Guest-Editorial

Talkin' Omics

The 1990s will be remembered as the decade when advances in biomedical research launched the genomics era. While new information and technologies are clearly important products of the genomics revolution, perhaps most important is a change in mindset of how we pursue scientific discovery. We are no longer satisfied to study a gene or gene product in isolation, but rather we strive to view each gene within the complex circuitry of a cell. Understanding how genes and their products interact will open many exciting avenues in biological and biomedical research. In rapid succession, this new mindset has invigorated the analysis of all molecular entities, from the genome, to transcripts (transcriptome) and proteins (proteome). And it is clear that this is just the beginning of the omics revolution.

While the understanding and treatment of many diseases will be impacted by omics, arguably the greatest biomedical opportunity for discovery is cancer. As a family of diseases, all cancer results from changes in the genome. The genomic changes take many forms, from point mutations, to amplifications and deletions, to translocations. Cancers in particular body sites (breast, prostate, brain) display a multitude of different changes in the genomic blueprint that can result in disease. As we move toward classification schemes based on molecular signatures, omics approaches provide the opportunity to search for differences and similarities in those tumors. Moreover, cancer is a temporal disease, usually developing over many years from an accumulation of changes occurring within the genome. Therefore, the opportunity exists to define events not only occurring in tumors, but also in precursor stages of disease that might be most amenable to intervention.

The complexity of molecular events within the genome are reflected and amplified by the diversity of transcripts and proteins within a cell. A variety of transcripts can be derived from the same gene, and the encoded proteins can be modified extensively to fulfill specific biological functions within a cell. The omics revolution has challenged researchers to integrate the study of the genome, transcriptome, and proteome, for this is the most promising approach to attaining a comprehensive omic view of the molecular circuitry within a cell.

In this issue of *Disease Markers*, we are fortunate to have contributions from some of the leaders of the omics approach. While many of the articles feature cancer research, we hope that the more general applicability of the described approaches is apparent. We have tried to make this inaugural omics special issue of *Disease Markers* provocative and informative, and we hope that it captures the excitement that has led to the description of omics research as revolutionary.

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