Summary

This chapter describes the role of proteomics in developing personalized management of cancer, which is defined as choice of the best treatment for an individual. Numerous proteomic technologies are available, and selected ones relevant to development of personalized therapy are described. Cancer biomarkers discovered by proteomics can be used for diagnosis as well as drug targets, thus facilitating the integration of diagnostics and therapeutics. Proteomics fulfills many of the requirements for personalized therapy of cancer.
1. INTRODUCTION

Oncoproteomics is the term used for application of proteomic technologies in oncology, and this chapter will discuss the role it plays in the development of personalized medicine, which simply means selection of therapy best suited for an individual patient (1). Pharmacogenomics (application of genomics to drug discovery and development), pharmacogenetics (influence of genetic factors on action of drugs), and pharmacoproteomics (application of proteomics to drug discovery and development) play an important role in this process (2). However, metabolomics (study of metabolites) and environmental factors also need to be taken into consideration. Management of cancer has been unsatisfactory in the past, but an understanding of the molecular, genetic, genomic, and proteomic aspects of cancer is accelerating progress in cancer therapy. A major improvement in cancer therapy is the introduction of the concept of personalization. Personalized medicine requires a better understanding of the molecular biology of the disease, improved diagnosis for early detection as well as monitoring the course of the disease, and rational therapeutics, which may be combined with appropriate diagnostics. The role of proteomics in the development of personalized therapy for cancer is shown in Fig. 1.

This chapter will describe the use of proteomics for developing personalized therapies for cancer. Proteomic technologies have been described in detail elsewhere (3). Selected proteomic technologies will facilitate the development of personalized medicine as follows:

- a better understanding of cancer molecular pathology of cancer;
- improving the molecular diagnosis of cancer;
- improved classification of cancer;
- cancer biomarkers discovered by proteomics can be used for diagnosis as well as drug targets, thus facilitating the integration of diagnostics and therapeutics;
- toxicoproteomics, by identifying toxic effects of anticancer drugs at an early stage, will help in the development of safer therapies for cancer.