

Matthew S. Walters, Ph.D.

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Education:

2000: B.S., (1st Class Honors) Genetics, University of Liverpool, UK

2004: Ph.D., Molecular Virology, School of Medicine, University of Leeds, UK

Academic Appointments:

2004-2009: Postdoctoral Research Scientist, Department of Microbiology and Immunology, Columbia University, NY

2009-2010: Associate Research Scientist, Department of Microbiology and Immunology, Columbia University, NY

2010-2016: Assistant Research Professor, Department of Genetic Medicine, Weill Cornell Medical College, NY

2016-present: Assistant Professor of Medicine, Pulmonary, Critical Care and Sleep Medicine, Department of Medicine, University of Oklahoma Health Sciences Center, OK

Awards and Honors:

1997: Henry Deacon Scholarship Award from the University of Liverpool

1998: A Nuffield Foundation undergraduate research bursary

1999: The GlaxoSmithKline UK Research Industrial Trainee Award

2000: School of Biological Sciences Prize for Genetics at the University of Liverpool

Other Experience and Professional Memberships:

2010-present: American Thoracic Society

2016-present: Oklahoma Thoracic Society

2017-present: Affiliate member, Stephenson Cancer Center, The University of Oklahoma

Research Support:

Current

- 07/01/19-06/30/20: Presbyterian Health Foundation New Investigator Seed Grant, "COPD-dependent Changes in Human Airway Stem/Progenitor Cell Function", Role: PI
- 12/01/18-11/30/19: Presbyterian Health Foundation 3D Bio-printing Seed Grant, "A 3D Printed Lung Model for COPD Disease Modeling and Drug Development", Role: PI

- 09/01/18-06/30/23: 2P20 GM103636-06, NIH/NCRR, "Expanding Excellence in Developmental Biology in Oklahoma", "Project 4: Notch regulation of COPD-associated goblet cell hyperplasia/metaplasia", Role: Project Lead
Past:
- 07/01/18-06/30/19: College of Medicine Alumni Association (COMAA) Research Grant, "The Role of Extracellular Matrix in Notch-dependent Airway Epithelial Remodeling", Role: PI
- 07/01/18-06/30/19: The Oklahoma Nathan Shock Center Pilot Project Award, "Aging-dependent changes in human airway stem/progenitor cell function", Role: PI
- 07/01/17-06/30/18: Oklahoma Center for Adult Stem Cell Research (OCASCR) Grant, "Notch-mediated regulation of airway epithelial secretory cell differentiation", Role: PI
- 07/01/17-06/30/18: Oklahoma Shared Clinical & Translational Resources, (OSCTR) Pilot Project Grant, "Cigarette smoke-induction of UCHL1 suppresses innate immunity in the lung", Role: PI
- 01/01/16-12/31/16: CRYSTAL15XX0, Cystic Fibrosis Foundation Therapeutics, Inc., "Assessment and gene repair of human CF basal stem/progenitor cells", Role: Co-PI
- 10/15/15-10/14/16: P20 HL113443-Pilot Project Supplement, NHLBI/NIH, "Nitric oxide as a determinant of stem/progenitor cell fate and metabolism", Role: PI
- 12/01/10-02/28/15: NPRP 09-742-3-194, Qatar Foundation, "Effect of Shisha Smoking on the Biology of the Airway Epithelium in Qataris", Role: Lead-PI (from 07/01/12)

Selected Publications:

