PHOL 610/NTRN610/ANAT610- Basic Oxygen and Physiological Function (1 credit)

Course Director/Professor: Joseph LaManna, PhD, 368-1112; JCL4@case.edu

Co-Instructors: Michelle Puchowicz, PhD, map10 and Kui Xu, MD/PhD, 368-5950, kxx

Spring semester 2021: class 2/01/2021 to 5/19/2021

Course TA: Alireza Abdollahifar<axa860@case.edu>

Pathway for Oxygen: Weibel E. R., *Harvard Univ Press 1984; ISBN O-674-65790-X*

Physiology of Oxygen Radicals: *Aubrey E. Taylor et al.; Waverly Press, Inc 1986; ISBN 0-683-08104-7*

Atom: *L. Krauss, Library of Congress 2001 ISBN 0-316-49946-3*

Oxygen: *Nick Lane; Oxford University Press 2002; ISBN 0-19-850803-4*

Symmorphosis: *E. Weibel; Harvard Univ Press 2000; ISBN 0-674-00068-4*

Bioenergetics3: *David G. Nicholls, Stuart J. Ferguson, 1999;Academic Press ISBN 0-12-518121-3*

Scaling: *K. Schmidt-Nielsen, Cambridge Univ Press, 1984; ISBN 0-521-31987-0*

High Altitude and Man: *J.B. West, S. Lahiri; Amer Physiol Soc. The Williams & Wilkins Co. 1984; ISBN 0-683-08945-5*

Schedule: 1 hour per week, Thursday 1-2 pm, ZOOM

Grading: A: 85 and above; B: 70 -84; C: <70

Grading: midterm 35%, final 40%, class participation 10%, presentation 15%,

SESSION	Week	Discussion Topic
1	4-Feb	**Discussion: Origin of Oxygen, Dicovery of Oxygen.** Papers; vidoes to watch: *1. "Oxygen: a play in 2 acts, by Carl Djerassi and Roald Hoffmann"* 2. "Elements"
2	11-Feb	**Discussion: Life before oxygen, Photosynthesis**
3	18-Feb	**Discussion: Oxygen Toxicity, Measurement of Oxygen: Methods of detection**
4	25-Feb	**Discussion: Lung and Gas Exchange**
5	4-Mar	**Discussion: Blood, Heart and Circulation**
6	11-Mar	**Discussion: Microcirculation, Blood Brain Barrier and Gas Channels, transporters**
7	18-Mar	**Discussion: Scaling, Symmorphosis, Energy Expenditure, Temperature**
8	25-Mar	***Midterm Exam***
9	1-Apr	**Discussion: Mitochondria and Mitochondrial Metabolism** Introduction/Origin of Mitochondria; Discovery of respiratory chain; chemiosmotic energy and bioenergetics (theory and biological applications); prevention of mitochondrial oxidative damage
10	8-Apr	**Discussion: Adaptation/acclimatization to Altitude**
11	15-Apr	**Discussion: Hypoxia-induced angiogenesis, Anoxia tolerance** Selected reading: *J.C. LaManna et al, Review: Structural and functional adaptation*

12	**22-Apr**	**Discussion: Ketosis**
13	**29-Apr**	**Discussion: Ischmia, Clinical and Experimental studies**
14	**6-May**	**Student presentation**
15	**13-May**	***Final Exam***