

Chapter 3 Cleaning

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A microscope image can look awful if the microscope has dirty optics. Figure 3.1 is through a clean lens; figure 3.2 is through a dirty lens. It is very easy to get lenses dirty!

Figure 3.1 Clean lens image.

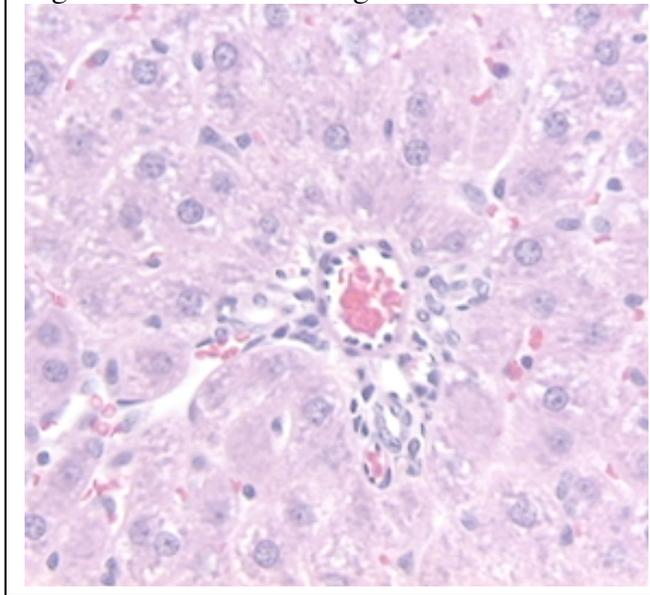
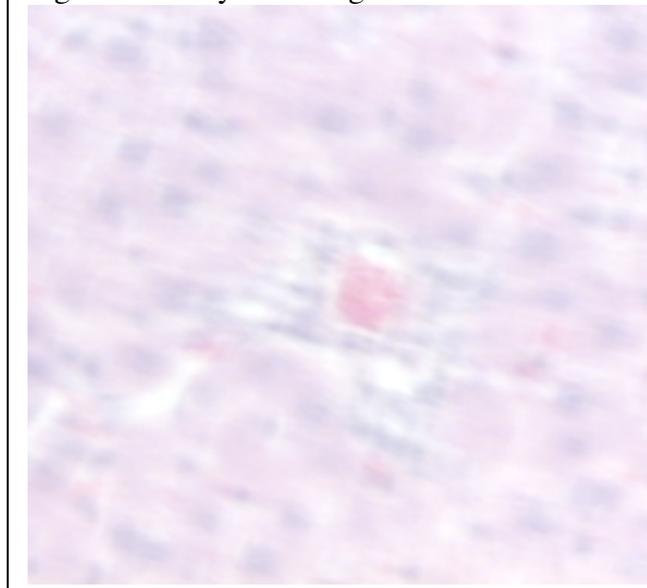


Figure 3.2 Dirty lens image.



*** Methods described in this section are those used in the Microscopy Services Laboratory, Department of Pathology and Laboratory Medicine at the University of North Carolina at Chapel Hill. You should read the manual accompanying your microscope to learn any cleaning recommendations or warnings made by the manufacturer. When in doubt, call a representative of the company. Appendix B indicates how to contact the USA representatives of the major microscope manufacturers. ***

Cleaning Your Microscope

Remove objective lenses, condensers, and oculars from the stand and observe them under a dissecting microscope for cleaning. The dissecting microscope is very desirable, but if you have none, use an ocular turned backwards to observe your lenses.

The front lens of objectives and condensers (the lens that faces the specimen), and that of oculars (the lens that faces the microscopist) has a hardened coating so it can stand a bit of gentle rubbing. The back lens has a soft coating. Clean it extremely gently.

The best material for cleaning depends on what is on the lens. Dust, glass shards, oils, salts, and mounting media are the most common problems. A soft brush or a gentle gas duster can remove most dust and glass shards. (When using a gas duster use gentle puffs. Strong blasts may cause a particle to scratch the lens coating. Gas dusters can also emit a liquid if too long a blast is used or if they are tilted too far from vertical.) Soap and water on a newly made cotton swab is good for oil and salt from fingerprints and for water-soluble mounting media.

Ready-made cotton swabs are not recommended for cleaning as they may contain adhesives. Roll a tiny bit of plain cotton on either end of a sharpened applicator stick for the best cotton swab. Wet the end of the stick with ethanol first to help the cotton adhere to the stick.

Remove immersion oil and non-water soluble mounting media by dragging good quality, soft lens paper over the lens. Follow this with a gentle wipe of a newly made cotton swab. Use a touch of solvent on the swab but touch the dampened swab to a bit of lens paper first to remove most of the solvent. You can also put a drop of solvent on one end of a lens paper, touch the wet end to the lens, then drag the paper over the lens until all solvent is removed (drop and drag technique). Repeat the process until the lens is clean. Check for cleanliness by observing the lens under the dissecting microscope while reflecting the microscope's light off the lens' surface.

WARNING: Which solvent to use depends on the lens; ask the manufacturers for their recommendation. Old lenses are mounted with balsam that dissolves in most aromatic solvents. High quality ethanol or methanol is usually safe as is commercial glass cleaner without ammonia. Always immediately wipe the solvent off with a newly made cotton swab or by dragging lens paper over the lens. **NEVER** soak a lens in solvent.

Oil immersion lenses on inverted stands present a special problem. There is a high probability that oil will creep into the lens through the collapsible nosepiece connection. The lens' optics are housed inside an inner cylinder that should protect them from oil. However, should oil find its way onto internal lens surfaces, the lens will have to be sent to the manufacturer for cleaning. Many devices have been proposed to minimize this problem including using hair "scrunchies" around the lens to absorb oil, special rubber dams over the end of the lens and elaborate liquid collection systems used for water immersion lenses. I have found that wiping the lenses with lens tissue immediately after use helps. However, the best method that I have found is to remove the lenses from the stand at the end of the day, clean the lenses, place a strip of lens tissue into the front and/or back of the lenses, lay them on their sides – lens paper strip down, and let them drain overnight.

The metal housing of lenses should occasionally be wiped with a lint free cloth. Exercise any mechanical parts of lenses such as retractable ends, correction collars, irises, etc. to ensure their free movement.

Mechanical parts of the microscope should also be cleaned. The simplest measure is to keep a cover over the stand when it is not in use. A plastic trash bag is fine. Lint free cloth or cotton gauze used dry or dampened with a little solvent (water or ethanol depending of the soil) should be used for cleaning. The stage should be cleaned frequently. Remove any slide clips and clean them separately. Use a gas duster to clean the dust glass over the field iris and to dust out attached camera backs. Exercise the movable mechanical parts such as stage controls, focus mechanisms, condenser focus, condenser centration, irises, movable filters, etc. to ensure their free motion. On inverted stands it is good to remove the objective lenses and thoroughly clean the revolving nosepiece, threaded lens mounts and DIC prisms.

Exercise

Perform the following tasks and make a note about each of them:

- 1) Clean the objective lenses, condensers, and oculars of your microscope.
- 2) Clean the exposed mechanical parts, especially the stage.
- 3) Exercise all mechanical parts to insure free motion.