

# Turning the Oxygen and Vitamin Dials

**February 3**

**Tuesday, 12:30 pm**

**Billings Building—Rosedale Room**

**SPEAKER:**



**Isha Jain, Ph.D.**

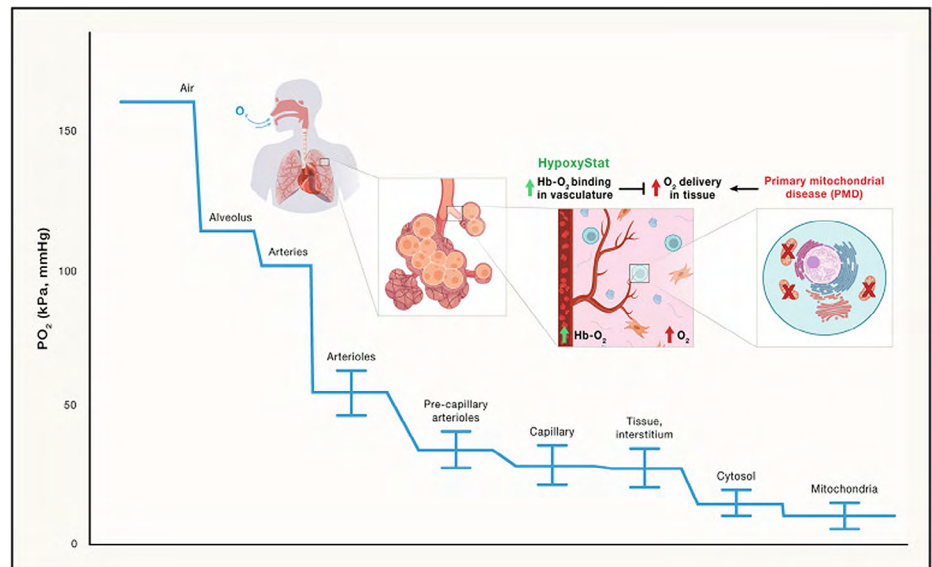
Core Investigator, Arc Institute  
Associate Professor and Investigator  
Gladstone Institutes, University of  
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**Host: Rajiv R. Ratan, M.D., Ph.D.**

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## Abstract

Oxygen deprivation (hypoxia) and excess (hyperoxia) are both toxic to humans. Oxygen deprivation contributes to 3 of the 5 leading causes of mortality in developed nations—heart attack, stroke, and respiratory failure. On the other hand, hyperoxia is toxic to nearly all organisms and contributes to the pathology of ischemia-reperfusion injury, mitochondrial disease and hyperoxic lung injury. However, the molecular mechanisms underlying hypoxia and hyperoxia toxicity remain unknown. By deciphering these mechanisms, we strive to nominate novel therapeutic candidates. Our recent work highlights such mechanisms of hyperoxia toxicity and the cycle of damage caused by destabilization of specific iron-containing protein complexes. While small molecules and biologics are the most common forms of therapy, we believe we have uncovered a new mode of treating metabolic disorders. We now hope to extend our findings to additional inborn errors of metabolism, as well as more common metabolic disorders, including aging and age-associated damage.



## Publications:

1. Alan H. Baik, Augustinus G. Haribowo, Xuewen Chen, Bruno B. Queliconi, Alec M. Barrios, Ankur Garg, Mazharul Maishan, Alexandre R. Campos, Michael A. Matthay, Isha H. Jain. *Small-molecule hypoxia therapy in mitochondrial disease*. <https://doi.org/10.1016/j.molcel.2023.02.013>
2. Isha H. Jain, Luca Zazzaron, Rahul Goli, Kristen ALEXAlexa, Stephanie Schatzman-Bone, Harveen Dhillon, Olga Goldberger, Jun Peng, Ophir Shalem, Vamsi K. Mootha. *Oxygen toxicity causes cyclic damage by destabilizing specific Fe-S cluster-containing protein complexes*. [https://www.cell.com/cell/abstract/S0092-8674\(25\)00207-7](https://www.cell.com/cell/abstract/S0092-8674(25)00207-7)
3. Ayush D. Midha, Yuyin Zhou, Bruno B. Queliconi, Alec M. Barrios, Augustinus G. Haribowo, Brandon T.L. Chew, Cyril O.Y. Fong, Joseph E. Blecha, Henry VanBrocklin, Youngho Seo, Isha H. Jain. *Organ-specific fuel rewiring in acute and chronic hypoxia redistributes glucose and fatty acid metabolism*. <https://doi.org/10.1016/j.cmet.2023.02.007>