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Brief Note

Morphological Spectrum of Normal and Reactive Mesothelial Cells

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The part of the mesoderm which lines the celom —— the peritoneal, pleural and pericardial cavities —— is referred to as the mesothelium.[1] The tunica vaginalis propria testis, which bounds the serous cavity around the testis, is an outpocketing of the peritoneum and, therefore, it is lined by the mesothelium as well.[2] The mesothelial cells are stretchable and have been shown to range in size from 16.4 ±6.8 to 41.9 ±9.5 μm. When they cover the visceral surface and/or a very rigid substructure such as a rib, they are usually flat in shape and quiescent metabolically. When metabolically active, however, they may assume a cuboidal or even low columnar shape. Furthermore, in a variety of reactive conditions, such as inflammation of the serous membrane, they change their morphological appearance to a greater extent, which may lead histopathologists and cytopathologists to a misdiagnosis.

Described herein are some of the mesothelial features seen in normal and reactive conditions. It is quite important for those people, who examine serous membranes or fluid samples from the serous cavity light microscopically, to be

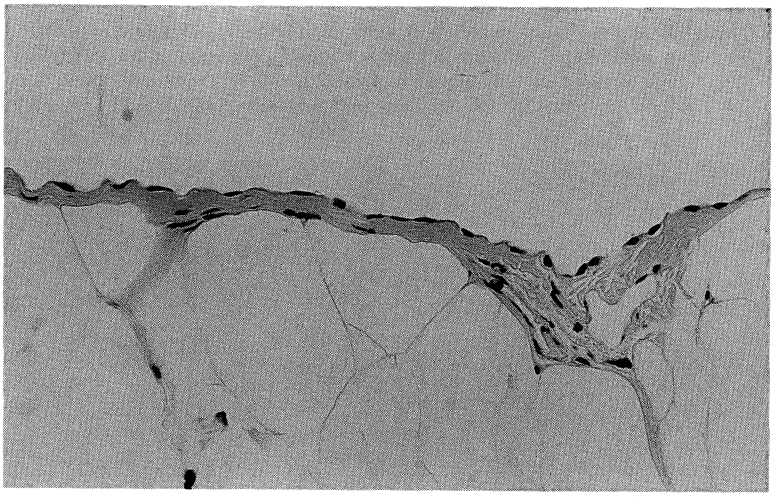

Fig. 1. Mesothelial cells of the peritoneum. This material was obtained at a surgery for non-perforated gastric ulcer, and the mesothelium was considered to be in physiological condition. Note that mesothelial cells are flat in shape. (B-5 fixation, hematoxylin-eosin)

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aware of its wide spectrum of morphological change.

In presumable physiological conditions, such as shown in Fig. 1, which is a photomicrograph of the serous membrane taken from the anterior wall of the abdomen at the time of surgery for a non-perforated gastric ulcer, the mesothelial cells are flat. Fig. 2 is an example of vacuolated or signet-ring-shaped mesothelial cells which were seen in the parietal pleura of a 79-year-old man who died with lung carcinoma. On occasion, the peritoneal membrane may be covered by columnar mesothelial cells (Fig. 3a, b), and the tunica vaginalis may be focally lined by columnar cells resembling the müllerian epithelium (Fig. 4a, b). In the early embryonic stage, the müllerian or paramesonephric duct arises as a longitudinal invagination of the celomic epithelium and is

