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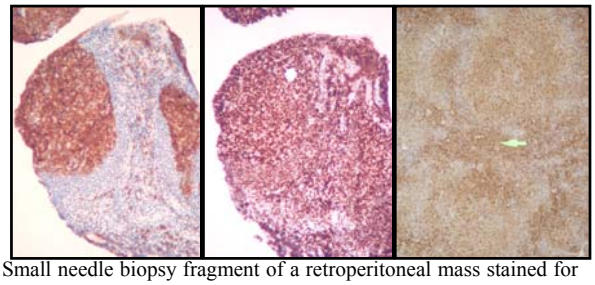
# Focus on Immunohistochemistry – May 2001

## CD10

The CD10 antigen is a cell surface zinc-dependent metalloprotease that is expressed in a wide variety of cell types. It is often referred to as "common ALL antigen" or "CALLA", secondary to its frequent expression in most cases of acute lymphoblastic leukemia. CD10 is also expressed in a variety of other lymph-ohematopoetic and non-lymphohematopoetic neoplasms. Within the past several years, an antibody to CD10 that is reactive in paraffin-embedded material has become available (clone 56C6), and this antibody has proven to be a very useful and reliable reagent for a number of diagnostic problems. Potential uses of this antibody are discussed below.

### Diagnosis of lymphoma

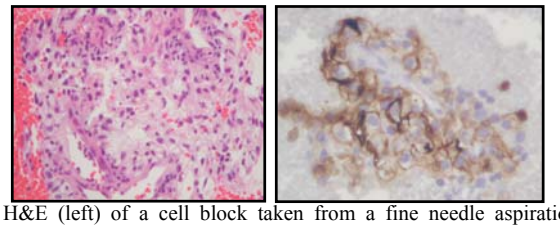
In a normal lymph node, CD10 (CALLA) expression is generally confined to reactive germinal centers (i.e. secondary follicles), with occasional scattered positive lymphocytes in the interfollicular areas. Stromal cells are also frequently positive, as are neutrophils. Therefore, identification of a significant CD10-positive population of lymphocytes outside of the confines of a reactive germinal center is distinctly abnormal, and this finding is often a reflection of a neoplastic lymphoid proliferation. The majority of follicular lymphomas express this marker, and in many of these cases one is often able to appreciate an abnormal population of CD10-positive lymphocytes that is present between the neoplastic follicles. This antibody can be particularly useful in the evaluation of small fragmented needle biopsies of lymph nodes, since the identification of a population of CD10-positive, BCL-2-positive lymphocytes can provide very strong support for a neoplastic lymphoid population (since normal germinal centers are BCL-2 negative, and as such fragmented portions of normal CD10-positive germinal centers in a lymph node biopsy would not be expected to express BCL-2). In addition, the finding of a diffuse CD10-positive proliferation of lymphocytes in an extranodal location also provides very strong supportive evidence in favor of lymphoma. A certain proportion of diffuse large B-cell lymphomas express CD10, and there is some recent evidence that the expression of CD10 may be associated with shortened overall survival. Burkitt-like lymphomas characteristically express CD10, and about one-third of cases of multiple myeloma express this marker. CD10 expression is unusual in T-cell neoplasia, with the exception of angioimmunoblastic T-cell lymphoma. B-cell lymphomas that are characteristically negative for CD10 include mantle cell lymphoma (with rare exceptions), small lymphocytic lymphoma, and marginal zone B-cell lymphoma (lymphoma of MALT).



Small needle biopsy fragment of a retroperitoneal mass stained for CD10 (left panel) and BCL-2 (adjacent panel). This provides strong support for follicular lymphoma, since a primary (resting) follicle would be CD10 (CALLA) negative and BCL-2 positive, whereas a normal germinal center (i.e., secondary follicle) is CD10 (CALLA) positive but BCL-2 negative. The right panel shows a low power photo of CD10 in a follicular lymphoma. The arrow points to a population of CD10-positive lymphocytes that is present between two CD10-positive neoplastic follicles (above and below the arrow), from a case of follicular lymphoma (low power).

