Identification of biomarkers using DeePathology™ STUDIO AI Platform

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Introduction

The MMR examination is an important indicator for treatment with Kytruda for various types of cancer. It is done on PFFE biopsies which are IHC stained with 4 Antibodies for proteins that generate the complex responsible for correcting DNA mutations. In case one of these proteins is not expressed, a mutation examination is done in order to identify the change in the DNA sequence. Eligibility for the Kytruda treatment requires identifying a mutation at least in one of these genes or proteins.

Objectives

The MMR examination is done on IHC platforms such as Ultra Bench Ventana using fixed reagents and antibodies. The differences in tissue processing, procedures and the antibodies batches lead to inconsistent results. This calls for an objective rule for the screening. This objective rule can also be used as an advanced decision support system for a variety of antibodies or products thanks to its objectivity.

Materials & Methods

An AI solution was created to check whether at least one cancerous nuclei was positively stained. 10 cases were screened using the DP200 slide scanner. The WSIs were analyzed using the DeePathology™ STUDIO, a Do It Yourself platform that allows the creation of AI solutions for various problems in Pathology.

Results
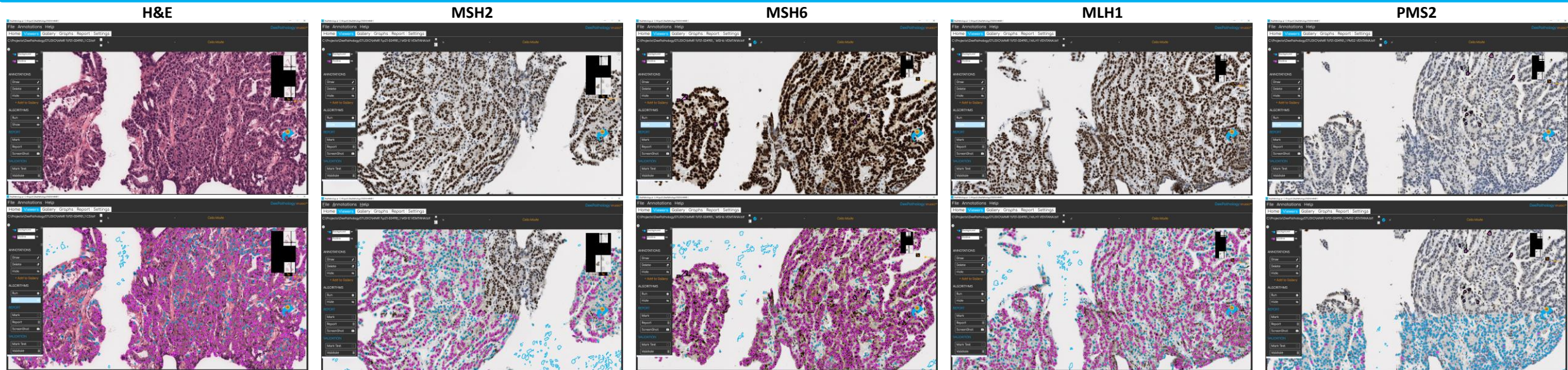
Upper raw: Original slides from the basic H&E staining followed by four MMR antibodies stained slides. Lower raw: Slides following the DeePathology™ STUDIO analysis. The positive nuclei are marked in pink. The DeePathology™ STUDIO succeeded in detecting the positive nuclei even with the weaker staining with the PMS2 as well as in the H&E slides.

Conclusion

Identification of solely weakly stained cancerous nuclei is very demanding and usually requires the analysis of highly trained senior pathologists and high resolution and magnification microscopes. The ability to create and deploy an AI solution to this problem greatly simplifies this procedure.

The DeePathology™ STUDIO learns to identify the cancerous nuclei of the tumor and differentiates them from the normal tissue. In addition, the DeePathology™ STUDIO can also identify the cancerous nuclei on the original H&E slides. This is important in cases with weak staining that are tedious and time consuming for the pathologists. We have found full correspondence between the DeePathology™ Studio analysis to the pathologist.