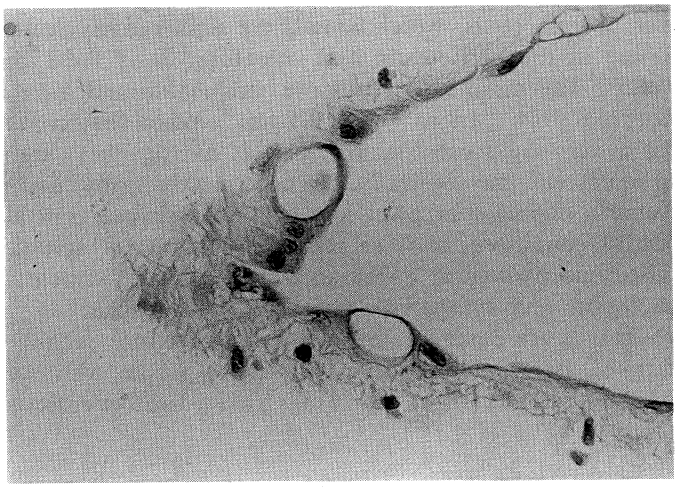

Fig. 2. Vacuolated mesothelial cells in the parietal pleura, seen in a patient with lung cancer who died of pneumonia. (This and succeeding photomicrographs are taken from specimens fixed in formalin and stained with hematoxylin-eosin.)

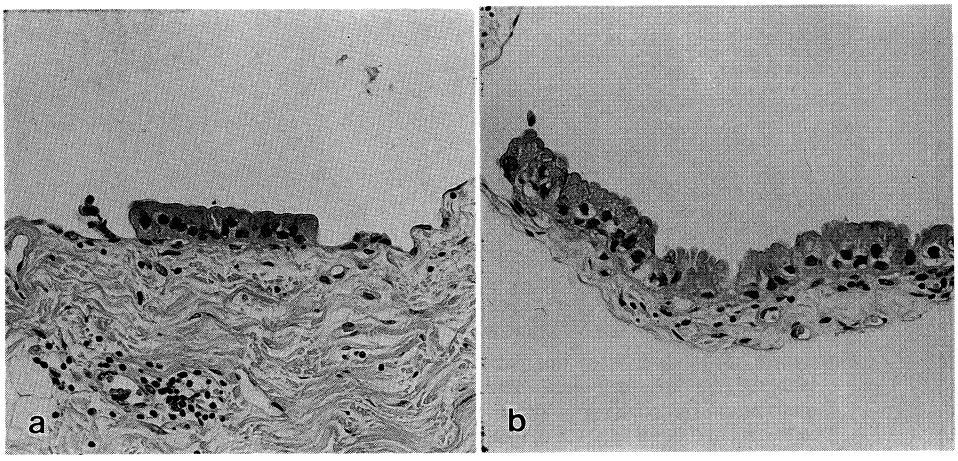

Fig. 3. Columnar metaplasia of the mesothelium over the urinary bladder. Cells appear to be quiescent. This patient died of adenosquamous carcinoma of the lung without any metastasis to the abdominal organs or cavity.

cranially in open connection with the celomic cavity.[3] Therefore, it is not inconceivable that the mesothelial cells give rise to the müllerian metaplasia in certain situations. In fact, endometriosis or endosalpingiosis may be seen in the female peritoneum. Even in the male, a covering epithelium of the müllerian type exists normally in the appendix testis (hydatid of Morgagni).[4] The appendix testis is a fan-shaped, sometimes pedunculated structure arising from the tunica of the testis beneath the head of the epididymis and thought to be of müllerian origin, corresponding to the fimbriated end of the fallopian tube. We believe that those columnar cells resembling müllerian epithelium in the tunica vaginalis represent an unusual metaplastic change of the mesothelium which may occur in the male.

In reactive conditions, mesothelial cells may show a hobnail appearance (Fig. 5a, b), multinucleation (Figs. 6 and 7), cuboidal change (Fig. 7), squamoid change with or without intercellular bridges (Fig. 8a, b), and vacuolar and glandular formation (Fig. 9a, b). It has also been noted that reactive mesothelial cells may exhibit some nuclear atypism like that seen in Figs. 5 and 6. Cytoplasmic vacuolation with accompanying formation of large signet ring cells may give a pathologist the false impression of metastatic adenocarcinoma of signet ring cell type. These vacuoles react negatively with periodic acid Schiff (PAS) and Meyer's mucicarmine, and in suitably fixed materials they often

