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Epigenetic disruption of cell signaling in human cancer pathogenesis

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Carcinogenesis involves multiple genetic and epigenetic alterations of cancer genes, including the epigenetic disruption of many tumor suppressor genes (TSG) by promoter CpG methylation. These epigenetic abnormalities provide us with useful epigenetic biomarkers for novel TSG identification as well as cancer diagnosis. Through integrative cancer epigenetics/epigenomics, we have identified a series of methylated cancer genes, including various nuclear proteins and regulatory genes involved in cell signaling regulation. These candidate genes could induce tumor cell apoptosis and suppress tumor cell growth, are thus functional TSGs. Epigenetic silencing of these TSGs leads to the disrupting of normal cell signaling including Ras, WNT/b-catenin and nuclear signaling, which further facilitates the de-regulation of cell cycle, apoptosis, cell stemness and metastasis. These TSGs are frequently methylated and downregulated in aero- and digestive tumors in a tumor-specific manner, thus could serve as non-invasive epigenetic biomarkers for early tumor detection and prognosis prediction, as well as therapeutic targeting.

Biography

Qian Tao obtained his PhD from the University of Hong Kong in 1995 and completed his postdoct training in Johns Hopkins School of Medicine. He was appointed as an Assistant Professor in Johns Hopkins in 1999, and is currently a full Professor in The Chinese University of Hong Kong. His research interest is cancer epigenetics/epigenomics - identification and functional characterization of methylated novel tumor suppressor genes. He has published 125 papers including *Cancer Res, JCO, Oncogene* and *PNAS* ones. He is currently an Academic Editor for *PLoS*, external reviewer for multiple journals, and a vice-President of the International Epigenetics Society.

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