

# Use of Chives for the Study of Meiosis<sup>1</sup>

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Chives, *Allium schoenoprasum*, can easily be grown in a garden or in a flower pot. Chives in pots can be “forced” to produce flowers in the winter by exposing the plants to increased light exposure. The inflorescence of chives is an umbel, and within the floral head one can find buds at different stages of development. The chromosomes (8 pairs) are relatively large and easily stained with orcein or hematoxylin without pretreatment or fixation (although fixed materials may be used).

Use a dissecting needle or forceps to crush immature buds in a drop of stain to release microspore mother cells from the anthers. Remove as much of the debris as possible. Many cells undergoing meiosis will be left suspended in the stain, and by the time the debris is removed the chromosomes within those cells will be adequately stained (perhaps even overly stained). If hematoxylin is used, a drop of 45% acetic acid should be added to destain the cells. Add a cover glass. Blot away the excess liquid, but be careful to avoid adding very much pressure to the cover glass because the chromosomes are somewhat fragile. Observe the slide at low and high dry magnifications. Once the preparation is scanned with the compound microscope it may be obvious that some pressure on the cover glass is needed in order to spread the arms of the chromosomes. This will be especially true when viewing cells in the earliest stages of meiosis. Use oil immersion to observe greater detail.

Prepare the orcein by gently boiling 1 g of synthetic orcein for 2–5 minutes in a mixture of 45 ml of acetic acid plus 55 ml of water. Prepare the hematoxylin by dissolving 2 g of hematoxylin in 50 ml of 45% acetic acid to which is added 0.5 g of iron alum ([ferric ammonium sulfate]  $\text{Fe}(\text{NH}_4)(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ ). Filter after 24 hours, and store in a brown bottle for 2–6 weeks.

Robinson, A. 1982. Teaching meiosis with chives. *Journal of Heredity*, 73:379–380.

Robinson, A., and T. Peck. 1990. Postmeiotic mitosis in chives. *Journal of Heredity*, 81:399–400.

Wittmann, W. 1962. Aceto-iron haematoxylin for staining chromosomes in squashes of plant material. *Stain Technology*, 37:27–30.

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1. This exercise was first presented as a major workshop at the 8th Workshop/Conference of the Association for Biology Laboratory Education (ABLE), Cornell University (1986), and will appear in *Tested Studies for Laboratory Teaching*, Volume 8 (in preparation). A revised methodology was published in *Laboratory Collection to Accompany Campbell's BIOLOGY* (J. E. Goodenough, Benjamin/Cummings Publishing Co., 1988, pages 19–21).