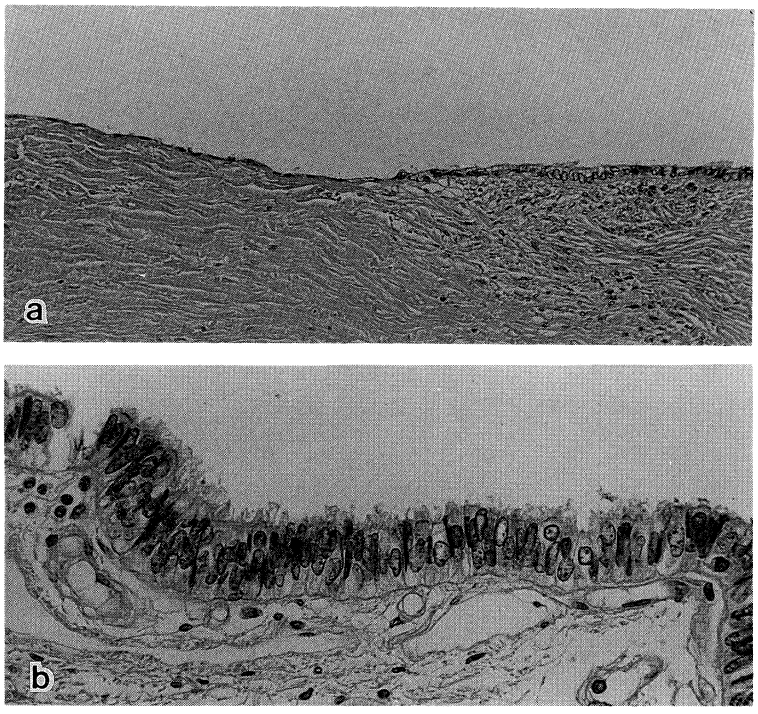

Fig. 4. Müllerian metaplasia of the tunica vaginalis propria testis seen in a patient who died of hepatic abscess.
a. Transformation zone from the columnar to the flat cells.
b. Under high magnification, these cells are reminiscent of müllerian epithelium, especially that of the fallopian tube.

show a peripheral reaction with colloidal iron which is largely or entirely removed by prior hyaluronidase treatment. By these procedures, mesothelial cells are differentiated from adenocarcinoma cells, which are usually PAS-positive.

