

# Features of the Automated Slide Stainer Tissue-Tek Prisma® Plus

## - Showa General Hospital's Experience

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### Pathological Tissue Sample Handling Manual (The Japanese Society of Pathology) - Preventing Mix-up of Pathological Tissue Samples -

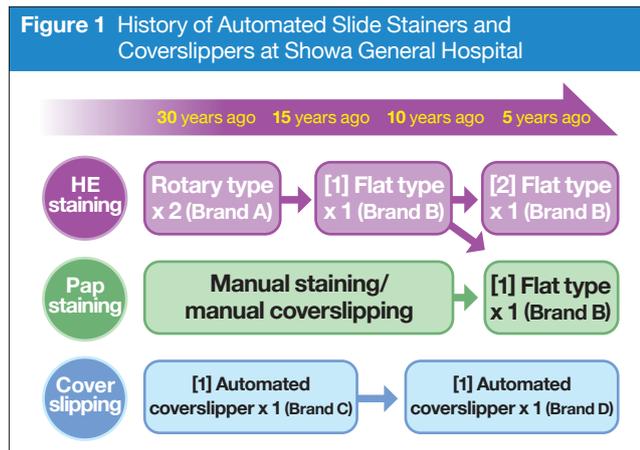
The Pathological Tissue Sample Handling Manual - Preventing Mix-up of Pathological Tissue Samples issued in July 2016 by the Japanese Society of Pathology (in collaboration with the Japanese Association of Medical Technologists), recommends that stained tissue samples be checked daily for staining quality and signed off by the histotechnologist in charge.

At the same time, the manual prohibits histotechs from submitting tissue samples to pathologists without checking the staining quality and suitability of the tissue sample.

The manual further lists specific precautionary instructions regarding the quality of HE staining, such as, [1] tissue samples should be stained following the staining manuals of each institution; [2] if inadequate staining occurs, investigate and determine the cause to improve staining quality; and [3] adopt a standard staining method so that the same stained quality can be achieved at every institution.

Clearly, it is very important to ensure traceability – in other words, to put in place an environment where problems can be reviewed so that prevention measures can be implemented.

One way to do this efficiently is to automate manual processes.



### History of Automated Slide Stainers and Coverslippers at Showa General Hospital

Showa General Hospital began using two rotary-type automated slide stainers and an automated coverslipper 30 years ago (Figure 1). In those days, hospitals using these instruments were rare.

Because exchanging solutions – particularly the solution stations located at the back – was difficult and staining efficiency was poor with the rotary-type stainers, we then shifted to the more effective flat-type stainer about 15 years ago.

When implementing the stainers, programming that complies with our staining manual, improvement of operational efficiency and improvement of the work environment were among the benefits we considered. Having a solution station configuration that prevents installation errors when exchanging reagents, easy management of staining solutions and staining accuracy were also key points when managing automated slide stainers.

### Effective Utilization of Tissue-Tek Prisma® and Tissue-Tek® Glas™ g2

Five years ago, we implemented the automated slide stainer Tissue-Tek Prisma® to cope with an increasing workload and histotech shortage. We decided to introduce the state-of-the-art automated slide stainer to achieve operational efficiency, speed, and consistent staining performance. At the same time, we adopted the automated coverslipper Tissue-Tek® Glas™ g2 and linked it to the slide stainer which significantly improved the work environment and work efficiency. We also shifted to the Tissue-Tek® Hematoxylin 3G to control the accuracy of HE staining.

Our initial plan was to use the Prisma and Glas g2 solely for HE staining, but we decided to use them also for other staining jobs that were required daily, such as the Alcian Blue/PAS (AI-B/PAS) double staining, EVG staining, and Papanicolaou (Pap) staining after all. To use multiple staining methods, we needed many solution stations (see Figure 2) and

