WHITEPAPER

IHC Applications: Mesothelioma

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Mesothelioma is a rare but aggressive cancer affecting the mesothelial lining of the lungs, abdomen, reproductive system, or heart [1,5,8] It is generally considered an occupational disease due to its strong association with environmental exposure to asbestos particles, which accounts for over 80% of mesothelioma cases.[7] The median survival time for untreated patients is just 4 to 12 months, and so quick and accurate diagnosis of the condition is of utmost importance.[3]

Although it is most frequently located in the lungs, mesothelioma is a separate condition from lung cancer.[2] Mesothelioma patients and lung cancer patients require different treatment plans and have different prognoses.[2] However, these conditions may present very similarly, and so differentiating them can be challenging, often requiring a panel of multiple confirmatory assays.[1,2] Mesothelioma also has three major subtypes, each with distinct histological features and clinical behaviors: epitheliod, sarcomatoid, and biphasic.[2,8]

Immunohistochemical (IHC) assays may play a crucial role in the accurate diagnosis of mesothelioma, and laboratories that frequently deal with mesothelioma cases often stain with panels of IHC markers to analyze protein expression.[1] Immunohistochemistry for mesothelioma is still developing as a science, and there is currently no standard set of markers for mesothelioma diagnosis.[2,7] To date, standard practice for initial diagnosis is to stain with two positive mesothelial markers and two negative markers.[3,4]

IHC markers commonly used to stain for mesothelioma include:

Calretinin: Calretinin is a calcium-binding protein expressed in mesothelial cells.[2,3] It is one of the most widely used markers for mesothelioma.[2,3] Calretinin may also provide information on prognosis.[3]

CK5/6: Cytokeratins are intermediate filament proteins found in epithelial cells. CK5/6 is often positive in mesothelioma, though it is less sensitive to the sarcomatoid subtype.[4]

WT-1 (Wilms' Tumor 1): WT-1 is a transcription regulator expressed in mesothelioma cells.[3] It is beneficial in distinguishing mesothelioma from lung carcinomas and other malignancies, especially the epithelioid subtype.[2,3]

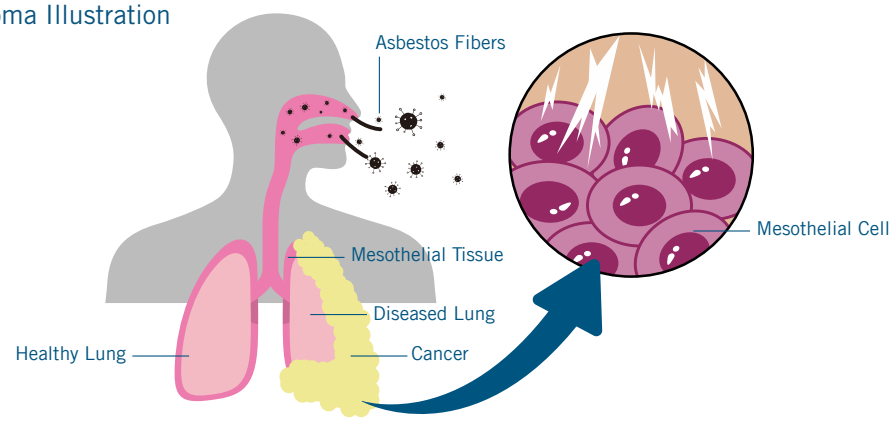
D2-40 (Podoplanin): D2-40 is a lymphatic endothelium marker that is a highly sensitive marker of mesothelioma, particularly in the epithelioid subtype.[2,3,4,6]

BAP1 (BRCA1-Associated Protein 1): BAP1 loss, detected through IHC, is a significant marker for the diagnosis of mesothelioma. BAP1 is a tumor suppressor gene, and its loss is associated with mesothelioma and a family history of cancer.[2]

Additionally, IHC may assist in differentiating mesothelioma subtypes. The markers mesothelin and Ki-67 have been used for subclassification.[8] A 2021 research study suggests that markers MUC4 and GATA 3 may aid doctors in the distinction of pleural sarcomatoid mesothelioma.[9]

While IHC staining is a valuable tool in mesothelioma diagnosis and management, it is not without limitations. While testing is still in the research stage, advances in fluorescence in situ hybridization (FISH) assays for mesothelioma markers may complement IHC staining in future clinical applications.[7]

Pleural Mesothelioma Illustration



To learn more about the markers listed above, please visit our website at biocare.net or call 1-800-799-9499, option #3

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