The State of the Art in Histotechnology

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Histotechnologists live in exciting times. During the 1970s and 1980s anatomic pathology evolved from what was essentially a descriptive science relying primarily on classical tinctorial stains to enhance morphologic data to a more "scientific pathology" employing molecular and immunohistochemical (IHC) techniques that define the genotype and phenotype, respectively. Despite their proven value for over 100 years, most tinctorial stains do not provide much information about the biology of tumors. In contrast, molecular and IHC methods that define nucleic acids and proteins are based on well defined scientific principles and provide precise information about the structure and function of these macromolecules. For example, by combining non-radioactive in situ hybridization analysis of the oncogene Her2/neu/c-erbB-2 with IHC analysis of c-erbB-2 protein, we gain a greater understanding of the oncogene's biological role in breast cancer.

During this transition pathologists have become increasingly aware that sole dependence on descriptive morphology to distinguish benign from malignant tumors, to track metastases, and to classify the different stages of any single tumor is not practical without the benefit of modern techniques. For example, the distinction between primary and metastatic pulmonary adenocarcinoma, the most morphologically heterogeneous tumor of the lung, posed a diagnostic difficulty for surgical pathologists using only the H&E. However, differences in cytokeratin and villin immunostaining proved to be helpful in making this distinction.

The H&E is also unreliable for the detection of cryptic tumor cells in lymph nodes of patients with esophageal cancer; unless the H&E revealed tumor cells in lymph nodes, patients were classified as tumor free. Recently, immunostains for Ber-EP4, a marker of epithelial cells, have revealed a single metastatic cell undiscernible with the H&E. Detection of this metastatic cell significantly alters the patient's prognosis.

As the understanding of the biology of cancer increases, the use of the modern techniques will undoubtedly increase, but morphology will always be the basis of surgical pathology. It would be an egregious error to discard the classical stains that have been the stalwarts of the pathologist's armamentarium for so long. For example, despite the extraordinary advances made in diagnosing the acute leukemias with molecular probes and fluorescence in situ hybridization (FISH), careful microscopic observation using standard morphological criteria very frequently corresponds to genetic distinctions uncovered by these "scientific" techniques.

The specialitvies available prior to the early 1970s were in different subcategories of special stains like the neurological silver stains used by neuropathologists, enzyme stains used by neuropathologists and hematopathologists, and stains for lipids, amyloid, metals, connective tissue elements, and nucleic acids used primarily by surgical pathologists. However, the "cook book" approach of imparting dyes to tissues elements now appears antiquated, and the newly introduced techniques provide a wider choice for histotechnologists. They can strive to excel in IHC, in situ hybridization, FISH, hard tissue morphometry, measurement of apoptosis using a molecular in situ method, to name a few. Furthermore, histotechnologists fortunate enough to have achieved the specialized training for performing these assays are likely to achieve specialty status in the eyes of the surgical pathologist and to be involved in the evaluation of the molecular or IHC stained sections. In a recent national survey to determine the approach to performing and interpreting the IHC estrogen receptor assay, it was determined that a significant percentage of histotechnologists evaluate these specimens in concert with pathologists.

The formation of the National Society for Histotechnology (NSH) in the early 1970s coincided with the introduction of IHC techniques. This was a fortuitous event because the NSH Board of Directors with the guiding hand of all the presidents (Dominic Europa, Lee Luna, Don Hammer, Vivian McClure, John Ryan, Marilyn Gamble, and the current president Freida Carson) provided a vehicle for the dissemination of information on emerging technologies at the annual symposium, which allowed histotechnologists to gain knowledge and experience through lectures and hands-on workshops. Until then, opportunities to "share notes" with colleagues or to get insights on a particular stain from the experts were virtually non-existent except for the Armed Forces Institute of Pathology annual meetings directed by Lee Luna and the American Society of Medical Technologists histology section chaired by Desna Sheehan, Billie Swisher, Sue Judge, and Frieda Carson, among others. I have a vivid recollection of presenting a talk on the "Chemistry of the H&E" to this very dedicated contingent of pros-
fessionals whose small number was overshadowed by the larger number of medical technologists dominating that professional organization. A society just for histotechnologists did not seem practical at the time. However, Dominic Europa and Lee Luna provided the impetus for the establishment of NSH in 1973.

The 25 year history of NSH is very closely linked to that of its journal, which has been the custodian of the technical advances in histotechnology and dedicated to spreading the principles of the art and science of staining of diseased tissue among its members. As Editor-in-Chief of the Journal of Histotechnology for the past 14 years, I have made every effort to publish papers from all sections of our discipline in an attempt to stay with the times. As a result, I have had the satisfaction of seeing the journal earn a respected place in the community of pathologists both in this country and around the world. It is my expectation that this trend will continue into the next century for the benefit of present and future members who rely on us to stay current with advances in this field while continuing to reinforce the tried and true.

Happy 25th anniversary, NSH!

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Editor-in-Chief

References


