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GC-MS investigation of cell-culture based small molecular cancer biomarkers (SMCBs)

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Abstract

A large number of biochemical reactions proceed with great accuracy inside the body of live organisms. In a normal, healthy state, therefore, the concentration of many different metabolites in blood is fairly constant [1]. However, it is believed that if biochemical processes become defective, usually due to a disease, the concentration of normal metabolites may change considerably, and in some cases new, abnormal metabolites may also be generated, usually defined as disease biomarkers [2]. The past decade has witnessed rapid progress in the understanding of the molecular basis of human illness, and it is expected that cures will be found for the major fatal diseases, particularly cancer [3]. More than four decades ago, Jellum *et al.* proposed that if one was able to identify and determine the concentration of all metabolites excreted by the human body, including both high and low molecular weight substances, one would likely find that many diseases would consequently result in characteristic changes of the biochemical composition of the cells and body fluids [2].

Solid phase microextraction (SPME) coupled with GC-MS analysis currently is the most widely used sample preparation technique possessing several important advantages over traditional analytical methods such as the convenient integration of extraction, preconcentration, and sample introduction. Recently we have developed novel devices for the in-vitro extraction of small molecular cancer biomarkers (SMCBs) excreted by the cancer cells. We believe that specific changes in the metabolic composition of cancer cells can provide useful molecular information for rapid disease screening.

Biography

Seung-Woo Lee obtained his Ph. D. degree in Chemistry and Biochemistry from Kyushu University, Japan, in 1999. He is now a Professor of the Graduate School of Environmental Engineering of the University of Kitakyushu, Japan. His current scientific interests include organic/inorganic nanohybrids, molecular imprinting using metal oxide thin films, and GC-MS analysis and chemical sensors for biomedical applications.