1. INTRODUCTION

Almost all ovarian tumors can be diagnosed on routine examination of adequate numbers of sections stained with hematoxylin and eosin, with the occasional addition of mucin, glycogen, argyrophil or reticulum stains (1). Although electron microscopic studies have expanded our knowledge of the morphologic features of ovarian tumors, they have rarely yielded information of diagnostic significance. Immunohistochemistry has already contributed to our understanding of the biology of ovarian tumors, but up to the present time has likewise been of little diagnostic aid. It is probable, however, that, with the continuing identification of new and more specific antibodies and experience with larger numbers of cases, this approach will have an increasingly important role in the diagnosis of unusual ovarian tumors.

Several problems exist currently with regard to the use of immunohistochemistry for the diagnosis of ovarian neoplasms. Some of these problems apply to the field of immunohistochemistry in general, and have been well summarized in a recent editorial (2). They include variations in fixation and technique from one study to another, differences in the specificity of the antibodies being used, and experience with too few cases, leading to preliminary unwarranted claims of specificity for many antibodies. An additional problem with regard to ovarian tumors is that most of the diagnostic difficulties involve the interpretation of rare neoplasms, which often exhibit considerable variation from one specimen to another. For example, Sertoli-Leydig cell tumors have many patterns and cell types, so that experience with large numbers of cases will be necessary before generally applicable conclusions can be drawn about their immunohistochemical properties.
This chapter will review some of the many contributions in the field of immunohistochemistry of ovarian tumors, with an attempt to evaluate their biologic and diagnostic significance. Instead of discussing successively each antibody and its application to the entire range of ovarian neoplasms, the chapter will consider the published experience with various antibodies in relation to each of the major categories of ovarian tumor and most of the subtypes that are included in the classification of the World Health Organization (3). Several valuable reviews of the role of immunohistochemistry in ovarian (4) and gynecologic pathology (5-7) have appeared recently in the literature.

2. COMMON EPITHELIAL TUMORS

Carcinoembryonic Antigen. Carcinoembryonic antigen (CEA), which was initially identified in the serum of patients with adenocarcinoma of the colon, was found subsequently to be elevated in the serum in association with benign disorders and cancers of a variety of organs, including those of the female genital tract (8). Immunohistochemical investigations of CEA in ovarian tumors (9-14) have produced a wide range of findings, with the differences attributable largely to methodology and antibody specificity. For example, one team of investigators (14) found that 50 percent of common epithelial carcinomas, including almost all types, stained positively for CEA, while others (13) reported its absence in serous and undifferentiated carcinomas in contrast to the other forms of common epithelial tumor, whether benign, borderline or invasive (Fig. 1). In addition to its presence in neoplastic glandular epithelium in these neoplasms, CEA has been demonstrated in the transitional type epithelium.

Figure 1. Endometrioid carcinoma, stained for carcinoembryonic antigen.