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Antibody Based Tumor Markers: Discovery to Practice

Zhi-Nan Chen
Cell Engineering Research Centre & Department of Cell Biology, Fourth Military Medical University, 710032 Xi’an, China
znchen@fmmu.edu.cn

Tumor markers are molecules occurring in blood or tissue that are associated with cancer and whose measurement or identification are useful in patient diagnosis or clinical management. They are either produced by tumor cells or by the body in response to tumor cells. A ideal tumor markers can be used for one of four purposes: (1) screening a healthy population or a high risk population for the presence of cancer; (2) making a diagnosis of cancer or of a specific type of cancer; (3) determining the prognosis in a patient; (4) monitoring the course in a patient in remission or while receiving surgery, radiation, or chemotherapy. The progress in discovering and generating new potential tumor markers was mainly from the completion of human genome sequencing and applications of gene expression profiling with DNA and protein microarrays, Two-dimensional (2D) gel electrophoresis coupled with MS, multi-dimensional HPLC, SELDI-TOF-MS, helped to analyze the potential markers at the protein level. Notably, antibody as specific adaptor molecule is an important tool linking genomic, proteomic and systems biology. A large number of tumor markers were defined or discovered by monoclonal antibodies or polyclonal antisera, such as CA125, CA 19-9, CA 242 came from antibody OC 125, 19-9, C242, respectively. Presently, antibody microarray is a potential way to profile tumor markers. HAb18G/CD147 is a novel hepatoma-associated antigen recently cloned by hepatoma monoclonal antibody HAb18 screening from human hepatocellular carcinoma cDNA library. HAb18G/CD147 is abundantly expressed in human hepatoma tissues and on the cell surface of several highly metastatic hepatoma cell lines as detected by immunohistochemistry using monoclonal antibody against HAb18G/CD147. HAb18G/CD147 is a highly glycosylated protein of 60kDa to immunoglobulin superfamily. HAb18G/CD147 has been identified as a factor that induces matrix metalloproteinases production, and it plays an important role in cell migration and tumor invasion. And we also found the over-expression of HAb18G/CD147 promotes invasion and metastasis via alpha3beta1 integrin mediated FAK-paxillin and FAK-PI3K-Ca2+ pathways. In further, we will verify whether HAb18G/CD147 is a novel cancer-associated biomarker that might be developed as biomarkers and/or therapeutic targets for different types of cancer.

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