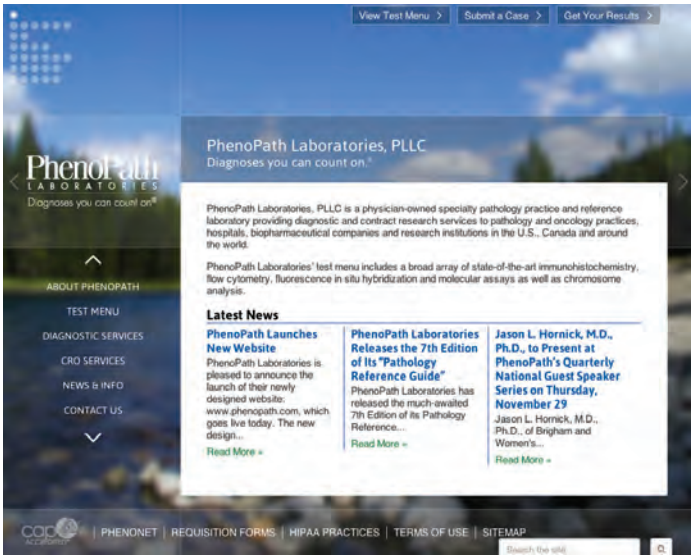
The Newsletter of PhenoPath

phenomena™

Laboratories ● 1-888-92-PHENO ● www.phenopath.com ● Winter 2012 ● Volume 15 No.3

PhenoPath Launches → New Website

PhenoPath Laboratories is pleased to announce the launch of our newly designed website: **www.phenopath.com**, which went live Monday, November 19, 2012. The new design advances our mission to provide "Diagnoses you can count on®" by providing our customers access to extensive diagnostic pathology reference and referral resources. The website is designed to support the needs of pathologists and their administrative staff with easily accessible information from their computer browsers, mobile phones, and tablets.



For Pathologists: Clinical reference information is provided in a number of contexts including:

- Test information sortable by disease state, organ system, test type and alphabetically
- Clinical setting descriptions of consultative studies and test interpretation maps
- Secure on-line access to their current and historic patient consultation and test results (PhenoNet)
- Continuing education resources

For Administrative Staff: Easy-to-use tools for finding and ordering tests and consultations

- Extensive test menu with comprehensive information including CPTs & specimen requirements
- Test alpha search and "favorites" menu options with test names searchable by alias
- Quick link to requisitions that can be filled out on-line
- Easy to use on-line form to request supplies for submitting cases
- Contact tool that facilitates sending your message to the appropriate department

The website will be updated on a regular basis, with news, product launches, and new clinically related content. Be on the lookout for additional enhancements in the months ahead (e.g., educational videos, case studies, etc). We're always interested in your feedback, so please email us at **lab@phenopath.com** to share.

PhenoPath Laboratories releases the *7th edition* of its *"Pathology Reference Guide"*

PhenoPath Laboratories has released the much-awaited 7th Edition of its Pathology Reference Guide, a comprehensive overview of all the immunohistochemistry, flow cytometry, and molecular (PCR-based and FISH-based) testing offered by PhenoPath Laboratories.

The current guide, completely revised and updated, further expands upon the mission of the first Pathology Reference Guide in 1998: education of, and collaboration with, our physician clients to foster the optimal delivery of quality care through accurate diagnoses.

The Pathology Reference Guide covers general consultation areas (e.g., carcinomas of unknown primary, small blue round cell tumors), organ-restricted analyses (e.g., breast carcinoma markers and lung carcinoma subclassification), as well as other diagnostic pathology (e.g., germ cell tumors and amyloid analysis).

