THE PATHOLOGY LAB PROCESS

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Presentation preference: Oral presentations
A look into an illustration process: How a collaboration between a medical expert and artist can result in a fun and accurate poster that takes the viewer through the step-by-step process of a pathology lab.

Each year new medical and life sciences students enter the hospital’s pathology lab to learn about how they process specimens and obtain diagnostic results. At some point in their career they will no doubt encounter this fairly complex process again. Sometimes this can involve patient understanding and having an idea of what goes on within the labs can contribute to their conversation with patients whenever they embark on a biopsy route.

Dr. Richard Oparka, also the teaching lead of pathology, was looking for a visual resource that not only illustrates each step but also puts across the message of how long the entire process takes. He also wanted to highlight the various factors that can affect this timeline, as each specimen is a unique case. He had a clear idea in mind to make this a one page and easily referable resource, namely an infographic poster.

My goal, as a designer, was to make this aesthetically pleasing as well as maintain accuracy and familiarity in the equipment required for each step. My talk will focus on the process for developing this visual resource, the references and research that lies behind it. The success of the illustration lies in the collaboration between the medical expert and artist. There are a few useful tools and tips that I would like to share with the audience as part of the presentation. By the end of my talk, viewers will have an insight into how to create something similar.

Final poster can be viewed in the following page.
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The below step-by-step process can vary greatly depending on the complexity of the specimen involved. Large specimens spend longer in the fixation stage than small and will require a period of decalcification prior to processing. Small specimens, like a gastric biopsy, the process is straightforward and the specimen will be ready and well not require any decalcification. These small specimens can not be seen by a pathologist until the slide exits the lab.

1. Booking in/into formalin
   Day 1: The specimen arrives, already immersed in formalin (normol plane, unless given a unique identifier and entered into the laboratory’s information system. The specimen is then labelled with a barcode and remains in formalin until the tissues are completely fixed.

2. Gross examination and cutting of specimen
   Day 1: The pathologist will then examine the specimen, checking method of the slice, colour and texture. Reference photos of the specimen may be taken as well. The pathologist then selects the specimen, obtaining small portions of tissue that are then inserted into small rectangular boxes, known as cassettes. These smaller segments of the specimen will give the information the pathologist needs.

3. Processing
   Day 1-2 (overnight): The small fragments of tissue are loaded into a processor overnight, slowly removing water from the specimen.

4. Into paraffin
   Day 2: The processed tissue fragments are then embedded, in the correct orientation, in wax blocks that harden at room temperature.

5. Cutting of block
   Day 2: Very thin sections of the block are then cut using a cutting machine, known as a microtome. The sections are then placed on a glass slide.

6. Staining
   Day 2: The blank section is stained with eosin red and haematoxylin blue.

7. Microscope
   Day 3: Once stained, the slides are then ready for review by the pathologist.

8. Ancillary – IHC/ISH/FISH/genetics
   Oftentimes a diagnosis cannot be confidently made on the vital stained slides alone. The pathologist can then use a range of other techniques to aid in the diagnosis. These would include: molecular genetic analyses, cytogenetic analyses (FISH), immunohistochemistry (IHC) and immunofluorescence.

**Images and Illustrations:**
- Immunohistochemistry (IHC)
- In situ hybridization (ISH)
- Genetic sequencing
- Cytogenetic analysis (FISH)