

FXVD3: A PROMISING BIOMARKER FOR CANCER TREATMENT

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Easy access to the Na⁺-K⁺ pump in the cell surface membrane and the critical dependence of cell survival on the pump has made it an attractive therapeutic target in cancer. Use of cardiac glycosides have been explored but has turned out to have limited utility due cardiac toxicity of the drugs. As an alternative we have examined if targeting FXVD proteins that associate closely with the Na⁺-K⁺ pump molecular complex might be useful. FXVD3 is of interest because it is markedly over-expressed in several common cancers and we have shown that several FXVD proteins, including FXVD3, are critical for reversal of glutathionylation of the β1 Na⁺-K⁺ pump subunit, an oxidative modification that inhibits pump activity. We hypothesized that FXVD3 protein overexpression protects pump function against inhibition by the high levels of oxidative stress in cancer cells typically encounter and a reduction in FXVD3 expression levels would sensitize cells to chemotherapy and radiotherapy that largely induce cell kill by increasing oxidative stress. In light of the reported treatment resistance of overexpressing FXVD3 cancers, results suggest silencing wild type proteins may greatly strengthen the efficacy of treatments that increase oxidative stress within tumors. Such increases are commonly seen with radiotherapy and chemotherapeutic agents. This ongoing study endeavors to develop amalgamated novel treatments for cancer patients while alleviating side effects associated with traditional therapy; advance diagnosis and improve overall patient well-being.

BIOGRAPHY

Chia chi Liu is Senior Research Fellow and Molecular Biologist with expertise in oxidative protein chemistry at University of Sydney. She was a Biochemistry Lecturer in Taipei Medical University Taiwan. She completed MSc in Cell and Molecular Biology at Taipei Medical University Taiwan, followed by second MSc in Biotechnology, University of New South Wales. She then completed her PhD within the Department of Chemistry and Biomolecular Science, Macquarie University. Her core focus is investigating the relationship between oxidative stress and the sodium pump function. Her research interests include the development of new diagnostic methods for oxidative damage of the pump; the discovery of new drugs for heart disease; and the design of novel therapeutic proteins for cancer treatment.

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