

Ewing Sarcoma Family of Tumors

Indications for Ordering

Individuals diagnosed with or suspected of having Ewing sarcoma based on morphology or immunophenotypic studies

Test Description

- Fluorescence in situ hybridization (FISH) analysis on formalin-fixed, paraffin-embedded (FFPE) tissue
- Break-apart DNA probes flank the 22q12 locus
- 100 cells evaluated from regions of tumor identified on histopathologic review of a matching hematoxylin and eosin stained section

Tests to Consider

Primary test

[EWSR1 \(22q12\) Gene Rearrangement by FISH 2007225](#)

- Diagnose members of Ewing sarcoma family of tumors (ESFT)
- Does not identify the translocation partner

Related test

[Chromosome FISH, Interphase 2002298](#)

- Specific probe for 22q12.2 must be specified
- Fresh tissue or touch-prep

Disease Overview

Prevalence and/or incidence – ~4/million children/year

- ESFT– most common malignant bone and soft-tissue tumors in childhood and young adulthood

Age of onset – peak incidence in adolescence

Diagnostic issues

- ESFT types
 - Ewing sarcoma, peripheral neuroectodermal tumors (PNET), and Askin sarcoma
- Differentiating tumors in Ewing family from each other or from other small, round cell tumors may be difficult
- Accurate diagnosis of the tumor type is essential for prognosis and determining therapy
 - *EWSR1* translocations are the hallmark of Ewing family tumors

Genetics

Gene – *EWSR1*

Variants

- *EWSR1-FLI1* fusion [t(11;22)(q24;q12)] – ~85%
- *EWSR1-ERG* fusion [t(21;22)(q22;q12)] – ~10%
- Other chimeric translocations – rare
 - *EWSR1-ETV1* [t(7;22)]
 - *EWSR1-TVA* [t(17;22)]
 - *EWSR1-FEV* [t(2;22)]

Test Interpretation

Results

- Positive – *EWSR1* gene rearrangement detected in ≥25% of nuclei
 - Strongly supportive of a diagnosis of Ewing sarcoma
- Negative – *EWSR1* gene rearrangement not detected
 - Does not exclude the diagnosis of Ewing sarcoma

Limitations

- Results may be compromised if the recommended fixation procedures have not been followed
- Does not identify specific translocation partner