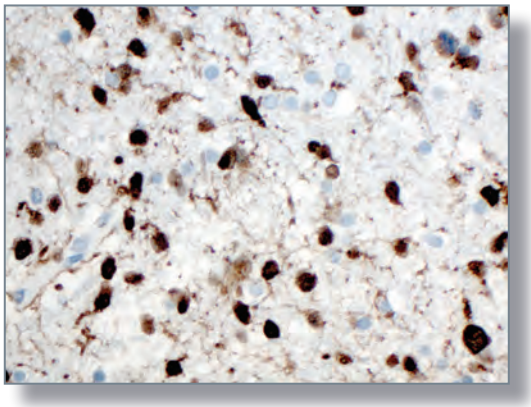
To help illustrate the various IHC and FISH results associated with each clinical setting, PhenoPath is introducing a new visual presentment of the specificity and sensitivity of specific IHC and FISH results, utilizing "heat maps" that employ color coding to indicate the likelihood of a marker being positive in a given tumor. The color assignment to each marker represents a distillate of data from the published literature and the personal experience of PhenoPath pathologists examining and interpreting thousands of cases every year. Illustrated to the right is an example "heat map" of spindle cell tumors of the skin.

For information on securing a copy of the Pathology Reference Guide contact lab@phenopath.com.

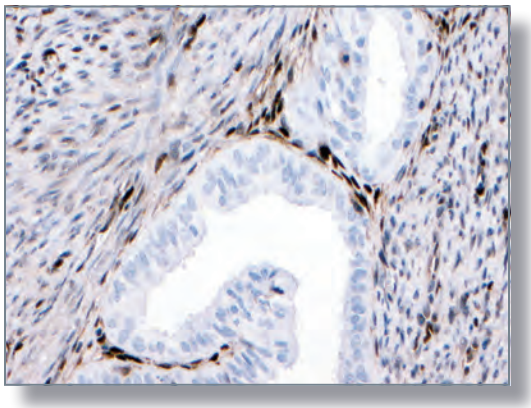
PhenoPath announces the validation of five new antibodies for the analysis of solid and hematologic malignancies.

IDH1

Isocitrate dehydrogenase 1 is an enzyme that participates in the citric acid cycle, and is mutated in a high fraction of gliomas and oligodendrogliomas, particularly in grade II and grade III neoplasms. In these tumors, the overwhelming majority show a point mutation at codon 132 (R132H). The availability of a monoclonal antibody specific for the mutated IDH1 (see image right), which does not cross-react with the native protein, has provided an immunohistochemical tool that can be used to positively identify these tumors. Mutation of IDH1 also appears to be a very strong prognostic factor in diffuse gliomas, independent of grade. Moreover, because IDH mutations do not occur in reactive gliosis, the latter can often be separated from diffuse gliomas, which are usually positive for the mutation (and hence positive by IHC).



Mutant IDH1



PTEN

PTEN

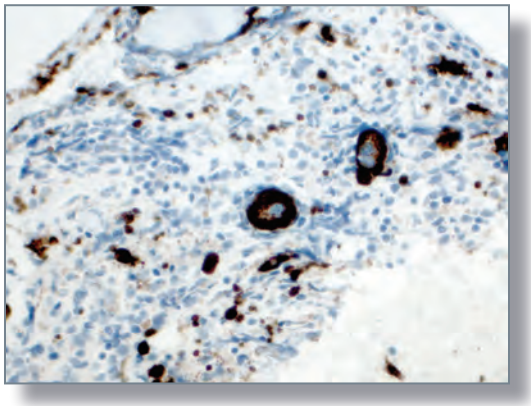
Phosphatase and tensin homolog (PTEN) is a ubiquitous protein that acts as a phosphatase to dephosphorylate phosphatidylinositol (3,4,5)-trophosphate, also known as PIP3, resulting in inhibition of the AKT signaling pathway. In normal cells, PTEN is involved in the regulation of the cell cycle as part of signal pathway that shuts down cell proliferation and leads to apoptosis. Functioning as a tumor suppressor gene, when there are inactivating mutations or deletions of the PTEN gene, this can result in activation of the PI3K/AKT signaling pathway, resulting in increased cell proliferation and other features associated with poor prognosis, such as resistance to chemotherapy and hormone therapy. PTEN is mutated in a large number of human malignancies, including carcinomas of the breast, generally resulting in loss of protein expression (see image left). There is increasing interest in the potential use of inhibitors to molecules downstream from PTEN, particularly mTOR kinases, such as rapamycin, in the setting of tumors demonstrating loss of expression of PTEN.

