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ASSISTANT PROFESSOR OF MEDICINE & SURGERY
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Education & Training

2018 - 2022	Whitehead Institute for Biomedical Research Postdoctoral research fellow (advisor: Prof. David M. Sabatini)
2016 - 2020	Massachusetts General Hospital & Harvard Medical School Clinical fellow, Pulmonary and Critical Care Medicine
2014 - 2016	House officer, Internal Medicine
2013 - 2014	House officer, General Surgery
2007 - 2013	Johns Hopkins University Doctor of Philosophy in Human Genetics (advisor: Prof. Joshua T. Mendell)
2005 - 2013	Doctor of Medicine Alpha Omega Alpha; Medical Scientist Training Program
2001 - 2005	Bachelor of Arts in Neuroscience Phi Beta Kappa; University and Departmental Honors

Honors & Awards

2023	Ellison Foundation Award	Ellison Foundation
2023	Young Physician-Scientist Award	American Society of Clinical Investigation
2022	Donahoe Catalyst Award	Massachusetts General Hospital Department of Surgery
2021	Career Award for Medical Scientists (CAMS)	Burroughs Wellcome Fund
2021	Basic Science Prize	MA Pulmonary Society
2020 - 2023	Parker B. Francis Fellowship Award	Parker B. Francis Family Foundation
2019	ATS Foundation Unrestricted Grant Award	American Thoracic Society Foundation
2019	First place award in basic science research	National Jewish Respiratory Disease Young Investigators Forum
2019	Peer award for best overall presentation	National Jewish Respiratory Disease Young Investigators Forum
2019	RCMB Abstract Scholarship	American Thoracic Society
2019	Winner, Koch Institute Image Awards	Massachusetts Institute of Technology
2018	2nd prize, W.M. Keck Image Awards	Whitehead Institute for Biomedical Research
2018 - 2020	NIH Kirschstein Institutional NRSA Award	Massachusetts General Hospital
2015	MA state champion, "Doctor's Dilemma"	American College of Physicians
2014	"30 Under 30" in Science and Healthcare	Forbes Magazine
2013	Michael A. Shanoff Research Award	Johns Hopkins University School of Medicine
2013	Alpha Omega Alpha election	Johns Hopkins University School of Medicine
2013	William Stewart Halsted Award in Surgery	Johns Hopkins University School of Medicine
2009	2nd prize, Best Ph.D. Student Talk	IMBA Small RNA Microsymposium (Vienna)
2006 - 2013	NIH Medical Scientist Training Program Award	National Institutes of Health
2005	Dean's Summer Research Award	Johns Hopkins University School of Medicine
2004	HHMI undergraduate research fellowship	Johns Hopkins University
2004	Phi Beta Kappa election	Johns Hopkins University
2004	Inter-fraternity Council Outstanding Junior	Johns Hopkins University
2003	Mensa Member Scholarship	Mensa Education & Research Foundation
2003	Provost's Undergraduate Research Award	Johns Hopkins University
2000	National Merit Scholarship Finalist	Wichita High School East (Wichita, KS)

Scientific contributions

[papers]

