

Performing a Fluid Crystal Examination

Principle Gout caused by monosodium urate (MSU) and pseudogout caused by calcium pyrophosphate dehydrate (CPPD) may be identified with a wet preparation using polarized light. Cholesterol crystals may also be noted, especially in biliary drainage.

Purpose To promote appropriate processing of fluids to optimize the recovery and identification of crystals.

Equipment and Materials

1. Glass microscope slides.
2. Cover slips.
3. Polarizing attachment for microscope.
4. Microscope with a removable polarized lens incorporated in the light path.
5. Positive control – tissue slide.

Specimen Fluid should be collected either without anticoagulant, or with a small amount of heparin. EDTA crystals are birefringent, and can be confused with MSU or CPPD.

Quality Control To verify that the microscope is properly set up, use the positive control slide, following the procedure below. Ensure that the MSU crystals are showing birefringence (crystals turning from yellow to blue). If the control slide does not exhibit birefringence, do not proceed with the fluid examination. Repeat the procedure and the microscope setup.

Performing a Fluid Crystal Examination – Cont'd

Procedure

1. Clean a slide and cover slip with alcohol immediately prior to use.
2. Dry the slide thoroughly with lens paper.
3. Place a few drops of fluid on the slide so that when the cover slip is gently added, the fluid margins barely reach the edges of the coverslip.
4. Place the cover slip over the drops of fluid, eliminating as many air bubbles as possible.
5. Place the polarizing attachment over the light source of the microscope.
6. Place the control slide on the stage. Using the 10X objective, swing out the Full Wave Plate so the field turns black.

Identification of Monosodium Urate Crystals

1. Bring the crystals into sharp focus. The needle-shaped crystals will appear white.
2. Bring in the Full Wave Plate, and put the Orientation Handle in the extreme left position so that the Slow Axis is parallel to the North-South of the stage. Yellow crystals with long dimension North-South may be Monosodium Urate crystals.
3. Pick one yellow crystal with the long-dimension running North-South for examination. Move the Orientation Handle to its extreme right position so the Slow Axis is perpendicular to the North-South oriented crystal. If the crystal turns from yellow to blue, it is a Monosodium Urate crystal.

Identification of Pyrophosphate Dihydrate Crystals

1. Bring the crystals into sharp focus. The needle-shaped crystals will appear white.
 2. Swing in the Full Wave Plate, and put the Orientation Handle in the extreme left position so that the Slow Axis is parallel to the North-South axis of the stage. Blue crystals with long dimension North-South MAY be Calcium Pyrophosphate Dihydrate Crystals.
 3. Pick one blue crystal with the long dimension running North-South for examination. Move the Orientation Handle to its extreme-right position so the Slow Axis is perpendicular to the North-South oriented crystal. If the crystal turns from blue to yellow, it is a Calcium Pyrophosphate Dihydrate Crystal.
 4. Place the slide with the fluid specimen on the microscope. Repeat steps 1-3 from both sections, above.
 5. If the crystal does not turn from yellow to blue – or from blue to yellow – the presence of an artifact is suspect.
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Performing a Fluid Crystal Examination – Cont'd

Reporting Results

NEG – if no crystals are seen

POS – if crystals are seen. Enter one of the following options into the specimen comment:

- Monosodium Urate Crystals present.
- Calcium Pyrophosphate Dihydrate Crystals present.

If positive for crystals seen, order Pathologist Review.

1. If a pathologist is available, and the result is positive, refer to pathologist for review before reporting the result. The pathologist must co-sign the work sheet.
2. If there is no pathologist available, enter the result and footnote the result with the comment “Pathologist’s review to follow”.
 - a. Make a copy of the worksheet and place it in the pathologist’s mail slot.
 - b. Store the fluid crystal specimen with the original worksheet.

Test Codes: SFCRYB (synovial fluid crystals) and FCRYSB (fluid crystals).

Worksheets: RVSFM (synovial fluid crystals) and RVFLDM (fluid crystals).