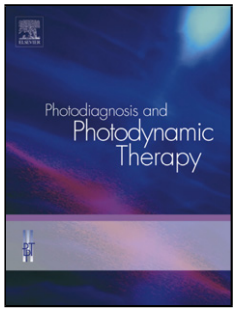
Accepted Manuscript



Title: Liaison between Heme Metabolism and Bioenergetics Pathways-A Multimodal Elucidation for Early Diagnosis of Oral Cancer

Authors: Ripon Sarkar, Kabita Chaterjee, Durbadal Ojha, Bijurica Chakraborty, Sanghamitra Sengupta, Debprasad Chattopadhyay, Chirasree RoyChaudhuri, Ananya Barui

PII: S1572-1000(17)30451-9
DOI: https://doi.org/10.1016/j.pdpdt.2018.01.002
Reference: PDPDT 1093

To appear in: *Photodiagnosis and Photodynamic Therapy*

Received date: 21-9-2017
Revised date: 29-12-2017
Accepted date: 3-1-2018

Please cite this article as: Sarkar Ripon, Chaterjee Kabita, Ojha Durbadal, Chakraborty Bijurica, Sengupta Sanghamitra, Chattopadhyay Debprasad, RoyChaudhuri Chirasree, Barui Ananya.Liaison between Heme Metabolism and Bioenergetics Pathways-A Multimodal Elucidation for Early Diagnosis of Oral Cancer.*Photodiagnosis and Photodynamic Therapy* https://doi.org/10.1016/j.pdpdt.2018.01.002

Liaison between Heme Metabolism and Bioenergetics Pathways-A Multimodal Elucidation for Early Diagnosis of Oral Cancer

Ripon Sarkar[1], Kabita Chaterjee[2], Durbadal Ojha[3], Bijurica Chakraborty[4], Sanghamitra Sengupta[4], Debprasad Chattopadhyay[3, 5**], Chirasree RoyChaudhuri[6], Ananya Barui[1*]

[1]Centre for Healthcare Science and Technology, Indian Institute of Engineering of Science and Technology Shibpur, Howrah-711103, India

[2]Department of Oral and Maxillofacial Pathology, Buddha Institute of Dental Sciences, Patna

[3]ICMR Virus Unit, Kolkata

[4]Department of Biochemistry, University of Calcutta, Kolkata

[5] Regional Medical Research Centre (ICMR), Belagavi

[6]Department of Electronics & Telecommunication Engineering, Indian Institute of Engineering of Science and Technology Shibpur, Howrah-711103, India

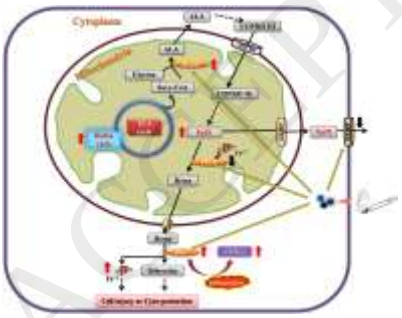
[*]Corresponding Author:

Ananya Barui
Centre for Healthcare Science and Technology, IIEST, Shibpur.
Howrah Pin-711103
Email: ananya.pariksha@gmail.com

[**]Co-Corresponding Author

Debprasad Chattopadhyay
ICMR Virus Unit, Kolkata
and
Regional Medical Research Centre (ICMR), Belagavi
Email: debprasaddc@gmail.com

Graphical Abstract



Graphical abstract: Proposed role of cigarette smoking on cellular metabolic pathways. The schematic diagram shows heme metabolism that takes place in mitochondria and cytoplasm, and how the pathway is impaired under long exposure to smoking. NADH and FAD from TCA and other path ways in mitochondria are affected and the redox is imbalanced. Expression of ALAS1 gene in mitochondria is increased after cigarette smoking leading to over synthesis of PpIX. Excess PpIX is toxic for cells and is excreted out form the cells through ABCG2 channel. Cigarette smoke also suppresses expression of membrane protein ABCG2. In the final step of heme biosynthesis, PpIX is coupled with ferrous ion to form heme by the enzyme FECH. Excess heme accumulation is controlled by feedback inhibition of ALAS1