- Shi C.Y., Elcavage L.E., **Chivukula R.R.**, Stefano J., Kleaveland B., Bartel D.P. The widespread influence of ZSWIM8 on microRNAs during mouse embryonic development. *Genome Research*. 33:1482–1496. (2023)
- Boehnke N., Strachla J.P., Safford H.C., Kocak M., Rees M.G., Ronan M., Adelman C.H., **Chivukula R.R.**, Cheah J.H., Li, H., Sabatini D.M., Roth J.A., Kochler A.N., Hammond P.T. Massively parallel pooled screening reveals genomic determinants of nanoparticle-cell interactions. *Science*. eabm5551 (2022). doi: 10.1126/science.abm5551
- Shah V.S., **Chivukula R.R.**, Lin B., Waghray A., Rajagopal J. Cystic fibrosis and cells of the airway epithelium: What are ionocytes and what do they do? *Annual Review of Pathology: Mechanisms of Disease*. doi: 10.1146/annurev-pathol-042420-094031 (2021)
- Chivukula R.R.**, Maley J.H., Dudzinski D.M., Hibbert, K.A., Hardin, C.C. Evidence-based management of the critically ill adult with SARS-CoV-2 infection. *Journal of Intensive Care Medicine*. 36(1):18-41 (2021).
- Hariri, L.P., North, C.M., Shih, A., Villalba, J., Vinarsky, V., Hardin, C.C., Rubin, J., Okin, D.A., Sclafani, A., Alladina, J.W., Griffith, J.W., Gillette, M.A., Raz, Y., Richards, C.J., Wong, A.K., Ly, A., Hung, Y.P., **Chivukula, R.R.**, [...] Stone, J.R., Mino-Kenudson, M. Lung histopathology in COVID-19 as compared to SARS and H1N1 influenza: a systematic review. *CHEST*. 159(1):73-84 (2020).
- Maley, J.H., Petri, C.R., Brenner, L.N., **Chivukula, R.R.**, [...] Hardin, C.C. Anticoagulation, Immortality, and Observations of COVID-19. *Research and Practice in Thrombosis and Haemostasis*. 4 (5), 674-676 (2020).
- Petri C.R., Brenner L.N., Calhoun T.F., **Chivukula R.R.**, Maley, J.H. Vinarsky V., Dudzinski D.M., Hardin C.C. The FLARE Initiative: A collaborative effort for timely literature appraisal during the COVID-19 pandemic. *ATS Scholar*. doi: 10.34197/ats-scholar.2020-0045IN (2020)
- Shamseldin, H.E., Mogarri, I., Alqwaiee, M., Alharbi, A., Baqais, K., AlSaadi, M., AlAnzi, T., Alhashem, A., Saghier, A., Ameen, W., Ibrahim, N., Yang, J., Abdulwahab, F., Hashem, M., **Chivukula, R.R.**, Alkuraya, F.S. An exome-first approach to aid in the diagnosis of primary ciliary dyskinesia. *Human Genetics*. 139(10):1273-1283 (2020).
- Chivukula, R.R.**[†], [...] Alkuraya, F.S.[†], Sabatini, D.M. A human ciliopathy reveals essential functions for NEK10 in airway mucociliary clearance. *Nature Medicine*. 26(2), 244-251 (2020). [†]corresponding
- Taylor, M.S.* **Chivukula, R.R.***, [...] Kradin R.L. A conserved distal lung regenerative pathway in acute lung injury. *Am J Pathol*. 188(5):1149-1160 (2018). *equal contribution
- Taylor, M.S.* **Chivukula, R.R.***, [...] Kradin R.L. Delayed alveolar epithelialization: a distinct pathology in diffuse acute lung injury. *Am. J. Respir. Crit. Care Med*. 197, 522–524 (2018). *equal contribution
- Knabel, M.K., Ramachandran, K., Karhardkar, S., Hwang, H.W., Creamer, T.J., **Chivukula, R.R.**, [...] Warren D.S. Systemic delivery of scAAV8-encoded miR-29a ameliorates hepatic fibrosis in carbon tetrachloride-treated mice. *PLoS ONE* 10, e0124411 (2015).
- Zeitels, L.R., Acharya, A., Shi, G., Chivukula, D., **Chivukula, R.R.**, [...] Mendell, J.T. Tumor suppression by miR-26 overrides potential oncogenic activity in intestinal tumorigenesis. *Genes Dev*. 28, 2585-2590 (2014).
- Chivukula, R.R.***, Shi G.*, [...] Mendell, J.T. An essential mesenchymal function for miR-143/145 in intestinal epithelial regeneration. *Cell* 157, 1104-16 (2014). *equal contribution
- Hsu S., Wang B., Kota J., Yu J., Costinean S., Kutay H., Yu L., Bai S., LaPerle K., **Chivukula R.R.**, [...] Ghoshal K. Essential metabolic, anti-inflammatory and anti-tumorigenic functions for miR-122 in mouse liver. *J. Clin. Invest*. 122, 2871-2883 (2012).
- Pramanik, D., Campbell N., Karikari C., **Chivukula R.**, [...] Maitra A. Restitution of tumor suppressor microRNAs using a systemic nanovector inhibits pancreatic cancer growth in mice. *Mol. Cancer Ther*. 10, 1470–1480 (2011).
- Kent, O.A., **Chivukula R.R.**, [...] Mendell J.T. Repression of the miR-143/145 cluster by oncogenic Ras initiates a tumor-promoting feed-forward pathway. *Genes Dev*. 24, 2754–2759 (2010).
- Persat, A., **Chivukula, R.R.**, Mendell, J.T. & Santiago, J.G. Quantification of global microRNA abundance by selective isotachopheresis. *Anal. Chem*. 82, 9631–9635 (2010).
- Kota, J., **Chivukula R.R.**, [...] Mendell J.T. Therapeutic microRNA delivery suppresses tumorigenesis in a murine liver cancer model. *Cell* 137, 1005–1017 (2009).
- Chivukula, R.R.** & Mendell, J.T. Abate and switch: miR-145 in stem cell differentiation. *Cell* 137, 606–608 (2009).
- Soderlund, K.A., **Chivukula R.R.**, [...] Halushka M.K. Prognostic value of left ventricular apical tissue removed for HeartMate II left ventricular assist device placement. *Cardiovasc. Pathol*. 18, 217–222 (2009).
- Chang, T.-C., Zeitels L.R., Hwang H., **Chivukula R.R.**, [...] Mendell J.T. Lin-28B transactivation is necessary for Myc-mediated let-7 repression and proliferation. *Proc. Natl. Acad. Sci. USA* 106, 3384–3389 (2009).
- Allen, G., Simpkins C.E., Segev D., Warren D., King K., Taube J., Locke J., Baldwin W., Haas M., **Chivukula R.** & Montgomery R.A. Rapid accommodation of an A1 renal allograft after preconditioning for ABO-incompatible transplantation. *Contrib. Nephrol*. 162, 35–46 (2009).
- Chivukula, R.R.** & Mendell, J.T. Circular reasoning: microRNAs and cell-cycle control. *Trends Biochem. Sci*. 33, 474–481 (2008).
- Chaudhury, S., Eisinger J., Hao L., Hicks J. **Chivukula R.** & Turano K. Visual illusion in virtual world alters women's target-directed walking. *Exp. Brain. Res*. 159, 360–369 (2004).