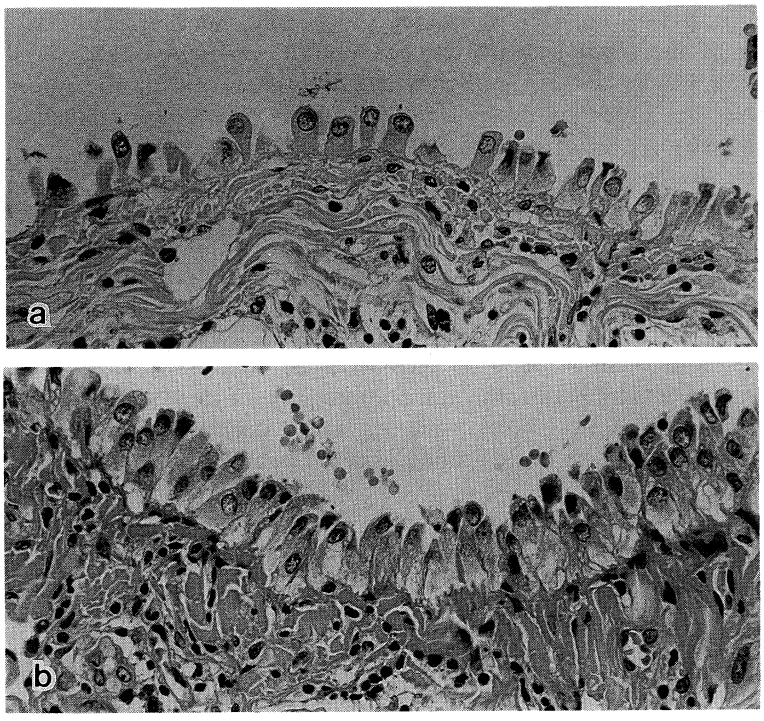

Fig. 5. Hobnail appearance of the mesothelial cells in the diaphragm. Note that elongated columnar cells contain their nuclei in the upper portion of the cytoplasm. This patient died of the rupture of a hepatocellular carcinoma.
a. Cells are aligned rather loosely here.
b. Cells here are compactly gathered.

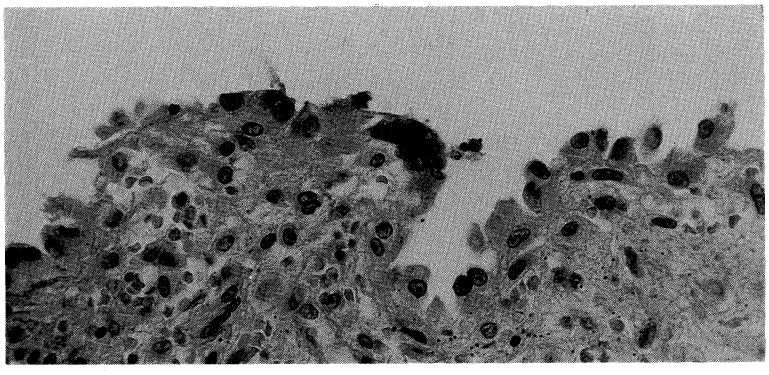

Fig. 6. Multinucleation of mesothelial cells. Note that nuclei are hyperchromatic and somewhat atypical.

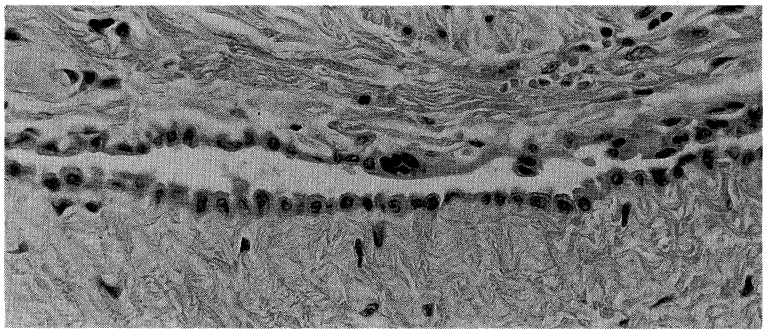

Fig. 7. Cuboidal mesothelial cells. Multinucleated cells are also seen in this photomicrograph.