1. Ogawa F, Walters MS, Shafquat A, O'Beirne SL, Kaner RJ, Mezey JG, Zhang H, Leopold PL, Crystal RG. Role of KRAS in regulating normal human airway basal cell differentiation. *Respir Res.* 2019 Aug 9;20(1):181. doi: 10.1186/s12931-019-1129-4. PubMed PMID: 31399087; PubMed Central PMCID: PMC6688249.
2. Zuo WL, Shenoy SA, Li S, O'Beirne SL, Strulovici-Barel Y, Leopold PL, Wang G, Staudt MR, Walters MS, Mason C, Kaner RJ, Mezey JG, Crystal RG. Ontogeny and Biology of Human Small Airway Epithelial Club Cells. *Am J Respir Crit Care Med.* 2018 Dec 1;198(11):1375-1388. doi: 10.1164/rccm.201710-2107OC. PubMed PMID: 29874100; PubMed Central PMCID: PMC6290945 [Available on 2019-12-01]
3. Zhang H, Yang J, Walters MS, Staudt MR, Strulovici-Barel Y, Salit J, Mezey JG, Leopold PL, Crystal RG. Mandatory role of HMGA1 in human airway epithelial normal differentiation and post-injury regeneration. *Oncotarget.* 2018 Feb 16;9(18):14324-14337. doi: 10.18632/oncotarget.24511. eCollection 2018 Mar 6. PubMed PMID: 29581847; PubMed Central PMCID: PMC5865673.
4. Wang G, Zhou H, Strulovici-Barel Y, Al-Hijji M, Ou X, Salit J, Walters MS, Staudt MR, Kaner RJ, and Crystal RG. Role of OSGIN1 in mediating smoking-induced autophagy in the human airway epithelium. *Autophagy.* 2017 Jul 3;13(7):1205-1220. doi: 10.1080/15548627.2017.1301327. PubMed PMID: 28548877; PubMed Central PMCID: PMC5529077.
5. Walters MS*, Salit J*, Ju JH, Staudt MR, Kaner RJ, Rogalski AM, Sodeinde TB, Rahim R, Strulovici- Barel Y, Mezey JG, Almulla AM, Sattar H, Mahmoud M, Crystal RG. Waterpipe smoking induces epigenetic changes in the small airway epithelium. *PLoS One.* 2017 Mar 8;12(3):e0171112. doi: 10.1371/journal.pone. 0171112. PubMed PMID: 28273093; PubMed Central PMCID: PMC5342191
6. Gomi K, Tang Y, Arbelaez V, Crystal RG, Walters MS. Endothelial Cell Mediated Promotion of Ciliated Cell Differentiation of Human Airway Basal Cells via Insulin and Insulin-Like Growth Factor 1 Receptor Mediated Signaling. *Stem Cell Rev.* 2017 Apr;13(2):309-317. doi: 10.1007/s12015-016-9707-z. PubMed PMID: 28050756; PubMed Central PMCID: PMC5584604
7. Strulovici-Barel Y, Shaykhiev R, Salit J, Deeb RS, Krause A, Kaner RJ, Vincent TL, Agosto-Perez F, Wang G, Hollmann C, Shanmugam V, Almulla AM, Sattar H, Mahmoud M, Mezey JG, Gross SS, Staudt MR, Walters MS, Crystal RG. Pulmonary Abnormalities in Young, Light-Use Waterpipe (Hookah) Smokers. *Am J Respir Crit Care Med.* 2016 Sep 1;194(5):587-95. doi: 10.1164/rccm.201512-2470OC. PubMed PMID: 27007171; PubMed Central PMCID: PMC5027211.
8. Gomi K, Staudt MR, Salit J, Kaner RJ, Heldrich J, Rogalski AM, Arbelaez V, Crystal RG, Walters MS. JAG1-Mediated Notch Signaling Regulates Secretory Cell Differentiation of the Human Airway Epithelium. *Stem Cell Rev.* 2016 Aug;12(4):454-63. doi: 10.1007/s12015-016-9656-6. PubMed PMID: 27216293; PubMed Central PMCID: PMC4926772.
9. Zhou H, Brekman A, Zuo WL, Ou X, Shaykhiev R, Agosto-Perez FJ, Wang R, Walters MS, Salit J, Strulovici-Barel Y, Staudt MR, Kaner RJ, Mezey JG, Crystal RG, Wang G. POU2AF1 Functions in the Human Airway Epithelium To Regulate Expression of Host Defense Genes. *J Immunol.* 2016 Apr 1;196(7):3159-67. doi: 10.4049/jimmunol.1502400. PubMed PMID: 26927796; PubMed Central PMCID: PMC4799774.

