air GM. Human H3N2 Influenza Viruses Isolated from 1968 To 2012 Show Varying Preference for Receptor Substructures with No Apparent Consequences for Disease or Spread. *PLoS One*. 2013;8(6):e66325. PubMed Central PMCID: PMC3689742.
20. Tappert MM, Porterfield JZ, Mehta-D'Souza P, Gulati S, Air GM. Quantitative comparison of human parainfluenza virus hemagglutinin-neuraminidase receptor binding and receptor cleavage. *J Virol*. 2013;87(16):8962-70.
21. Walther T, Karamanska R, Chan RW, Chan MC, Jia N, Air G, Hopton C, Wong MP, Dell A, Malik Peiris JS, Haslam SM, Nicholls JM. Glycomic analysis of human respiratory tract tissues and correlation with influenza virus infection. *PLoS Pathog*. 2013;9(3):e1003223. PubMed Central PMCID: PMC3597497.
22. Air GM. 2014. Influenza virus-glycan interactions. *Curr Opin Virol*.7:128-33. PubMed PMID: 25061947; PMCID: 4149921.
23. Gulati S, Lasanajak Y, Smith DF, Cummings RD, Air GM. 2014. Glycan array analysis of influenza H1N1 binding and release. *Cancer Biomark*.14(1):43-53. Epub 2014/03/20. PubMed PMID: 24643041.
24. Jia N, Barclay WS, Roberts K, Yen HL, Chan RW, Lam AK, Air G, Peiris JS, Dell A, Nicholls JM, Haslam SM. 2014. Glycomic characterization of respiratory tract tissues of ferrets: implications for its use in influenza virus infection studies. *J Biol Chem*.289(41):28489-504. PubMed PMID: 25135641; PMCID: 4192499.
25. Venkataram Prasad BV, Air GM. 2014. Editorial overview: virus-glycan interactions and pathogenesis. *Curr Opin Virol*.7:v-vi. PubMed PMID: 25128970; PMCID: 4256938.
26. Air GM. 2015. Influenza virus antigenicity and broadly neutralizing epitopes. *Curr Opin Virol*.11:113-21. PubMed PMID: 25846699; PMCID: 4456283.
27. Kocer ZA, Krauss S, Zanin M, Danner A, Gulati S, Jones JC, Friedman K, Graham A, Forrest H, Seiler J, Air GM, Webster RG. 2015. Possible basis for the emergence of H1N1 viruses with pandemic potential from avian hosts. *Emerg Microbes Infect*.4(7):e40. PubMed PMID: 26251829; PMCID: PMC4522614.

28. Alymova IV, York IA, Air GM, Cipollo JF, Gulati S, Baranovich T, Kumar A, Zeng H, Gansebom S, McCullers JA. 2016. Glycosylation changes in the globular head of H3N2 influenza hemagglutinin modulate receptor binding without affecting virus virulence. *Sci Rep.*6:36216. PubMed PMID: 27796371; PMCID: PMC5086918.