**Tungsten needles**

**MATERIALS**

**Reagents**

Potassium nitrite (KNO2) solution, saturated, prepared in water

*Alternatively, use 1 N NaOH.*

**Equipment**

Clips, alligator

Dish, porcelain

Ethanol burner

Forceps, fine

[caution](http://cshprotocols.cshlp.org/lookup/doi/10.1101/pdb.rec12084)Pasteur pipettes with customized opening diameters

*Prepare the pipettes such that the opening of the resulting capillary pipette will hold the sharpened tungsten needles.*

Power cable

Stereomicroscope (e.g., Stemi SV11; Zeiss)

Transformer, alternating current, capable of generating 4-8 V and up to 5 A

Tripod

Wire, platinum

Wire, tungsten, 0.1- to 0.2-mm diameter

**METHOD**

* 1. Clamp a 3- to 4-cm piece of tungsten wire in an alligator clip fixed to a tripod. Clamp a 3- to 4-cm piece of platinum wire in another alligator clip fixed to a tripod.
* 2. Submerge the tip of the platinum wire in a porcelain dish filled with the saturated KNO2 solution (or 1 N NaOH).
* 3. Connect the power cables of the alligator clips to the transformer.
* 4. While monitoring under a stereomicroscope, dip the tip of the tungsten wire repeatedly in the KNO2 solution to obtain a 2- to 3-mm-long conus with the desired sharpness.
* 5. Using fine forceps, place the sharpened tungsten needle into the opening of the capillary pipette.
* 6. Using an ethanol burner, melt the glass around the needle, fixing it into place.
* 7. Wash the tungsten needle extensively in water to remove any residual salt crystals.

*Blunt or damaged needles can be resharpened by flame-polishing using an ethanol burner. Although needle tips are less smooth after flame-polishing (compared with the procedure above), flame-polishing is acceptable as a fast and convenient method during embryo dissection.*