Prenatal and Pregnancy Loss Testing

FISH
also known as: Fluorescence in situ hybridization (FISH), trisomy panel or FISH for aneuploidy, FISH for microdeletions/microduplications, del/dup FISH

TEST DESCRIPTION:
• **Rapid Aneuploidy FISH** is used to detect approximately 99% of +13, +18, +21, and aneuploidies of X & Y. This test is not designed to detect structural chromosome abnormalities and inconclusive results may occur if mosaicism is present.
• **Constitutional (Targeted) FISH** is used to analyze a particular region of interest within a single chromosome. Alternate testing may be appropriate, as many of the microdeletions/microduplication conditions detected by targeted FISH are also identified using the Prenatal Microarray.

TEST DETAILS and COMPLEMENTARY TESTING:
• This test analyzes fetal cells during a pregnancy. Postnatal testing on maternal, paternal, or newborn blood after delivery, including Postnatal Chromosome Analysis, Postnatal FISH, or Postnatal Microarray, must be ordered separately.
• Prenatal Chromosome Analysis for confirmation and clarification of trisomy, translocation, or mosaicism of 13, 18, 21 or sex chromosome differences is required in conjunction with Aneuploidy FISH.
• Prenatal Chromosome Analysis is recommended in conjunction with any Constitutional (Targeted) FISH.
• In conjunction with Chromosome Analysis, FISH, and/or Microarray, Amniotic Fluid AFP (AF-AFP) can be ordered on amniotic fluid samples with a gestational age of 22 weeks 6 days or less. (AChE should be ordered, instead of AF-AFP, if gestational age is 23 weeks or greater). In most situations if AF-AFP is positive, AChE will be completed. These non-genetic send-out tests can be ordered on our laboratory’s test request form, but are performed, reported, and billed by UNMC Regional Pathology Services and questions for these tests should be directed to their laboratory by calling 402-559-6420.
• If single gene testing is considered for a familial genetic condition or abnormal ultrasound findings, contact a laboratory genetic counselor for coordination of testing prior to sending the sample.

ADVANTAGES:
• Detects aneuploidy, triploidy, structural rearrangements (balanced and unbalanced), and large-scale deletions and duplications
• Results are typically available in 24-48 hours for Rapid Aneuploidy FISH, 22q11.2, and other STAT indications
• Testing available on fresh or fixed tissues

LIMITATIONS:
• Targeted assay that provides information about the region(s) of interest only
• Detection dependent on the location and size of the aberration relative to the probe

INDICATIONS FOR RAPID ANEUPLOIDY FISH:
Prenatal Chromosome Analysis is required when ordering this test.
• Advanced maternal age (>35 years of age)
• Abnormal first or second trimester screening test indicating concern for Down syndrome or trisomy 13 or 18.
• Abnormal ultrasound findings suggestive of Down syndrome, trisomy 13 or 18, and/or triploidy

INDICATIONS FOR CONSTITUTIONAL (TARGETED) FISH:
Prenatal Chromosome Analysis is recommended when ordering this test.
• Prenatal ultrasound findings suggestive of a specific microdeletion or microduplication
• Previous pregnancy with or family history of a known familial chromosome abnormality
AVAILABLE FISH PROBES:
All probes in the FISH test catalog below are available for assessment of chromosomal abnormalities based on family history or suspicious/abnormal cytogenetic findings. Please contact our laboratory for case-specific probe availability.
* designates custom probe

- 1p36 Deletion GeneReviews® [http://www.ncbi.nlm.nih.gov/books/NBK1191/]
- Charcot-Marie-Tooth / HNPP [17p12]
- Cri-du-Chat [5p15.2]
- DiGeorge / 22q11.2 Deletion GeneReviews® [http://www.ncbi.nlm.nih.gov/books/NBK1523/]
- Kallmann [Xp22.3]
- *Langer Giedion [8q24]
- Miller Dieker [17p13.3]
- *Pallister-Killian [12p]
- Prader-Willi / Angelman [15q11.2]
- SHOX [Xp22.3/Yp11.3]
- Steroid Sulfatase (STS) [Xp22.3]
- SRY [Yp11.3]
- *Waardenburg Type III [2q36-37]
- XIST, X inactivation site [Xq13]
- Centromere enumeration
- Subtelomere analysis for each chromosome
- Whole chromosome Paint Probes

SPECIMEN COLLECTION & TRANSPORT:
Complimentary test kits are available upon request, but are not required.

