

Challenges and Solutions

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Digital & Computational Pathology could provide rapid and accurate diagnosis and AI could suggest the best treatment plan with prognosis from all provided digital information near future. Currently it is the important transition phase to build AI and use AI.

Many new innovative imaging technologies have been developed and implemented in the imaging system. To use all new technologies in pathology practices most effectively, and developing most reliable AI application, the optimization and knowing the condition of all data including sampling, sectioning, staining, image, annotation, and demographic information with grand truth, is still very important. Once we complete this phase, we will have a system truly support pathologists and patients. However, there are many challenges to use AI application and new technologies in Clinical. In case of HER2 assessment of breast cancer, we evaluate H&E, IHC. If IHC is 2+, evaluate FISH/CISH. Because of the recent topics of HER2, we intend to use ISH on all cancer cases. H&E WSI must be able to see morphology clearly especially low-middle power. The intensity is one of important keys for the IHC assessment. The staining condition and scanner color condition must be evaluated and corrected separately for HER2 assessment. For CISH/FISH assessment, single nuclei segmentation and analyzing correct number of signals on each nucleus. Nuclei selection is influences on the results. Current guidelines are for human assessment and may not best fit for AI/computer-based analysis. Many very helpful AI application are available. However, it is not easy to use multiple vendors AI application on same case or image at the same time. Output of AI may need to be standardized. Our results of how to optimize the entire process and how reflect on the results, how to interchange the results of AI will be presented.

