

Introduction

With throughput expectations of up to **300 tissues per day**, toxicologic pathology is possibly the most challenging use-case for Digital Pathology. Feedback from preclinical pathologists clearly indicates that adoption of digital pathology has been **constrained by perceived performance limitations** of the available technology.

In conjunction with industry collaborators, our focus surrounds the design and development of an **optimal digital pathology workflow** for preclinical pathology to demonstrate that digital pathology can be considered **equivalent in quality** and performance when compared with existing whole slide imaging (WSI) and on-microscope alternatives.

Materials & Methods

Multiple methods were deployed in the design and development of the **Patholytix solution**, including user interviews, user observation, requirements, gathering and documentation, wireframe generation, rapid prototyping of solution, formal verification studies on completed software and user acceptance surveying, and **direct comparison to on-microscope review**.



Figure 1: Patholytix preclinical montage view provides a general overview of all slides within a given study. The design facilitates random-order cohort selection utilizing per-study animal and slide attributes.

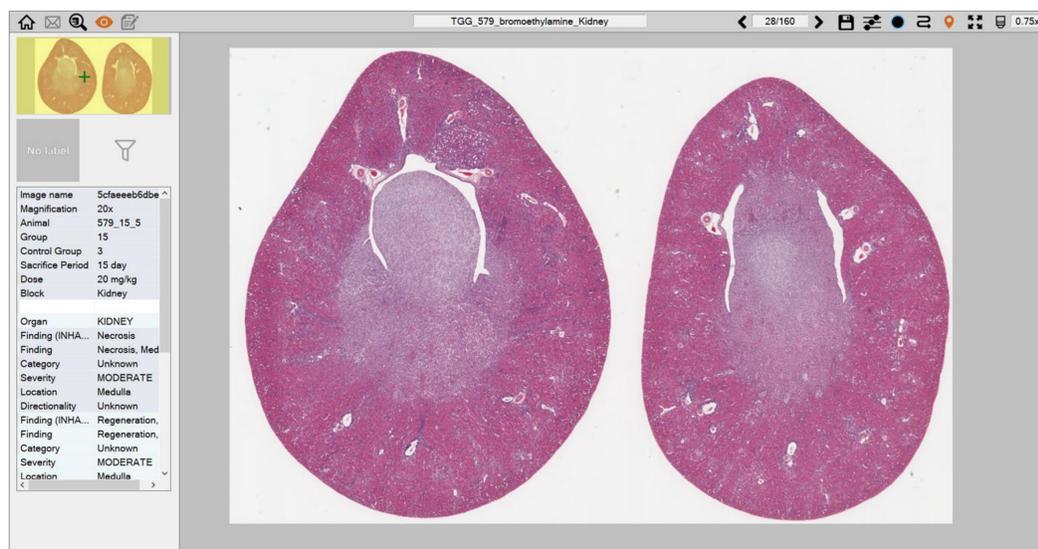


Figure 2: Patholytix preclinical image viewer was developed to optimize the pathology review process with consideration toward human factors including ergonomics and display quality & configuration.



Figure 3: User validation of the Patholytix platform; it was noted that the importance of both the ergonomics and the quality of the display were a critical in creating a suitable workflow that would facilitate routine use of whole slide imaging for preclinical pathology.

Results

- **Significant time savings** in onboarding studies from CRO partners through eliminating risk / cost-laden logistical processes including shipping slides & travel time.
- Thumbnail-driven study display coupled with **seamless transition between slides** with all relevant information available to the pathologist through a single interface.
- Substantial improvement in sorting slides prior to reading a study (e.g. for specific animal or organ reads), **saving approximately 20% of the typical review time** for a study.
- Ability to easily use whole slide imaging for a full days' pathology review with proper ergonomic and display configuration. Estimated **50% increase in throughput** per day compared to other WSI systems experienced.

Conclusion

Based on the results from our Evaluation Study, it is clear that participating pathologists feel our solution design is aligned with how they work and thus offers a **credible digital pathology solution** for routine preclinical pathology applications. Developing our design based on their specific needs was critical to their acceptance; the workflow for image distribution, display and sorting, the attention to **viewer ergonomics** and our understanding of the **optimal display configuration** being the primary differentiators when compared with other WSI solutions they had experienced. General feedback suggested that the solution could **offer immediate improvements to Peer Review process**, with future applicability in **GLP applications**.