10. Deeb RS*, Walters MS*, Strulovici-Barel Y, Chen Q, Gross SS, Crystal RG. Smoking-Associated Disordering of the Airway Basal Stem/Progenitor Cell Metabotype. *Am J Respir Cell Mol Biol.* 2016 Feb;54(2):231-40. doi: 10.1165/rcmb.2015-0055OC. PubMed PMID: 26161876; PubMed Central PMCID: PMC4821042.
11. Ding BS, Gomi K, Rafii S, Crystal RG, Walters MS. Endothelial MMP14 is required for endothelial- dependent growth support of human airway basal cells. *J Cell Sci.* 2015 Aug 15;128(16):2983-8. doi: 10.1242/jcs.168179. PubMed PMID: 26116571; PubMed Central PMCID: PMC4541042.
12. Gomi K, Arbelaez V, Crystal RG, Walters MS. Activation of NOTCH1 or NOTCH3 signaling skews human airway basal cell differentiation toward a secretory pathway. *PLoS One.* 2015 Feb 20;10(2):e0116507. doi: 10.1371/journal.pone.0116507. PubMed PMID: 25700162; PubMed Central PMCID: PMC4336283.
13. Tilley AE, Walters MS, Shaykhiev R, Crystal RG. Cilia dysfunction in lung disease. *Annu Rev Physiol.* 2015;77:379-406. doi: 10.1146/annurev-physiol-021014-071931. Review. PubMed PMID: 25386990; PubMed Central PMCID: PMC4465242.
14. Durgan J, Tao G, Walters MS, Florey O, Schmidt A, Arbelaez V, Rosen N, Crystal RG, Hall A. SOS1 and Ras regulate epithelial tight junction formation in the human airway through EMP1. *EMBO Rep.* 2015 Jan;16(1):87-96. doi: 10.15252/embr.201439218. PubMed PMID: 25394671; PubMed Central PMCID: PMC4304732.
15. Brekman A, Walters MS, Tilley AE, Crystal RG. FOXJ1 prevents cilia growth inhibition by cigarette smoke in human airway epithelium in vitro. *Am J Respir Cell Mol Biol.* 2014 Nov;51(5):688-700. doi: 10.1165/rcmb.2013-0363OC. PubMed PMID: 24828273; PubMed Central PMCID: PMC4224080.
16. Staudt MR, Buro-Auriemma LJ, Walters MS, Salit J, Vincent T, Shaykhiev R, Mezey JG, Tilley AE, Kaner RJ, Ho MW, Crystal RG. Airway Basal stem/progenitor cells have diminished capacity to regenerate airway epithelium in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med.* 2014 Oct 15;190(8):955- 8. doi: 10.1164/rccm.201406-1167LE. PubMed PMID: 25317467; PubMed Central PMCID: PMC4299582.
17. Walters MS*, De BP*, Salit J, Buro-Auriemma LJ, Wilson T, Rogalski AM, Lief L, Hackett NR, Staudt MR, Tilley AE, Harvey BG, Kaner RJ, Mezey JG, Ashbridge B, Moore MA, Crystal RG. Smoking accelerates aging of the small airway epithelium. *Respir Res.* 2014 Sep 24;15:94. doi: 10.1186/s12931-014- 0094-1. PubMed PMID: 25248511; PubMed Central PMCID: PMC4189169.
18. Feng B, Jiao P, Helou Y, Li Y, He Q, Walters MS, Salomon A, Xu H. Mitogen-activated protein kinase phosphatase 3 (MKP-3)-deficient mice are resistant to diet-induced obesity. *Diabetes.* 2014 Sep;63(9):2924- 34. doi: 10.2337/db14-0066. PubMed PMID: 24722245; PubMed Central PMCID: PMC4141371.
19. Ryan DM, Vincent TL, Salit J, Walters MS, Agosto-Perez F, Shaykhiev R, Strulovici-Barel Y, Downey RJ, Buro-Auriemma LJ, Staudt MR, Hackett NR, Mezey JG, Crystal RG. Smoking dysregulates the human airway basal cell transcriptome at COPD risk locus 19q13.2. *PLoS One.* 2014 Feb 3;9(2):e88051. doi: 10.1371/journal.pone.0088051. PubMed PMID: 24498427; PubMed Central PMCID: PMC3912203.
20. Walters MS, Gomi K, Ashbridge B, Moore MA, Arbelaez V, Heldrich J, Ding BS, Rafii S, Staudt MR, Crystal RG. Generation of a human airway epithelium derived basal cell line with multipotent differentiation capacity. *Respir Res.* 2013 Dec 3;14:135. doi: 10.1186/1465-9921-14-135. PubMed PMID: 24298994; PubMed Central PMCID: PMC3907041.
21. Buro-Auriemma LJ, Salit J, Hackett NR, Walters MS, Strulovici-Barel Y, Staudt MR, Fuller J, Mahmoud M, Stevenson CS, Hilton H, Ho MW, Crystal RG. Cigarette smoking induces small airway epithelial epigenetic changes with corresponding modulation of gene expression. *Hum Mol Genet.* 2013 Dec 1;22(23):4726-38. doi: 10.1093/hmg/ddt326. PubMed PMID: 23842454; PubMed Central PMCID: PMC3888123.
22. Didon L, Zwick RK, Chao IW, Walters MS, Wang R, Hackett NR, Crystal RG. RFX3 modulation of
23. FOXJ1 regulation of cilia genes in the human airway epithelium. *Respir Res.* 2013 Jul 3;14:70. doi: 10.1186/1465-9921-14-70. PubMed PMID: 23822649; PubMed Central PMCID: PMC3710277.
24. Curradi G*, Walters MS*, Ding BS*, Rafii S, Hackett NR, Crystal RG. Airway basal cell vascular endothelial growth factor-mediated cross-talk regulates endothelial cell-dependent growth support of human airway basal cells. *Cell Mol Life Sci.* 2012 Jul;69(13):2217-31. doi: 10.1007/s00018-012-0922-8. PubMed PMID: 22382924; PubMed Central PMCID: PMC3633460.
25. Hackett NR*, Shaykhiev R*, Walters MS*, Wang R, Zwick RK, Ferris B, Witover B, Salit J, Crystal RG. The human airway epithelial basal cell transcriptome. *PLoS One.* 2011 May 4;6(5):e18378. doi: 10.1371/journal.pone.0018378. PubMed PMID: 21572528; PubMed Central PMCID: PMC3087716.
26. Walters MS, Kinchington PR, Banfield BW, Silverstein S. Hyperphosphorylation of histone deacetylase 2 by alphaherpesvirus US3 kinases. *J Virol.* 2010 Oct;84(19):9666-76. doi: 10.1128/JVI.00981-10. PubMed PMID: 20660201; PubMed Central PMCID: PMC2937806.
27. Walters MS*, Kyratsous CA*, Silverstein SJ. The RING finger domain of Varicella-Zoster virus ORF61p has E3 ubiquitin ligase activity that is essential for efficient autoubiquitination and dispersion of Sp100- containing nuclear bodies. *J Virol.* 2010 Jul;84(13):6861-5. doi: 10.1128/JVI.00335-10. PubMed PMID: 20392849; PubMed Central PMCID: PMC2903287.

