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### **P**roteomics: beyond the genome sequence

The draft nucleotide sequence of the human genome may be more or less complete, but the formidable task of characterizing the proteins encoded by the sequence remains. The challenge is to understand how the immense amount of information encoded in the genome is translated into action via proteins within different cell types. The characterization of proteins will be essential if new therapeutic drugs are to be developed.

The complex set of proteins encoded by a cell during its lifetime is referred to as the proteome. Each cell type may express different patterns of proteins at different times during its development. Each protein in turn may be modified chemically in an equally diverse number of ways to serve different cellular functions — the complexity is overwhelming.

Diversity aside, researchers hope to be able to define the proteomes of certain cell types at specific stages of their development. Research is already underway to develop the technology necessary to compare the specific protein profiles of diseased versus non-diseased states of certain tissues. The rewards will be considerable including the identification of new disease markers and novel drug candidates.

Several companies hope to develop the methods necessary to exploit the information contained in different proteomes. One company, GeneProt, was recently formed in Geneva for this purpose. Professor Robin Offord, President and Vice Chairman of GeneProt and Director of the University of Geneva's Department of Medical Biochemistry, commented: "In addition to generating and commercializing proteomic and related information, GeneProt will identify novel proteins and peptides from industrial-scale screening of biological samples. We hope to obtain and rapidly sort large quantities of biological data from the analysis of biological fluids from healthy and sick individuals". This should allow improved diagnostic methods that may be used to identify molecular abnormalities in diseased states. Amos Bairoch, of the Swiss Institute of Bioinformatics and a member of GeneProt's scientific advisory board, remarked: "GeneProt will link expertise in bioinformatics with proteomics. Processing the large amounts of data generated will play a key role in the rapid identification of novel therapeutic

targets and identification of metabolic disorders."

In addition to their own efforts in proteomics, pharmaceutical companies will be watching closely the efforts of new startup companies adopting novel approaches to studying the complexity of the proteome. The benefits for diagnostic applications and drug development promise to be considerable.

Barry Whyte, *Bulletin*