Micromanipulator for Yeast Genetic Studies

FRED SHERMAN

Department of Radiation Biology and Biophysics, University of Rochester School of Medicine and Dentistry, Rochester, New York 14642

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An inexpensive mechanical micromanipulator, designed primarily for separating yeast ascospores, can be assembled from commercially available components and without extensive custom machining.

Meiotic analyses with the yeast Saccharomyces cerevisiae and other species require the separation of ascospores from individual asci. This is usually accomplished by treating a sporulated culture with snail juice (2) or mushroom extract (1) to digest the ascus sac and by then separating the clusters of four spores with either a microneedle, loop, or pipette. Although a few workers prefer to dissect asci by free hand (3, 4), dissection is almost universally carried out with the aid of micromanipulators. The most commonly used micromanipulators for yeast genetic studies are two commercially available models, the de Fonbrune micromanipulator (Curtin Scientific Co., St. Louis, Mo., cat. no. V58090, and Orion Research Inc., Cambridge, Mass., series A) and the Singer micromanipulator MKIII (Melpro Co., Brooklyn, N.Y., and Eric Sobotka Co., Inc., Farmingdale, N.Y.) as well as a custom-made model that was originally designed by R. K. Mortimer (University of California, Berkeley). Recently I have designed an inexpensive micromanipulator (Fig. 1). Its components can be purchased for approximately $125, and it requires little custom machining. The joystick controls the fine Y and Z motion, and the knurled knob controls the X motion. Coarse adjustments are made with the microclamp (C) and the dovetail slide (B). The micromanipulators are either directly fastened to the base of the microscope with a custom-made “C” clamp (D), or attached to the microscope stage with a bracket (H). The mechanical stage of the microscope should have left-handed controls. The direct coupling of the micromanipulator to the microscope minimizes vibration. The low price makes this model ideal for class instruction when large numbers are required.

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