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Heme and vascular disrupting agent in non-small cell lung cancer

Lung cancer is the leading cause of cancer-related death in the US and the world, and non-small cell lung cancer represents 85% of lung cancer cases. There are many challenges associated with studying and treating lung cancer, and there is a diverse set of metabolic factors influencing the tumorigenesis and metastasis of lung cancer. Recent studies have shown that lung cancer cells rely heavily on mitochondrial respiration and that inhibiting mitochondrial function may be an effective method to combat lung cancer. Further, more research has noted increased levels of heme flux and function as critical to intensified oxygen consumption and accompanying amplified pathogenesis and progression of lung cancer. The upregulation of mitochondrial DNA and biogenesis genes are also correlated with lung cancer. Interestingly, we found that the vascular disrupting agent combretastatin A-4 phosphate (CA4P) substantially enhanced the levels of enzymes involved in heme biosynthesis, uptake and degradation, and oxygen-utilizing hemoproteins. Furthermore, detection of markers of mitochondrial function suggests that CA4P did not diminish mitochondrial function in viable tumor cells. These results suggest that elevated levels of heme flux and function contribute to tumor regrowth and treatment resistance post-VDA administration. Novel strategies to inhibit vasculature functions and suppress lung tumors will be discussed.

Biography

Li Zhang has completed her PhD from UCLA and Postdoctoral studies from MIT department of Biology. She is the Cecil H. and Ida Green Distinguished Chair in Systems Biology Science at the University of Texas at Dallas. Her laboratory has worked on studying heme signaling and function for more than 20 years. She has published many original research articles and a book entitled *Heme Biology: The Secret Life of Heme in Regulating Diverse Biological Processes* on this subject. Her laboratory has also made important contributions in understanding the roles of molecular chaperones in cellular signaling, molecular mechanisms of oxygen signaling, and the actions of neurotoxicants. Recently, her lab focuses on investigating heme function in lung cancer. She and her colleagues have provided a unifying view of cancer bioenergetics in a review article entitled a holistic view of cancer bioenergetics: mitochondrial function and respiration play fundamental roles in the development and progression of diverse tumors, published in the journal *Clinical and Translational Medicine*.

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