

tumors have been classified may be in more contemporary terms considered as “biomarkers.” In like fashion, genomic and proteomic expression profiles of tumors have thrust pathology and oncology into molecular systematics to develop classifications.

The role of molecular profiling or systematics for clinical decision making and taxonomy has been recently considered, and the classification of tissue or other specimens for diagnostic, prognostic, and predictive purposes based on multiple gene expression and proteomics has been noted to hold major promise for optimizing the management of patients with cancer (Ioannidis 2007). However, assay development and data analysis have been principally investigative, and there exists a lofty potential for the introduction of bias. Most troubling is that standardization of profiles has been the exception. Moreover, classifier performance is typically overinterpreted by conveying the results as p-values or multiplicative effects, whereas the absolute sensitivity and specificity of classification are modest, particularly when tested in large validation samples (Ioannidis 2007). Furthermore, validation has frequently been made with less than favorable consideration for methodology and safeguarding for bias. Most disconcerting is that the postulated classifier performance can be inflated compared to what these profiles can accomplish.

Whether traditional morphological designated characteristics or molecular systematics are employed, the aim of any classification is to demonstrate diagnostic, prognostic, and predictive performance. This can generally be accomplished for any data set by training. However, it is well known that unless training is unsupervised (no knowledge of the correct class is involved), the performance of the system being tested on the training dataset is totally uninformative about its true operation (Ioannidis 2007). Cross-validation and independent validation are two methods to determine whether the proposed scheme is an accurate classifier (Allison et al. 2006). Despite the method employed, different metrics can be used to describe the classifier performance. These may include statistical testing measures, multiplicative effect measures such as likelihood ratios or hazard ratios, or absolute effect measures. Although all information has some value, absolute effect measures (sensitivity and specificity) are the most meaningful from a clinical perspective (Buyse et al. 2006).

Classification Systems for Salivary Gland Neoplasms

The classification system for salivary gland neoplasms has evolved with the accumulation of clinical experience and our understanding of the basis for neoplasia. Although a variety of classifications have been advocated, there has been some regional variation in terminology and classification between European and American authors. Historically, the first and most notable classification was that put forth by Foote and Frazell (1954). Later systems reflect the recognition and description of previously unrecognized entities or the deletion of some terms that were misnomers or were considered meaningless. The succeeding classifications include those by Thackray and Lucas (1974); Evans and Cruickshank (1970); the World Health Organization (WHO); Thackray and Sobin (1972); Batsakis (1979); Seifert et al. (1986); and Ellis and Auclair (Auclair, Ellis, and Gnepp 1991). The most recent fascicle on the subject provides a stepwise evolution of these taxonomies (Ellis and Auclair 1996).

THE CELLULAR CLASSIFICATION OF SALIVARY GLAND NEOPLASMS

Salivary gland neoplasms are noted for their histological variability. Reflecting the anatomy of these glands, benign and malignant salivary gland neoplasms may arise either from epithelial, mesenchymal, or lymphoid origins. The complexity of the classification and the rarity of some of these tumors, some of which display a wide spectrum of morphological patterns within the same tumor and the existence of hybrid lesions, challenge the surgical pathologist with a difficult task in differentiating benign from malignant tumors (Seifert and Donath 1996; Speight and Barrett 2002).

The following cellular classification system reiterates that advocated by the National Cancer Institute (NCI) of the U.S. Public Health Service (USPHS) (www.cancer.gov), which is derived heavily from that published by the Armed Forces Institute of Pathology (AFIP) (Ellis and Auclair 1996) (Table 7.1). Similar to the NCI scheme we also include malignant non-epithelial neoplasms because these lesions embrace a sizable proportion of salivary gland neoplasms. Though less common,