Application of the Confocal Scanning Laser Microscope for Observing Biological Specimens: Detection of Glomerular Bleeding

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Dear Sir,

Birch and Fairley [1, 2] and Birch et al. [3] described glomerular bleeding giving rise to a wide range of morphological alterations in red cells, including dysmorphic red cells. They also reported that phase contrast microscopy was clinically useful for detecting glomerular bleeding. This method has subsequently been applied for diagnosis of hematuria. However, this technique requires a trained technician and intraobserver subjectivity is a factor in specimen examination [4].

Recently, technology in the microscopic field has advanced remarkably. A particularly notable new instrument is the confocal scanning laser microscope, which was specifically developed for the inspection of semiconductors [5]. It provides excellent resolution and depth of focus, as well as capacity for three-dimensional imaging. Iino and Inaga [6] here applied this instrument in order to observe biological processes in living specimens, such as dividing metaphase chromosomes from cultured lymphocytes and human spermatozoa.

We also investigated the clinical utility of the confocal scanning laser microscope (1LM 01; Lasertec, Yokohama) in the identification of glomerular bleeding. We found that the microscope provided excellent images which facilitated diagnosis (fig. 1, 2). The method described here is very simple. A small drop of urine sediment from a patient is placed on a slide which is covered with a cover glass to be observed under the laser microscope, which is easily operated. Unlike the conventional light microscope, the confocal scanning laser microscope produces sharp images free of out-of-focus artifacts. Its nondistorted clear images of materials can be observed on a TV monitor and recorded on videotape. Thus it provides a permanent graphic record of materials, for

Fig. 1. The isomorphic red cell from a patient with bladder cancer seen using the confocal scanning laser microscope. $\times 4,100$.

Fig. 2. The dysmorphic red cells from a patient with IgA ne-phropathy seen using the confocal scanning laser microscope $\times 4,100$.

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example, of red blood cells in the urine, which can be viewed by many physicians at the same time. We therefore recommend that the confocal scanning laser microscope, because it provides objective and reproducible images, be adopted in the detection of glomerular bleeding.

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