CD42b & CD61

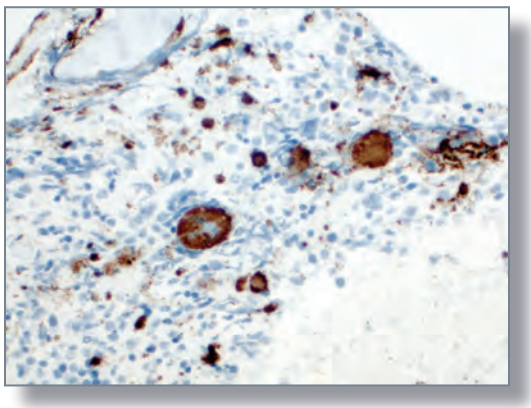
CD42b, also known as GPIb (alpha chain), is a cell surface and transmembrane glycoprotein expressed in megakaryocytes and platelets. It is defective in a number of diseases, including Bernard-Soulier syndrome and platelet-type von Willebrand disease. CD42b is a sensitive and specific marker of normal and neoplastic megakaryocytes and platelets, including at least a subset of acute megakaryoblastic leukemias. The literature suggests that CD42b may be a less sensitive marker of immature megakaryocytes/megakaryoblasts than anti-CD61 antibodies, as CD42b tends to be expressed on relatively mature megakaryocytes.

CD61, also known as GPIIIa, is a cell surface and transmembrane glycoprotein expressed in megakaryocytes, platelets, and their precursors. CD61 antigen plays a role in platelet aggregation and functions as a receptor for fibrinogen, fibronectin, von Willebrand factor (vWF), and vitronectin. CD61 is a sensitive and specific marker of normal and neoplastic megakaryocytes and platelets, including virtually all acute megakaryoblastic leukemias, for which it is likely to be a more sensitive marker than CD42b.

In addition to CD42b and CD61, PhenoPath continues to offer von Willebrand Factor (vWF) immunohistochemistry to aid in the identification of megakaryocytes, although note that vWF is less specific for megakaryocytes than CD42b or CD61, as vWF also tends to be uniformly expressed in endothelial cells.



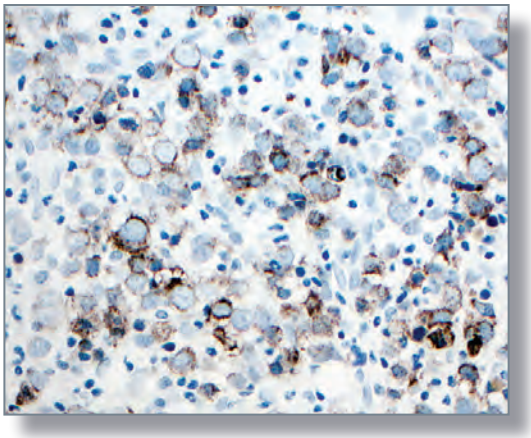
CD42b by IHC – positive staining of platelets and macrophages in a bone marrow core



CD61 by IHC – positive staining of platelets and macrophages in a bone marrow core

Continued on page 3

Continued from page 2



CD71 IHC identifies a proerythroblastic proliferation in a case of myelodysplasia.

CD71

CD71, or the transferrin receptor, is a protein required for the uptake of transferrin-bound iron by erythroid precursors in the bone marrow. In diagnostic hematopathology, CD71 is used as a sensitive and specific marker of erythrocyte precursors in both normal and abnormal bone marrows. It is a superior marker to both hemoglobin A and glycophorin A. When used together with CD15, which is positive at some level on virtually all myeloid cells in the marrow, CD71 can help estimate the myeloid:erythroid ratio in bone marrow sections.

BRAF mutation detection in melanoma by the FDA-approved cobas® V600E mutation test for vemurafenib (Zelboraf®) eligibility

Metastatic melanoma patients have a poor prognosis with an estimated median survival of 8 to 18 months for patients with stage IV disease. Until recently, the only FDA-approved treatment for metastatic melanoma was dacarbazine, which has limited clinical efficacy.

