

CHAPTER 3: ESSENTIAL LAB SKILLS FOR TISSUE ENGINEERS

This chapter is intended to familiarize students with the essential lab skills necessary to complete the experiments contained within subsequent chapters. Depending on the students' previous experience, it is suggested to spend 1-2 lab sessions on these activities. This is most easily accomplished by rotating students through stations where they, for example:

- Practice using pipette aides and micropipettes by determining the density of various solutions using a balance
- Prepare one or more solutions that will be used during the course (see Section 3.4)
- Use phase and fluorescence microscopy to visualize fluorescently-labeled cells in culture (see Section 3.5). Figure IM.A provides an example of a teaching aid the authors use to train students on the microscope.
- Prepare a bottle of media to use throughout the course (see Section 3.6.3)
- Initiate a cell culture by thawing cryopreserved cells (see Section 3.6.5)
- Passage cells (see Section 3.6.7)
- Determine the density of a cell suspension using a hemacytometer (see Section 3.6.8)



CKX41: Phase Contrast

- Turn on halogen light (1)
- Disengage all filters except frost filter (3)
- open aperture diaphragm (11)
- place specimen on stage (4)
- engage 10X objective (5)
- slide PH1 into center position (2)
- center specimen (6)
- focus specimen (7)
- adjust brightness (8)
- adjust interpupillary distance until left & right field coincide (9)
- adjust the diopter until periphery is focused (10)

If applicable:

- engage desired objective (5)
- slide corresponding phase ring into position (2)
- bring specimen into focus (7)
- adjust brightness (8)

Figure IM.A. Instructional aid providing step-by-step instructions for phase contrast observation on an Olympus CKX-41 inverted microscope (modified from the Olympus instructional manual for models IX71 and IX51).