MAYO CLINIC
LABORATORIES

Sarcoma Targeted Gene Panel [A Test in Focus] - Transcript

Testing Overview

This is Andre Oliveira, I am a surgical pathologist with an expertise in bone and soft tissue tumors at Mayo clinic. I'm also co-director of the molecular genomics lab. A sarcoma diagnosis can be quite challenging due to the many types and their overall rarity. Often a combination of pathology expertise on their histological features, a large panel of immunostains, and a variety of molecular assays are needed for reaching the correct diagnosis. In this regard, the Mayo Clinic sarcoma panel comes as an additional tool for accomplishing this aim. Our next generation sequencing assay assesses 138 fusion transcripts in a variety of bone and soft tissue tumors. The assay can detect fusions such as the EWSR1-FLI1 that is seen in Ewing sarcoma, but also novel fusions as long as at least one of the partners is present. The test relies on RNA extracted from formalin fixed paraffin embedded tissue so it can be easily employed in routine surgical pathology specimens.

When Should I Order this Test?

The panel is primarily intended for the detection of fusion genes in sarcomas and other bone and soft tissue tumors. For this reason usually the test is ordered by surgical pathologist. The sarcoma panel assess 39 types of bone and soft tissue tumors, such as tumors like aveolar soft part sarcoma, low grade fibromyxoid sarcoma, inflammatory myofibroblastic tumor, aneurysmal bone cyst, Ewing sarcoma and many others. The panel is useful in other tumors if they harbor the same fusion genes, such as some renal cell tumors in head and neck tumors. The tests can also sometimes be used to identify gene fusions that predict response to therapy, like ALK+ inflammatory myofibroblastic tumors and the so-called NTRK tumors.

How Does this Testing Improve Upon Previous Testing Approaches?

If the pathologist is fairly certain as to what the gene fusion they are specifically looking for a FISH assay should be considered because that is a DNA based test, it is more robust and because of the lower cost. For example, in a situation that a surgical pathologist is dealing with CD34+ dermal spinal cell tumor and the consideration is a dermatofibrosarcoma protuberans, a FISH test is more than adequate. However, a FISH test is limited only to specific genes or locus be analyzed. So while a positive result would support a diagnosis in question, a negative result would neither rule out the diagnosis nor provide information of possible alternative diagnosis. FISH tests cannot determine the fusion partner, which can be diagnostically important in certain contexts. For example, in the discrimination between Ewing sarcoma and the desmoplastic small round cell tumor both contain EWSR1 fusion genes and a FISH test only for EWSR1 cannot make the discrimination. Certain immunostains like ALK or FOSB can be used as a surrogate for genetic detection of gene fusions. For example, ALK in the case of inflammatory myofibroblast tumor, in FOSB in a subset of vascular tumors. There are other gene fusion assays for sarcomas that are offered by commercial and academic labs, but we believe our assay is the most comprehensive panel currently available for paraffin embedded tissues.

What Clinical Action is Enabled by the Results of this Testing?

As mentioned earlier, the primary use of the assay is to aid pathologists in establishing a definitive diagnosis of a variety of bone and soft tissue tumors. Establishing the correct diagnosis is important for determining the type of treatment the patients should receive and predicting prognosis.