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Secretomic analysis reveals that alpha-actinin 4 induces cell migration and invasion and is a serological indicator of lung adenocarcinoma

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Abstract

Based on comparative proteomic analyses of cell secretomes, it was found that alpha-actinin 4 (ACTN4) is a candidate metastasis-related protein in lung adenocarcinoma cell lines. To functionally characterize the ACTN4 protein in lung adenocarcinoma cell lines, we used ACTN4 knockdown in a series of analyses, including invasion and migration assays, as well as cellular microscopic morphology. To study the role of ACTN4 protein in clinical assessment, a total of 84 tissue samples at different stages of lung cancer were tested for ACTN4 expression using immunohistochemistry, and plasma from 147 healthy control patients and 185 lung cancer patients was analyzed by home-made ELISA. When ACTN4 protein was knocked down in CL1-5 cells, migration and invasion were strongly suppressed, and the cells changed from an early mesenchymal morphology into a globular morphology. Assessment of ACTN4 protein expression in clinical tissue samples showed that the levels differed between cancer tissue and the adjacent normal tissue; the area under the receiver operating characteristic (ROC) curve (AUC) was 0.736. In plasma, ACTN4 protein levels differed significantly between control and cancer patients, with an AUC of 0.828. Our results suggest that ACTN4 protein has a strong association with lung cancer metastasis, and that it has potential as a predictor of early metastasis in lung adenocarcinoma.

Biography

Liao received his B.S. in Chemistry and M.S. in Chemical Engineering from National Tsing-Hua University, Taiwan, and Ph.D. in Analytical Chemistry from Michigan State University in 1995. He joined the faculty at the Department of Environmental and Occupational Health, National Cheng-Kung University College of Medicine, Taiwan in 1997, where he established the Proteomics and Metabolomics Research Core Laboratory and was promoted to Distinguished Professor in 2011. His research interests include analytical chemistry, mass spectrometry, proteomics, biomarker discovery, cancer biomarkers, lung cancer metastasis, and environmental and occupational health. He is currently serving as the President of Taiwan Proteomics Society.