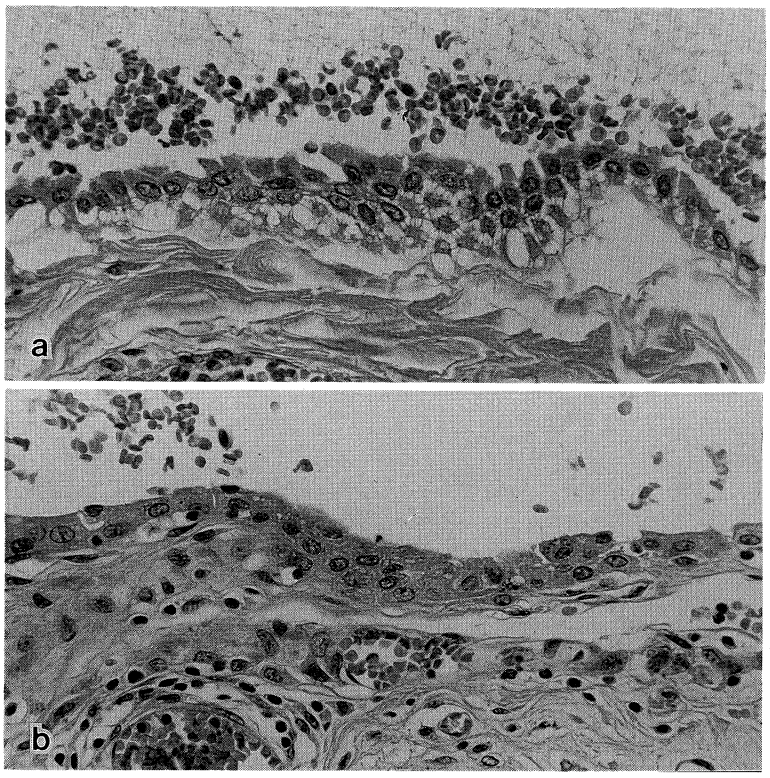

Fig. 8. Squamous and/or squamoid metaplasia of the mesothelium. This parietal peritoneal tissue was obtained during surgical repair surgery for abdominal incisional hernia.
a. The intercellular bridge is prominent.
b. Stratification of mesothelial cells is apparent.

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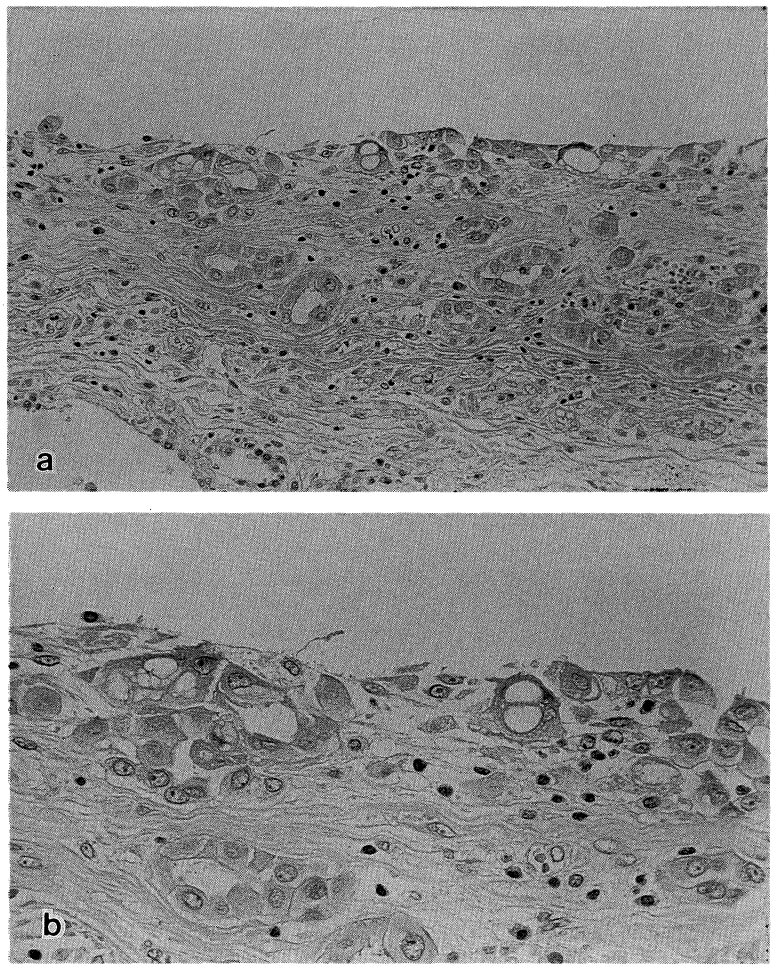

Fig. 9. Mesothelial cells assume a glandular structure. This patient died of the rupture of a hepatocellular carcinoma.
a. Lower magnification photomicrograph showing mesothelial cells embedded in the stroma.
b. Higher magnification of the same area. Note that vacuolated cells are also seen here, lining the surface.

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