[patents]

- Chivukula, R.R.** & Sabatini D.M. “The kinase NEK10 and its use in treating and diagnosing bronchiectasis and other respiratory disorders”. U.S. provisional patent pending.
- Mendell, J.T., Mendell, K.A., **Chivukula, R.R.**, et al. “Compositions and methods for treating hepatic neoplasia.” U.S. Patent 8,729,041. 20 May 2014.

[books]

- Magder, S. and Chivukula, R., (2021) ‘Acid Base and Hydrogen Ion’, in Magder S., Malhotra A., Hibbert K., Hardin C., (eds) *Cardiopulmonary Monitoring: Basic Physiology, Tools, and Bedside Management for the Critically Ill*. Switzerland: Springer.
- Le T., Bechis S., eds. **Chivukula R.**, et al. (2009) *First Aid Q&A for the USMLE Step I*. New York: McGraw-Hill/Medical.

[invited talks]

- “Leveraging rare respiratory disorders to illuminate pulmonary pathophysiology” *Massachusetts Pulmonary Society Conference* (2023)
- “Leveraging rare respiratory disorders to illuminate pulmonary physiology” *Pulmonary Basic & Translational Research Conference, Weill Cornell Medical Center* (2023)
- “New roles for polyglycine in health and disease” *Pediatric Surgery Research Labs seminar series, Massachusetts General Hospital* (2023)
- “New roles for polyglycine in health and disease” *Center for Genomic Medicine seminar series, Massachusetts General Hospital* (2022)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *EASEB Lung Epithelium Conference* (2022)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *Faculty Search Seminar, Center for Genomic Medicine, Massachusetts General Hospital* (2022)

“Leveraging Mendelian respiratory disorders to illuminate pulmonary physiology” *Physician-Scientist Faculty Candidate Seminar, Division of Pulmonary & Critical Care Medicine, Massachusetts General Hospital* (2021)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *Institute Seminar, Cardiovascular Research Institute (CVRI) / Lung Biology Center, University of California San Francisco (UCSF) Medical Center* (2021)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *Division Seminar, Division of Pulmonary Medicine, Boston Children’s Hospital* (2021)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *Children’s Research Institute lecture, University of Texas Southwestern Medical Center* (2021)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *University of Pennsylvania / Children’s Hospital of Philadelphia (Penn-CHOP) Lung Biology Seminar* (2021)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *Visiting Professor Grand Rounds, Division of Allergy, Pulmonary, & Critical Care Medicine, Vanderbilt University Medical Center* (2021)

“Biology and targeted therapy of SARS-CoV-2” *Respiratory Pathophysiology course, Harvard-MIT Health Sciences and Technology Graduate Program* (2021)

“A human ciliopathy reveals essential functions for NEK10 in airway mucociliary clearance” *MA Pulmonary Section, American Lung Association* (2021)

