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Editorial

Recent Advances in Cancer Biomarkers

As the scientific literature expands exponentially, the role of expert reviews becomes more important. "Cancer biomarkers" constitutes one of the most rapidly advancing fields in clinical diagnostics. Cancer biomarkers can be used to screen asymptomatic individuals in the population, assist diagnosis in suspected cases, predict prognosis and response to specific treatments, and monitor patients after primary therapy. Despite the fact that current cancer biomarkers are not very effective at screening the population and diagnosing cancer early, these tests are still valuable clinically to monitor patients during and after therapy and to select patients who may respond to specific treatments.

The introduction of new technologies such as microarrays and mass spectrometry, as well as the completion of the sequencing of the human genome, have sparked new interest in cancer biomarkers. Many scientists, including ourselves, have previously predicted that the knowledge of all human genes will enable the discovery of new cancer biomarkers which may be more effective than the classical biomarkers used in the clinic today. Others have postulated that mass spectrometry and microarrays will allow for more effective diagnosis of cancer by using complex proteomic patterns or for better classification of cancers, based on molecular signatures, respectively. These predictions have yet to be realized. However, previous experience teaches us that 10–20 years may be necessary before technological advances such as these move from the bench to the bedside. Monoclonal antibodies provide a case in point. Despite their discovery in the mid-1970s, only recently has their widespread use in therapeutics been realized.

We were invited by the Editor of *Clinical Biochemistry* to put together a 'Special Issue' of the journal, focusing specifically on reviews of cancer biomarkers. In our efforts to organize this volume, we did not attempt to either cover every cancer biomarker (as this would be unrealistic) or restrict ourselves to a specific cancer site. Rather, we relied on the expertise of the contributors, as well as their willingness to provide their reviews in a timely fashion. These papers complement our previous efforts to publish reviews on cancer biomarkers in the form of books [1] or special issues of other journals [2].

The 15 expert reviews published in this volume can be roughly categorized into four groups. In the first group, there are six reviews dealing with specific cancer biomarkers such as pro-gastrin-releasing peptide (pro-GRP) by Molina et al., S-100 protein by Harpio et al., kallikreins by Mikolajczyk et al., cytokeratins by Barak et al., the urokinase–plasminogen activator system by Duffy and Duggan, and human chorionic gonadotropin by Stenman et al. The second group focuses on cancer of specific sites such as that of the bladder by M. Sanchez-Carbayo and that of the breast by Robison et al. In the third group, there are reviews that describe cancer biomarkers that have not been previously recognized as such, inasmuch as they have arisen from new technologies, reflect novel targets, or represent alternative forms of genes or epigenetic changes. The topics covered here range from the application of proteomics to cancer diagnosis by Rodland, the realization that splice variants of certain genes may be promising new cancer biomarkers by Brinkman, DNA methylation as a cancer biomarker tool by Cottrell, and the current utility of apoptotic markers by Holdenrieder and Stieber. The remaining reviews discuss the important issues of tyrosine kinase inhibitors as promising cancer therapeutic targets (Madhusudan and Ganesan), bioinformatic strategies that optimize the discovery of cancer diagnostic proteomic profiles (White et al.), and the infrastructure and protocols required to transfer genomic biomarkers to patient care (Pritzker and Azad).

We hope that these reviews will be of interest to particularly the field of clinical chemists and medical oncologists, as well as to trainees in laboratory medicine.

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References

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