transparent spheres (do not confuse with yolk granules which are smaller and more opaque). Some 5–10 nuclei are taken up and then injected into recipient eggs in twos or threes. After some practice, it may be possible to inject only 1 nucleus. The same donor egg can serve as a source of nuclei for several injections if one picks nuclei each time from an area which was not injured. After injections are done, the donor eggs should be removed from the slide to avoid confusion.

Transplantation of pole cells. Recipient eggs should be at syncytial blastoderm stages (stages 11–13[5]). Slight drying will retract the ooplasm and leave a free space near the pole cells. The eggs are oriented parallel to the direction of the pipette.

The best source of donor pole cells is the late blastoderm stage. The egg should be oriented at a wide angle to the pipette. One pierces the egg on the side and works the needle to the base of the pole cells by pushing and pulling (fig. 5). The cells are aspirated, the pipette withdrawn and inserted into the posterior pole of the recipient egg. Since the needle usually penetrates deeply into the egg after piercing the vitelline membrane, it has to be retracted to bring the opening just under the membrane. If the egg has been properly dried, it will accept all the cells injected. Post-operative care is as for other injections.

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Improving laboratory safety: replacing benzene by toluene in phosphate analyses

Marianne Rütti and J.-M. Matthieu

Laboratoire de Neurochimie, Service de Pédiatrie, Centre Hospitalier Universitaire Vaudois, CH-1011 Lausanne (Switzerland), 26 May 1981

The determination of organic phosphorus compounds using phosphate analysis reported by several authors involves the use of an organic solvent mixture containing benzene. This old but very accurate and sensitive method is widely used for several enzymatic assays, including 5′-nucleotidase (EC 3.1.3.5)[1,2] and 2′,3′-cyclic nucleotide 3′-phosphodiesterase (EC 3.1.4.37)[3]. Concerned with the danger of acute and chronic benzene toxicity, we tried substituting toluene for benzene. We obtained identical phosphate values using either benzene or toluene in the solvent mixture. Therefore, we recommend discarding benzene in phosphate analyses and replacing it with toluene, which is much less toxic.

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A field-portable racetrack and timer for measuring acceleration and speed of small cursorial animals[1]

R.B. Huey, W. Schneider, G.L. Erie and R.D. Stevenson

Department of Zoology NJ-15, University of Washington, Seattle (Washington 98195, USA), Department of Psychology, University of Illinois at Urbana-Champaign, Champaign (Illinois 61801, USA), Department of Physiology and Biophysics SJ-40, and Center for Quantitative Science in Forestry, Fisheries, and Wildlife HR-20, University of Washington, Seattle (Washington 98195, USA), 25 August 1980

Summary. We describe a relatively inexpensive, field-portable racetrack and timer that can be used to measure acceleration and maximum speed of small cursorial animals. Procedures for interfacing the racetrack to microprocessors are also outlined.

Measurements of acceleration and velocity are basic to various physiological, morphological and ecological studies. Average velocity can be estimated easily by connecting 2 photocell detectors to an electronic clock; but acceleration and maximum velocity require more elaborate equipment. The usual technique involves frame-by-frame analysis of films or videotapes. However, this method is relatively expensive, tedious, and inconvenient for field research. More importantly, data reduction is not immediate.

Here we describe a field-portable racetrack and timer that instantaneously provide data necessary to quantify acceleration and velocity. The timer and photocells cost between US$250 and $500 (exclusive of labor), depending on options selected. We also outline procedures and programs for attaching the racetrack to microprocessors to speed data recording and analysis. Complete circuit diagrams (timer and photocell stations) and computer programs are available on request from the senior author.

Apparatus. The racetrack consists of a narrow runway that contains several photocell stations positioned at known distances along the walls of the track. An animal is placed just behind the 1st photocell beam and is stimulated to sprint. When the animal breaks the 1st beam, a multichannel timer is activated; and the time when each subsequent beam along the track is broken is stored into memo-