“New tools for probing lysosome function and dysfunction *in vivo*” *Hermansky-Pudlak Syndrome (HPS) Network Conference* (2021)

“Pulmonary pathophysiology: an introduction” *Human Physiology course, Massachusetts Institute of Technology* (2020)

“COVID-19” *Invited discussant, MD/PhD Grand Rounds, Harvard Medical School* (2020)

“Approach to respiratory failure, ARDS, and COVID-19” *General Surgery residency didactic lecture, Massachusetts General Hospital* (2020)

“SARS-CoV-2 and COVID-19: a primer” *Respiratory Pathophysiology course, Harvard-MIT Health Sciences and Technology Graduate Program* (2020)

“A human ciliopathy reveals essential functions for NEK10 in airway mucociliary clearance” *Department of Medicine Grand Rounds, Massachusetts General Hospital* (2020)

“Leveraging rare respiratory disorders to illuminate pulmonary physiology” *Children’s Research Institute lecture, University of Texas Southwestern Medical Center* (2020)

“NEK10 controls human airway mucociliary clearance.” *University of Iowa Airway Research Seminar* (2019)

“Inactivating mutations in NEK10 cause a human short cilia syndrome.” *National Jewish Respiratory Disease Young Investigators’ Forum* (2019)

“NEK10 controls human airway mucociliary clearance.” *Whitehead Institute Forum seminar* (2019)

“NEK10 loss-of-function causes a novel human motile ciliopathy.” *Rare Lung Diseases mini-symposium, American Thoracic Society Conference* (2019)

“Pathophysiology of EBV-associated hemophagocytic lymphohistiocytosis” *Fellowship Grand Rounds, Harvard Combined Pulmonary/ Critical Care Program* (2017)

“Physiology and applications of extracorporeal CO2 removal”. *Grand Rounds, Division of PCCM, BIDMC* (2017)

“Molecular genetics of primary ciliary dyskinesias.” *Grand Rounds, Division of PCCM, MGH.* (2017)

“Pathobiology of Pneumocystis jirovecii” *Grand Rounds, Division of PCCM, BIDMC* (2017)

“Anti-amino-acyl tRNA synthetase syndromes.” *Grand Rounds, Division of PCCM, MGH.* (2017)

“Diulefoy’s disease of the bronchus.” *Grand Rounds, Division of PCCM, BIDMC* (2017)

“The science of the night: novel and unexpected roles for miR-143/145 in intestinal regeneration.” *Department of Medicine Grand Rounds, Massachusetts General Hospital* (2016)

“Critical care goes viral: a case of adenoviral sepsis.” *Grand Rounds, Division of PCCM, MGH.* (2016)

“Novel and unexpected roles for miR-143/145 in mouse intestinal regeneration.” *The Johns Hopkins University School of Medicine Young Investigator’s Day.* (2013)

“Therapeutic microRNA replacement in murine liver cancer.” *microRNAs in Human Disease Meeting.* (2010)

“Therapeutic microRNA replacement in murine liver cancer.” *IMBA Microsymposium on Small RNAs.* (2009)

Other experience & certification

[experience] Ad hoc referee: *Science, Nature, Journal of Intensive Care Medicine, Acta Anaesthesiologica Scandinavica, American Journal of Physiology- Lung Cellular and Molecular Physiology, Genetics in Medicine*

Co-Director, Primer on Complex Trait Genetics course, Mass General Hospital and Broad Institute of Harvard and MIT (2023)

Infrastructure Committee, Center for Genomic Medicine, Massachusetts General Hospital (2023-)

Pathways Consult Service Core Scientist, Massachusetts General Hospital (2021-)

Training grant review committee, Division of Pulmonary and Critical Care Medicine, Massachusetts General Hospital (2020-)

Online Second Opinions Program, Mass General Brigham (2021-)

House staff critical care lecture faculty, Massachusetts General Hospital (2019-)

Member, American Thoracic Society (2018-)

Intensivist, Newton-Wellesley Hospital (2017-)

Faculty, Harvard “Principles of Critical Care Medicine for Non-Intensive Care Specialists” (2017-2019)

Grant reviewer, The Max and Minnie Tomerlin Voelcker Fund (2015)

[certification] Diplomate in Critical Care Medicine, American Board of Internal Medicine (2021)

Diplomate in Pulmonary Disease, American Board of Internal Medicine (2020)

Diplomate in Internal Medicine, American Board of Internal Medicine (2017)

Massachusetts state medical license, MA Board of Registration in Medicine (2017)