

Foreword

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Welcome to the second issue of a special supplement to the Journal of Disease Markers highlighting the role that various imaging techniques play or might play in detecting markers of disease. In these pages, cancer often is used as an example; but tumors exhibit many properties in common with other tissue, so it is possible to see how the techniques might be applied to the diagnosis and management of other diseases. There also are examples of the reverse of this flow of hypothesis and knowledge from one discipline to another.

Magnetic resonance spectroscopy (MRS) can be used to detect the chemical milieu of the nucleus being focused on, be it phosphorus-31 (Arias-Mendoza) or protons (H). Phosphorus is intimately involved in carbohydrate and phospholipid metabolism and energy transfer. The brain has been the testing ground for ideas in magnetic resonance imaging and MRS; it continues to be so today, with extension to tumor diagnosis as insights are reached and assimilated.

This issue discusses three techniques that rely solely or partially on optical characteristics of tissue. Tromberg describes diffuse optical spectroscopy, which is directly sensitive to concentrations of deoxy-hemoglobin and hemoglobin, and reports on the components of tissue density as may occur in the breast. Developing optical methods that definitively separate be-

nign and malignant breast tissues is a goal. Adding exogenous optical contrast agents can greatly improve the sensitivity of optical methods. Peptide targeting of the epidermal growth factor receptor is used as an example (Sevick-Muraca) of the possibilities for targeting disease markers. Combining ultrasound and optical imaging (Wang) to improve on their separate results also shows promise for cancer detection. Atomic force microscopy (Costa) is a technique currently in use at the cellular level to examine the physical properties of living cells in culture. Cell mechanics differ in health and disease; the properties may be of use clinically.

This supplement, in two issues, has emphasized mostly possibilities rather than clinically available techniques. The final chapter attempts to draw together the modalities of medical imaging and push the frontiers yet further to show how imaging and markers can be used together in the screening, diagnosis, and management of patients' disease.

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