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The University of Texas, USA

Heme and mitochondrial function in non-small cell lung cancer

In 1920s, Otto Warburg made the observation that cancer cells utilize significantly more glucose than normal, healthy cells, which led him to believe that cancer cells relied on glycolysis more than healthy cells. However, many subsequent studies have shown that glucose is not only necessary for glycolysis but also for oxidative phosphorylation and the production of building blocks for the synthesis of other molecules. 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. Lung cancer cells rely heavily on mitochondrial respiration, and several studies have shown that inhibiting mitochondrial function is an effective method to combat lung cancer. Several agents have been used to inhibit mitochondrial function, including cyclopamine and metformin. Further, more research has noted that increased levels of heme flux and function are 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. Recent experimental data will be presented to show that targeting tumor cell bioenergetics can suppress lung tumorigenesis and progression.

Biography

Li Zhang has completed her PhD at UCLA and Post-doctoral studies at 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 studied heme signaling and functions for more than 20 years and 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 helped unravel the functions of molecular chaperones, oxygen signaling, and the actions of neurotoxicants. Recently, her lab has investigated the function of heme in lung cancer, providing 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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