

# Miscellaneous Findings in Body Fluids

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ARDS = adult respiratory distress syndrome; BAL = bronchoalveolar lavage; LE = Lupus Erythematosus.

INDEX TERMS: body fluids; cerebrospinal; serous; synovial.

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## LEARNING OBJECTIVES

1. Describe the significance of eosinophils in urine.
2. Describe lupus erythematosus cells in serous and synovial fluids.
3. Describe the significant cellular findings in bronchial alveolar lavage (BAL) specimens.

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Cytocentrifuge slides can provide important information in diagnosing various conditions.

## Urine for eosinophils

Urine samples for eosinophils may be submitted when inter-

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stitial nephritis secondary to antibiotic therapy is suspected. Slides to search for eosinophils should be prepared by concentration of the sample by either standard centrifugation or cytocentrifugation. Slides should be stained with Wright stain and a thorough search made for eosinophils. A finding of any eosinophils is significant.

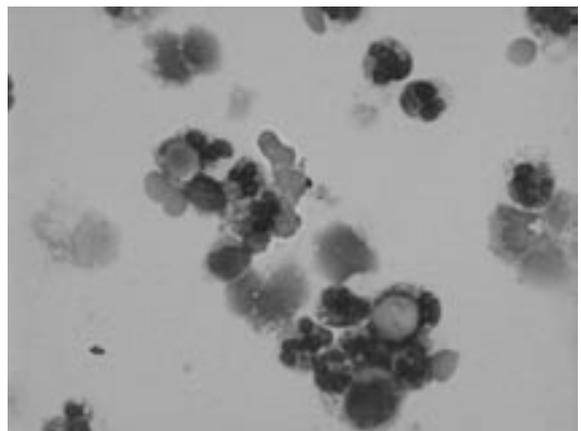
## Lupus Erythematosus (LE) cells

LE cells are neutrophils containing a smooth homogeneous nuclear mass. The nucleus of the neutrophil will be displaced to the edge of the cell wall by the large homogeneous mass. In patients who have systemic lupus erythematosus, the characteristic LE cell may be seen in serous and synovial fluids. All the factors necessary for formation of these cells—incubation, trauma to the cells, and the LE factor—are present *in vivo* in patients with systemic lupus erythematosus. The finding of these cells can be of diagnostic significance in patients not previously identified with this disease. See Figure 1.

## Bronchoalveolar lavage (BAL)—the fluid that isn't a fluid

Bronchoalveolar lavage (BAL) is usually performed on hospitalized patients who have non-resolving pneumonia in an attempt to identify organisms that are not responding to antibiotic treatment or to detect malignancy. The “fluid” is obtained by introducing warmed saline into the lungs through

Figure 1. Two LE cells in synovial fluid



a bronchoscope in 20 mL aliquots followed by aspiration of the saline. A total of 100-120 mL of saline is introduced and aspirated with a recovery of 40-60 mL.<sup>3</sup> The “fluid” is sent to the laboratory for extensive microbiology testing and cytology examination. Occasionally, cell counts and differential counts are requested. Any laboratory performing these procedures needs to be aware that organisms in these specimens are airborne and caution should be taken when containers of fluid are mixed and opened. Containers should be opened under a biological safety hood, tests should be “set up” under the hood (i.e., hemacytometers charged, cytofunnels filled, films prepared), and laboratory personnel performing these procedures should wear a mask while performing cell counts. There are no reference ranges for cell counts on these “fluids” and they have no clinical significance. As in any fluid, the types of cells present are significant. In BAL, the most clinically meaningful information is supplied by the extensive microbiological testing for bacteria and fungus that is the purpose for performing the procedure. The presence of numerous neutrophils can indicate infection or inflammation; numerous eosinophils can indicate allergic reactions, parasitic infections, or eosinophilic pneumonia; and excessive lymphocytes can indicate conditions including viral pneumonia, connective tissue disorders, or lymphoma.<sup>3</sup> Macrophages containing tar can be seen in samples from patients who smoke. Erythrophages may be seen if there has been hemorrhage in the lungs more than 12 hours prior to the procedure. Ciliated epithelial cells are columnar epithelial cells found in the upper respiratory tract. They are elongated cells with the nucleus on one end of the cell and cilia on the other.

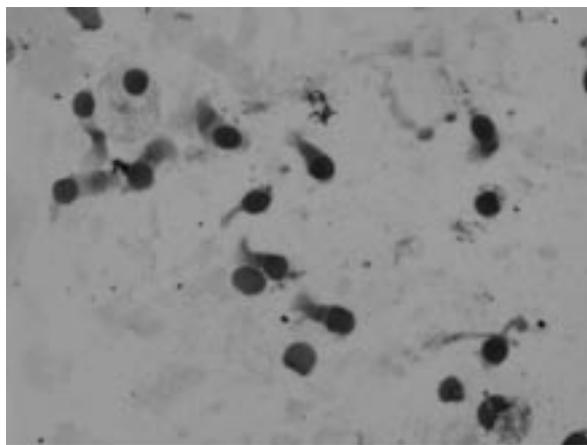
See Figure 2. If seen on the hemacytometer when performing cell counts on fresh specimens, these cells appear mobile as they are propelled by their cilia. Type II pneumocytes, resembling adenocarcinoma, can be seen in patients with adult respiratory distress syndrome (ARDS). Type II pneumocytes are very large, dark-staining cells in clumps containing large vacuoles that contain surfactant. Bacteria engulfed by neutrophils may be seen in cases of bacterial infection. Pneumocystis organisms, if present, will appear as amorphous material that, upon careful examination, may contain the round cysts characteristic of the organism. See Figure 3.

*Clin Lab Sci encourages readers to respond with thoughts, questions, or comments regarding this Focus section. Email responses to [george@fritsmafactor.com](mailto:george@fritsmafactor.com). In the subject line, please type “CLIN LAB SCI 22(1) FO BODY FLUIDS”. Selected responses will appear in the Dialogue and Discussion section in a future issue. Responses may be edited for length and clarity. We look forward to hearing from you.*

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**Figure 2.** Ciliated epithelial cells in BAL specimen



Note nucleus at one end of cell, elongated cytoplasm, and cilia at end opposite nucleus.

**Figure 3.** Pneumocystis in BAL specimen