**Distinction of renal cell carcinoma from adrenal cortical carcinoma**

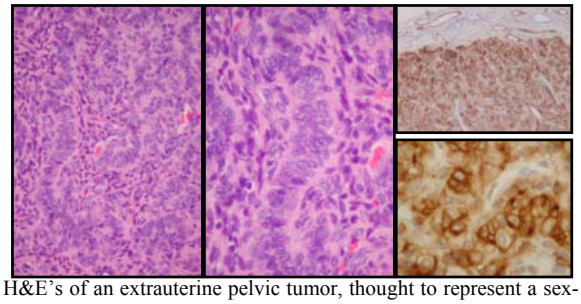
Recent studies of CD10 expression in non-hematopoetic neoplasms found that 89-94% of renal cell carcinomas of clear cell type and papillary type expressed CD10. In contrast, chromophobe carcinomas (19 cases) were negative. As such, CD10 is useful in a panel of markers to distinguish typical renal cell carcinoma from chromophobe carcinoma, a distinction that may have significant prognostic implications. Furthermore, CD10 was found to be absent in cases of adrenal cortical carcinoma (10 cases). For this reason, CD10 is a logical antibody to include in a panel of immunostains used for distinguishing renal cell carcinoma from adrenal cortical carcinoma. It should be noted that CD10 is also expressed in a variable percentage of a wide variety of other types of carcinomas, so the fact that a particular carcinoma expresses CD10 should not necessarily be interpreted as evidence to support a kidney primary origin. (The reader is referred to ProPath "Focus on Antibodies" from February 2001, for a discussion of the classic immunophenotype of clear cell renal cell carcinoma, and other antibodies that may be useful in its recognition).



H&E (left) of a cell block taken from a fine needle aspiration biopsy of an "adrenal mass" in an adult male. The clear cell neoplasm was originally thought to represent an adrenal adenoma, although immunophenotyping revealed that the tumor represented a clear cell carcinoma of renal origin. As expected, the tumor cells were positive for CD10 (right).

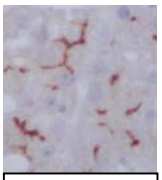
**Diagnosis of endometrial stromal sarcoma**

On occasion, the morphologic appearance of endometrial stromal tumors can be very similar to those of uterine smooth muscle tumors and also some sex cord-stromal tumors. CD10 has been found to be expressed in a very high percentage of endometrial stromal tumors, in contrast to smooth muscle tumors, where it was found in only 6% (1 of 16) of leiomyosarcomas. Since there may be significant immunophenotypic overlap using other markers, CD10 can be very useful in this differential diagnostic problem. Again, it is important to realize that CD10 is not specific for endometrial stromal tumors, and it has been identified in a variety of other mesenchymal neoplasms. Nevertheless, in the proper clinical context, expression of this marker can be very useful in determining the endometrial stromal origin of a uterine or pelvic spindle cell neoplasm.



H&E's of an extrauterine pelvic tumor, thought to represent a sex-cord stromal tumor (Sertoli) or smooth muscle neoplasm Immunophenotyping revealed that the tumor actually was an extrauterine endometrioid stromal sarcoma, and as expected, the tumor stained strongly for CD10 (right).

**Diagnosis of hepatoma**



CD10, liver

CD10 is expressed by normal bile canaliculi, and we have also found this reagent to be useful in the diagnosis of hepatocellular carcinoma, since it may also highlight a canalicular pattern of staining in cases of hepatoma. Polyclonal CEA is also expressed in bile canaliculi, and the use of that reagent has been advocated by some authors for the diagnosis of hepatoma. In our experience however, many hepatomas do not show a canalicular pattern with polyclonal CEA, but may show this pattern with CD10 (and also sometimes with villin). For this reason, we routinely include CD10 as part of our panel of antibodies when hepatoma is a strong diagnostic consideration.

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