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MicroRNAs and epigenetic change in cancer development and therapeutic resistance

Cancer incidences have been increasing worldwide. Rapid progress in cancer diagnosis and treatment has been accomplished during last 10 years. However, the therapeutic resistance still is the major hinder for cancer treatment. Our goal is to reveal new molecular mechanisms of chemoresistance and radioresistance and to identify novel diagnosis and treatment options to overcome therapeutic resistance in lung, breast and ovarian cancers. We found that suppression of several miRNAs including miR-152, miR-148a and miR-145; induction of reactive oxygen species (ROS) and epigenetic changes play important roles in cancer development and therapeutic resistance. To understand the mechanism of miRNA suppression, we found that DNA methylation, transcriptional regulation, and histone H3 lysine 27 trimethylation are key factors in inducing miRNA suppression which regulates cancer development and autophagy. We also find that in addition to the gene mutations, signaling molecule activation and ROS are new mechanism of acquired resistance of lung cancer cells to EGFR-TKIs treatment.

Biography

Bing-Hua Jiang obtained his PhD degree from Mississippi State University in 1994, then started the first post-doc training in The Johns Hopkins University School of Medicine (JHU). He originally cloned hypoxia-inducible factor 1 α (HIF-1 α) in JHU. He identified different functional domains of HIF-1 α for regulating HIF-1 transcriptional activation activity and many direct targets of HIF-1 including VEGF and heme oxygenase-1. He then moved to the Scripps Research Institute to have further post-doc training in 1997, where he studied the mechanism of PI3K in regulating different functions in different cells and animal. He initially demonstrated that PI3K and AKT play important roles in tumor angiogenesis by inducing VEGF and HIF-1 α expression. Since he established his own lab in 2000, our lab has demonstrated that oxidative stress and microRNA dysregulations are important in cancer development, drug resistance, tumor growth, and angiogenesis through epigenetic changes. He have published more than 157 research papers in peer-reviewed journals and his papers have more than 30,000 citations, H-index: 71.

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