SAMPLE TYPE and REQUIREMENTS:
- amniotic fluid: 5 ml in sterile tube(s)
  - Additional specimen is required to perform Chromosome Analysis or Microarray Analysis. Refer to our Prenatal and Pregnancy Loss specimen requirements for more details.
- chorionic villi sampling (CVS): 10-20 mg in tissue culture media
- fetal fluid / urine: 5 ml in sterile tube(s)
- products of conception (POC): 1 cm³ (sterile) fetal tissue and/or villi in tissue culture media
  - Preferred fetal tissue sample sites include buttocks or thigh. If fetal tissue is not available placental villi can be utilized.
  - Separate villi from maternal blood and decidua to reduce the chance for maternal cell contamination.
  - For IUFD or therapeutic abortion cases, amniotic fluid can be accepted.
- tissue, paraffin embedded: paraffin block containing formalin-fixed embedded tissue or 4-5 micron sections of formalin-fixed paraffin embedded tissue on positively charged slides (2 unstained slides for each chromosomal target)
  - Include a copy of the pathology report (if applicable).
SHIPPING:
- Maintain and ship samples at room temperature.
- Coordinate transport for sample to be received in our laboratory within 24-48 hours of collection.
  - LOCAL: Call 402-559-5070 (option 1)
  - OUT OF AREA: Prior to shipment, please fax the completed test request form to 402-559-7248, including the FedEx® airbill tracking number.
    - Saturday delivery MUST be checked when sending FedEx® on Friday.
    - Please include Internal Billing Reference # 3155070600 on the FedEx® airbill.
  - Ship To: Human Genetics Laboratory – Zip 5440
    UNMC Shipping & Receiving Dock
    601 S. Saddle Creek Road
    Omaha, NE 68106

REQUIRED FORM: The following form can be downloaded via our website.
- Prenatal and Pregnancy Loss Test Request Form

OPTIONAL FORM:
- Informed Consent for Genetic Testing

POTENTIAL TEST RESULTS:

NORMAL RESULTS:
- A normal result indicates no clinically-significant chromosome abnormalities were identified.
  - 46, XX (female)
  - 46, XY (male)

ABNORMAL RESULTS:
- An abnormal result indicates that a chromosome abnormality was identified that likely provides an explanation for the clinical indications.
  - Parental testing (Postnatal Chromosome Analysis on maternal and/or paternal blood) may be recommended in order to clarify whether the result is de novo or familial for the purpose of recurrence risk calculation.
  - Deletion: Missing pieces of chromosomes and/or genetic material. Some may be small and difficult to detect.
  - Duplication: Extra genetic material which may be present on any chromosome, such as the presence of two horizontal bands at a specific location instead of one.
  - Monosomy: The absence of one whole chromosome. This includes Turner syndrome, a female with a single X chromosome (45,X) instead of 46,XX. Most other monosomies are not compatible with life.
  - Rearrangement: Genetic material is present on a chromosome but not in its usual location.
  - Translocation: Translocations result when pieces of chromosomes break off and reattach to another chromosome. If it is a one-to-one switch and all of the genetic material is present (but in the wrong place), it is said to be a balanced translocation. If it is not, then it is called an unbalanced translocation.
  - Trisomy: The presence of an extra chromosome; a third instead of a pair. These include Trisomy 21 (Down syndrome), Trisomy 13 (Patau syndrome), Trisomy 18 (Edwards syndrome), and Klinefelter syndrome, a male with an extra X chromosome (47,XXY) instead of 46,XY, and other less common trisomies.
  - In some circumstances, a result will be unavailable.

TURN-AROUND-TIMES: Results are typically available in 24-48 hours for Rapid Aneuploidy FISH, 22q11.2, and other STAT indications when performed on amniotic fluid and fetal fluid/urine. FISH studies added as a result of abnormal cytogenetic or microarray findings may take 7-14 days. When performed on CVS or POC, results are typically available in 10-14 days. When performed on paraffin embedded tissue, results are typically available in 5-10 days.
BILLING: Our laboratory offers patient/self-pay, insurance (including Medicare/Medicaid), and client/institution billing options. Verifying coverage requirements or obtaining preauthorization PRIOR TO OR AT THE TIME OF SPECIMEN COLLECTION is often necessary. We provide preauthorization services upon request by calling 402-559-5070 (option 3); the following forms are helpful for obtaining the information required by insurance providers and can be downloaded via our website.

- Request for Insurance Pre-Authorization

In some circumstances, a test may be warranted even though insurance coverage is denied or not guaranteed. For these situations, we request the following form be signed by the patient and submitted with the sample. This helps inform patients of their potential financial responsibility, should the costs of genetic testing not be paid by their insurance provider.

- Advanced Beneficiary Notice of Noncoverage (ABN) – required when billing Medicare

CPT CODES:
- amniotic fluid: 88235, 88271, 88272, 88275
- CVS: 88235, 88271, 88272, 88275
- fetal fluid / urine: 88235, 88271, 88272, 88275
- POC: 88233, 88271, 88272, 88275
- tissue, paraffin embedded: 88271, 88272, 88275

PRICING: For current costs contact the laboratory billing staff at 402-559-5070 (option 3).

RESOURCES: The following resources can be downloaded via our website, or you may request brochures for your clinic by contacting our marketing specialist at 402-559-6935 | humangenetics@unmc.edu.

- PATIENT BROCHURE: Amniocentesis (English)
- PATIENT BROCHURE: Amniocentesis (Spanish)
- PATIENT BROCHURE: CVS (English)
- PATIENT BROCHURE: CVS (Spanish)

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