# MICROSCOPY 101

*We appreciate the response to this publication feature - and welcome all contributions. Contributions may be sent to Phil Oshel, our Technical Editor at:*


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## Removing Stains and Paraffin from Clothes

To remove hematoxylin spots on clothing I have a small amount of acid-ethanol (70% EtOH and HCl) at home. When I see a spot on clothing before washing, I put a drop or two on the spot. The hematoxylin comes out with regular washing.

To remove paraffin from clothing I use a product called "Goo-Gone". It is available in most hardware and discount stores. If you see paraffin on your clothes before washing just squirt a little Goo Gone on the spot. If the clothes are already washed and a greasy area is spotted after drying (like a great greasy meal was enjoyed), squirt the spot with Goo-Gone and rewash and dry. This sounds like a pain, but I give a lot less clothing away to Goodwill. Also, Goo-Gone works wonders at taking off sticky residue like store stickers and tape residue.

Eosin stains usually wash out with normal washing. If not, try the acid-ethanol on them too.

Stain and paraffin removal can get into all kinds of chemistry and expensive products, but sometimes the best solution is in your lab or at your local store.


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## What's Your Favorite Pet to Annoy?

I have noticed that there are many favorite materials used to make teasing hairs for EM thin sections. My favorite is cat whiskers, usually found near the cat's favorite lounging spot. Although they can be gotten by sneaking up on an unsuspecting pet and clipping the whiskers.


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*And in response to a previous article on the topic of flexible needles by Tina Carvalho (University of Hawaii):*

I was for many years an instrument maker and did most anything in that vein. She talks about fine needles for cleaning specimens—here is another, using a small diameter (1/16th or 1/8th inch) rod of nylon or delrin, heat middle slowly almost to melting point but not charred. Pull out straight out and hold until cool, then separate and choose the whisker you want. Nylon/delrin is/are very tough and yet flexible—as strong as glass. Or one could hold two ends together, heat until joined, and then pull out as above. Delrin is a bit tougher and black—easier to see.


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## Constant Pressure Perfusion Fixation of Rodent Lungs

When examining the lung for experimental studies, especially those studies designed for morphological analysis (image analysis, stereology), it is important to have a standardized method for fixation of the lung tissues. By infusing the lung via the trachea with fixative under constant pressure, this goal can be achieved and allow standardization in the fixation of each lung sample. A constant pressure perfusion device can be constructed in many ways, but the simplest can be designed using a separator funnel. Tubing can be attached to the base of the separator funnel with a Luer-Lok adapter at the end. A cannula is inserted into the trachea of an excised lung, tied into place, and attached to the perfusion device, which is filled with the fixative of choice. (Specialized cannulas can be ordered or constructed by cutting off the sharp end of an 18 or 16 gauge needle.) It is important to purge out any air in the tubing before attaching the lung to avoid filling the tissue with air bubbles. The tissue is left to float in a beaker filled with the same fixative while attached to the perfusion device. The pressure is measured as the distance from the head of pressure (the top of the fluid level in the separator funnel) to the bottom of pressure (the fluid level in the beaker holding the lung tissue). This distance should remain constant throughout the entire procedure, topping-off as needed. For most rodent studies, 25 cm of pressure is desirable. Once lungs are satisfactory fixed, they can be removed, tied off to maintain the internal pressure, and stored for later trimming of the desired region of interest. One hour of constant pressure perfusion is satisfactory for formalin fixation, with an additional 12-24 hours submerged in a fixative filled container before trimming.


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## Why Isn't There Arcing at the Metal Walls of a Microwave Processor?

When the magnetron is running, a pattern of "standing waves" is present in the microwave chamber that is characterized by an apparently stationary number of waves that span the inside dimensions. The chamber is sized so that some number of complete waves just fits inside, and the waves are at a null at the wall. A chamber like this is known as a "resonant cavity" and is characterized by the reflection, at the walls, of the microwaves so that their reflections coincide (more or less) with the incident waves. This same phenomena can sometimes be seen in a container of water that is being vibrated so that the waves on the surface form unmoving rings.

Anyway, the waves are, of course, electromagnetic waves in this case and the electric field component of the waves is a "zero" at the wall, so that no voltage potential is present to cause arcing. That's not to say that there is no current flowing in the walls, because there is. This current, in fact, produces the reflected wave, and since the walls are good conductors, there is little energy lost to heat in the walls.

It's interesting to note that it's the peaks of the standing waves that produce the "hot spots" in microwave ovens. One way to diminish the hot-spot problem is to force the standing wave pattern to change, *i.e.,* to force another resonant mode to alternate with the primary mode. In fact, there are probably several oscillation modes possible and by switching between these in rapid succession the hot-spots can be moved around to minimize their effect. This is the purpose of the rotating "stirrer" found in the top of many microwave ovens.


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