



No Risk of Tissue Cross Contamination When Using Dako CoverStainer

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Introduction

Cross contamination artifacts during pathology processes are a challenging problem, and tissue grossing, preparation of tissue blocks as well as tissue sectioning have all been identified as contributors¹.

A recent study has identified the linear staining baths as another possible source for cross contamination² and we raised the question:

How does the Dako CoverStainer solution for H&E perform when tested for cross contamination?

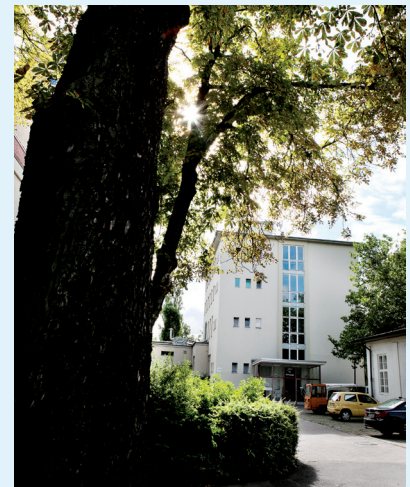
Purpose of the Study

Slide processing in Dako CoverStainer is similar to other automated staining devices where re-use of staining reagents day after day may induce a risk for cross contamination of tissue samples. Therefore, the aim was to determine whether tissue fragments remain in the staining compartments, which subsequently could be carried over to other slides (cross contamination).

Test Setup and Study Procedure

The Dako CoverStainer solution including reagents was used during the entire study. All reagents were new when the tests started. All tissue sections were freshly cut and placed on non-coated slides. The study was divided into two types of tests:

- Evaluation of cross contamination during staining
- Inspection for tissue debris in the reagents and staining tanks after five days of usage



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Test Set Up for Evaluation of Cross Contamination During Staining

First test run: 20 blank slides were used per day during the five day test period (Monday-Friday). The 100 blank slides were randomly placed in between 2,500 H&E routine slides which were stained with the same reagents during the test. After the five day test period, all blank slides were visually examined in a bright field microscope at 4x-40x magnification.

In the second test run, 50 blank slides were used per day with the same test setup as described above. The laboratory personal randomly placed the test racks in between the routine laboratory's regular H&E stainings. The racks were assembled as follows: patient slide - blank - patient slide - blank.

After the five day test period, all blank slides were visually examined in a bright field microscope at 4x-40x magnification.

Dewaxing Reagents

Xylene, 96% ethanol, and 70% ethanol, two liters of each, respectively, and one liter of deionized water were collected after each test run. The reagents were collected on the last test day (Friday) after all slides had been stained.

Staining Reagents

Dako Hematoxylin, Dako Eosin, and Dako Bluing buffer, one liter each respectively, were collected after each test run. The reagents were collected on the last test day (Friday) after all slides had been stained.

Dip Tanks

18 dip tanks, each containing two reagent stations giving a total of 36 reagent stations, were investigated for remaining tissue debris after all slides had been stained.

Filtration Reagents

After five days the reagents from every dewaxing reagent bottle were filtered through a filter paper and the filters were visually checked for sediments and tissue residues. Both the filters and the bottles were visually examined for precipitates.



Figure 1. Slides placed in a CoverStainer slide rack.



Figure 2. Unloading and loading of reagent bottles.



Figure 3. Dako CoverStainer reagent bottles.



Figure 4A. Filtering the reagents after five days of usage.



Figure 4B. A clear filter with no signs of tissue debris.

Results

Evaluation of Cross Contamination During Staining

No tissue residues could be detected on the first 100 blank slides nor in the second batch of 250 blank slides when examined in the microscope.

Inspection of the Filters and Staining Tanks After Five Days of Usage

No floater tissue fragments or other tissue debris could be observed in any of the filters.

None of the 18 staining tanks had any signs of tissue debris when visually examined.

Conclusion

This study shows that the Dako CoverStainer H&E solution does not contribute to tissue cross contamination. A study by Platt et al. reported that 16 out of 200 blank slides contained tissue floaters when stained on a linear H&E stainer². Here, 350 blank slides were stained together with 5,000 routine slides and none of the blank slides showed any signs of tissue fragments adhered to them.

Furthermore, the majority of the tissue contaminating fragments had been found within the dewaxing agents, i.e. xylenes and various concentrations of alcohol². When the CoverStainer reagents were evaluated after five days of usage, no tissue fragments could be detected. Neither in the filter papers that were used to filter the reagents nor in the staining tanks themselves. The study by Platt et al. used the reagents for one day before examination² but on Dako CoverStainer, the reagents were used for five days before examination.

This, taken together with a well-performing integrated baking unit, demonstrate a reliable H&E solution which does not contribute to tissue cross contamination. Dako CoverStainer system is therefore a safe solution for routine pathology laboratory to use.

References

1. Alonso A, Alves C, Suárez-Mier MP, Albarrán C, Pereira L, Fernández de Simón L, et al. Mitochondrial DNA haplotyping revealed the presence of mixed up benign and neoplastic tissue sections from two individuals on the same prostatic biopsy slide. *J Clin Pathol* 2005;58:83–6.
2. Platt E, Sommer P, McDonald L, Bennett A, Hunt J. Tissue floaters and contaminants in the histology laboratory. *Arch Pathol Lab Med.* 2009;133:973-8.

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