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Inhibitory roles of a novel glycosaminoglycan-binding peptide on cancer cell motility

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Glycosaminoglycans (GAGs) are carbohydrates that are usually attached to extracellular or plasma membrane proteins to form proteoglycans. A specific GAG-binding peptide (GBP-HH) has been identified from core heparan sulfate binding region in human RNase3, a unique RNase family member with *in vitro* antitumor activity. GBP-HH displayed a strong cell surface binding and penetrating activity with no obvious effect on general cell proliferation in a variety of cancer cell lines. Here we show that GBP-HH significantly reduced cell migration in A549 lung cancer and OECM-1 oral cancer cells, suggesting that GBP had an inhibitory effect on cancer cell motility. Specifically, GBP-HH also blocked HB-EGF-induced cell migration but not EGF. This implied that GBP-HH might control cell migration through its heparin sulfate binding ability. We found that treatment with GBP-HH increased the overall number of focal adhesion in A549 cell, as well as increased length of focal adhesion complex. To further study the dynamics of focal adhesion, A549 cells were transfected with vinculin-GFP expression constructs and subjected to time-lapse imaging. Treatment of GBP-HH significantly increased the stability of vinculin-positive focal adhesion complexes, as indicated by increased time-span between de novo assembly of focal adhesion and the final disassembly during imaging. Taken together, these results implied that GBP-HH may slow down disassembly of focal adhesion complex and thereby suppressed cell motility. Molecular mechanism underlying these intracellular processes is currently under investigation.

Biography

Lily Hui-Ching Wang has completed her PhD in 2004 in Taiwan and Postdoctoral studies in Max-Planck Institute of Biochemistry, Germany. She was a Project Leader of University of Basel (2009-2010) and presently an Associate Professor of National Tsing Hua University in Taiwan. Her expertise involves time-lapse live cell microscopy and the application of this technology to monitor timely changes of cells upon physiological and pathological conditions.

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