28. Mueller NH*, Walters MS*, Marcus RA, Graf LL, Prenni J, Gilden D, Silverstein SJ, Cohrs RJ. Identification of phosphorylated residues on varicella-zoster virus immediate-early protein ORF63. *J Gen Virol.* 2010 May;91(Pt 5):1133-7. doi: 10.1099/vir.0.019067-0. PubMed PMID: 20089801; PubMed Central PMCID: PMC2888152.
29. Walters MS, Erazo A, Kinchington PR, Silverstein S. Histone deacetylases 1 and 2 are phosphorylated novel sites during varicella-zoster virus infection. *J Virol.* 2009 Nov;83(22):11502-13. doi: 10.1128/JVI.01318-09. PubMed PMID: 19740981; PubMed Central PMCID: PMC2772673.
30. Kyratsous CA, Walters MS, Panagiotidis CA, Silverstein SJ. Complementation of a herpes simplex virus ICP0 null mutant by varicella-zoster virus ORF61p. *J Virol.* 2009 Oct;83(20):10637-43. doi: 10.1128/JVI.01144-09. PubMed PMID: 19656893; PubMed Central PMCID: PMC2753114.
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32. Zürcher T, Yates PJ, Daly J, Sahasrabudhe A, Walters M, Dash L, Tisdale M, McKimm-Breschkin JL. Mutations conferring zanamivir resistance in human influenza virus N2 neuraminidases compromise virus fitness and are not stably maintained in vitro. *J Antimicrob Chemother.* 2006 Oct;58(4):723-32. PubMed PMID: 16891631.
33. Wakenshaw L*, Walters MS*, Whitehouse A. The Herpesvirus saimiri replication and transcription activator acts synergistically with CCAAT enhancer binding protein alpha to activate the DNA polymerase promoter. *J Virol.* 2005 Nov;79(21):13548-60. PubMed PMID: 16227275; PubMed Central PMCID: PMC1262591.
34. Walters MS, Hall KT, Whitehouse A. The herpesvirus saimiri Rta gene autostimulates via binding to a non-consensus response element. *J Gen Virol.* 2005 Mar;86(Pt 3):581-7. PubMed PMID: 15722517.
35. Walters MS, Hall KT, Whitehouse A. The herpesvirus saimiri open reading frame (ORF) 50 (Rta) protein contains an at hook required for binding to the ORF 50 response element in delayed-early promoters. *J Virol.* 2004 May;78(9):4936-42. PubMed PMID: 15078979; PubMed Central PMCID: PMC387665.
35. Goodwin DJ, Walters MS, and Whitehouse A. Gene Regulation in the Prototype gamma-2 Herpesvirus. *Current Topics in Virology.* 2003 (3): 33-52.
36. Liloglou T, Walters M, Maloney P, Youngson J, Field JK. A T2517C polymorphism in the GSTM4 gene is associated with risk of developing lung cancer. *Lung Cancer.* 2002 Aug;37(2):143-6. PubMed PMID: 12140136.
37. Goodwin DJ, Walters MS, Smith PG, Thurau M, Fickenscher H, Whitehouse A. Herpesvirus saimiri open reading frame 50 (Rta) protein reactivates the lytic replication cycle in a persistently infected A549 cell line. *J Virol.* 2001 Apr;75(8):4008-13. PubMed PMID: 11264393; PubMed Central PMCID: PMC114895.
38. Barnett JM, Cadman A, Gor D, Dempsey M, Walters M, Candlin A, Tisdale M, Morley PJ, Owens IJ, Fenton RJ, Lewis AP, Claas EC, Rimmelzwaan GF, De Groot R, Osterhaus AD. Zanamivir susceptibility monitoring and characterization of influenza virus clinical isolates obtained during phase II clinical efficacy studies. *Antimicrob Agents Chemother.* 2000 Jan;44(1):78-87. PubMed PMID: 10602727; PubMed Central PMCID: PMC89632.

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