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During the first laboratory, students learnedthe initial steps to creating histological slides. This included dehydrating, infiltrating and embedding formalin-fixed tissue within paraffin wax forrigidity and sectioning. Students were able to learn the importance of propertechniques within a lab that can be translated into future research andprojects. Within laboratory two, students were taught the process for stainingsectioned slides in both Harris haematoxylin and Eosin as well as periodicacid-Schiff. This step of creating histological slides enabled students tounderstand the amount of time and precision it takes for these slides to becreated. Students were also given the opportunity to view these newly createdslides under microscopes, and were asked to identify the organ structurepresent. Specifically, the organs identified were the lung and kidney (andothers not mentioned within this report), through the use of key identificationfeatures. Thetissue samples identified in this lab were the lung and kidney.

A feature seenwithin the kidney slide is the renal corpuscle, which consists of theglomerulus and Bowman’s capsule. In both the haematoxylin and eosin stain andperiodic acid-Schiff stain this structure can be easily identified. This is a structurethat is commonly accepted as a key identifying feature between researchers, asshown in multiple studies1, 2,. When looking at histological slidesof the kidney, scientists will often look for the Ducts of Bellini, which wasalso present within the slide stained during this lab2. These ductsconsist of simple cuboidal cells with a centrally located nucleus. This isreadily seen

in the H stain. The basement membrane of the Bowman’scapsule and ducts are more easily seen within the PAS stain, as it containsglycoproteins3.

The lung was also identified using keyidentification features. Within the tissue sample, terminal bronchioles, respiratory bronchioles and alveoli were identified. In a previous study, thesewere the identifying characteristics of a healthy mouse lung, confirming thatthese structures are in fact used to determine the lung within histology4. A limitation in creating the histological slidesmanually is that there are many errors that are largely human. Error infollowing the staining schedule may have resulted in some difficulty seeingstructures within the slides. Particularly, there was no set time for how longthe slide should stay within the eosin stain, and as such may not have beenkept in for long enough to stain the cytoplasm properly.

Additionally, whenwashing the haematoxylin stain off of the slide, it did not turn light blue, but rather a purple colour despite being under the tap for more than threeminutes. This may have also caused the eosin stain not to be taken up asnicely. There errors may be fixed by keeping the slide in the stain for alonger period of time (such as 30 seconds) to ensure complete uptake. Anothersource of error was seen in laboratory one. When the tissue samples were placedinto the paraffin wax for infiltration, the wax was not properly incubatedcausing the wax to solidify while the samples were in the tube, and may haveresulted in the tissue not being properly infiltrated. This may have caused thetissue samples to lose their rigidity and structure.

This can be alleviated byusing an automated mechanism that would ensure the paraffin stays at aconsistent temperature (and therefore liquid). An

automatic system would alsoallow for all samples to be created at the same time, lessening the error intime. Alternate techniques may be to use a different infiltration substancethat is not as temperature sensitive. Different stains can also be utilized tosee other features such as the elastic and reticular fibers within the lung.