Approximately 40-60% of melanomas contain a mutation in BRAF, a serine-threonine protein kinase that is an important component of the mitogen-activated protein (MAP) kinase signaling pathway. Deregulated activation of this pathway, has been shown to be a key contributor to tumor cell growth. The most common BRAF mutation is a point mutation that results in the substitution of glutamic acid for valine at codon 600 (V600E) and this mutation accounts for the vast majority (~90%) of activating BRAF mutations that occur in melanoma. The drug vemurafenib (Zelboraf®) is a potent inhibitor of activated BRAF and has been the focus of several clinical trials for treatment of metastatic melanoma. A large-scale phase 2 clinical trial reported in the June 30, 2011 issue of New England Journal of Medicine (NEJM 364;26, 2011) showed that vemurafenib significantly improved the rates of overall and progression-free survival in patients with previously untreated melanoma harboring a BRAF V600E mutation compared to conventional dacarbazine therapy. More recently, an FDA-approved companion diagnostic test, the cobas® 4800 V600E mutation test, was released to identify the V600E mutation in these patients.

In light of these recent clinical trial reports, PhenoPath Laboratories recommends BRAF V600E testing in all cases of metastatic melanoma to determine patient eligibility for vemurafenib. Phenopath Laboratories is pleased to offer the FDA-approved cobas® 4800 BRAF V600E mutation test for such testing on melanoma specimens. This assay has been specifically optimized to detect the BRAF V600E mutation in heavily pigmented melanoma specimens, which can sometimes interfere with conventional PCR methodologies and has been validated on formalin-fixed paraffin-embedded specimens containing melanoma. Turnaround time for most cases is 2-4 days. Please contact Client Services (lab@phenopath.com) for more details.

References

1. Chapman PB et al. Improved Survival with vemurafenib in melanoma with BRAF V600E mutation. N Engl J Med 2011;364:2507.

2. Flaherty KT, et al. Inhibition of mutated, activated BRAF in metastatic melanoma. N Engl J Med 2010;363:809.

CLIENT

We value our clients. To ensure we are meeting your needs and to realize opportunities for improvements to our service, we would appreciate your taking a few minutes to complete our on-line survey at www.phenopath.com.

Completed surveys will be entered into a random drawing for an *Apple iPad*.
Participants may also submit a survey anonymously.

SATISFACTION SURVEY DEADLINE: FEBRUARY 15, 2013

PhenoPath
LABORATORIES
Diagnoses you can count on®

551 North 34th Street, Suite 100
Seattle, Washington, 98103
P (206) 374-9000
F (206) 374-9009

Jason L. Hornick, MD, PhD

PhenoPath's Quarterly National Guest Speaker Series

Jason L. Hornick, MD, PhD of Brigham and Women's Hospital, Harvard Medical School, Boston, MA presented "Gastrointestinal Stromal Tumors: From KIT to Succinate Dehydrogenase" at the PhenoPath Quarterly Conference held on Thursday, November 29, 2012. Dr. Hornick also presented a daytime lecture the same day entitled, "Immunohistochemistry in Soft Tissue Tumor Pathology: Recent Developments Based on Genetic Alterations."

Dr. Jason L. Hornick received a BA from Amherst College (Amherst, MA) and an MD and PhD from the University of Southern California (Los Angeles, CA). In 2003, Dr. Hornick joined the faculty of Brigham and Women's Hospital, where he is now Associate Director of Surgical Pathology and Director of the Immunohistochemistry Laboratory. He is an Associate Professor of Pathology at Harvard Medical School and a consultant in pathology at Dana Farber Cancer Institute. Dr. Hornick serves on the editorial boards of the *American Journal of Surgical Pathology*, the *American Journal of Clinical Pathology*, *Human Pathology*, and *Applied Immunohistochemistry and Molecular Morphology*. He serves on the Education Committee of the United States and Canadian Academy of Pathology and is Chair of the Abstract Review Subcommittee. He is Chair of the Immunohistochemistry Committee of the College of American Pathologists. He has published over 175 original papers, review articles, and book chapters on soft tissue tumor pathology, gastrointestinal pathology, and diagnostic immunohistochemistry, and has recently finished editing a new textbook entitled Practical Soft Tissue Pathology which will be published in the spring of 2013.