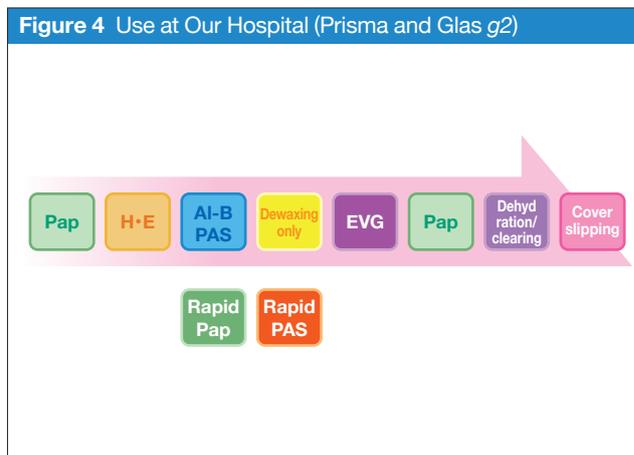
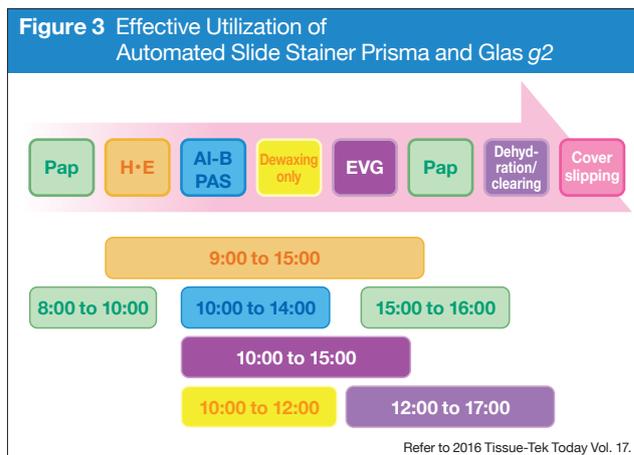
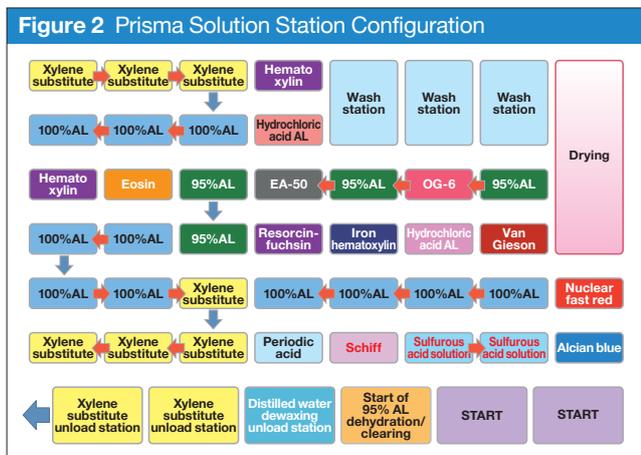
therefore opted for the small solution reservoirs and 20-slide staining baskets. In order to optimize the daily throughput of each slide stainer, we scheduled Pap staining between 8 to 10am and 3 to 4pm, both outside the HE staining hours.

The Prisma and Glas g2 were also used for various other purposes such as dewaxing and the dehydration → clearing → coverslipping processes during manual staining using special stains or IHC staining, thus contributing to greater operational efficiency (Figure 3).

We sought further operational efficiency and considered adding rapid Pap staining and rapid PAS reaction (Figure 4), but after encountering staining delays, we decided that running these processes concurrently was difficult.

### Introduction of Tissue-Tek Prisma® Plus

With expected improvements in the processing capability, work flow efficiency and visibility, implementation of accuracy control, and traceability we implemented the Prisma



*Plus* in May 2017, in addition to the Prisma. We wanted to link the new automated slide stainer to our existing automated coverslipper and we decided that the Prisma *Plus* was the best fit.

In our dual-instrument setup consisting of the Prisma and Prisma *Plus*, the Prisma was designated as a dedicated instrument for cytology, programmed to include regular and rapid Pap, PAS reaction and Al-B staining. Meanwhile, the newly introduced Prisma *Plus* is used primarily for tissue samples. Using the two instruments for different purposes allows us to do our jobs efficiently.

## Features of Tissue-Tek Prisma® *Plus*

As for solution exchange management, the Prisma *Plus* has a slide count management function in addition to the days/runs function offered by the Prisma, to keep track of the number of processed slides and notifies the user to exchange solutions. When the number of slides exceeds the set number, the instrument displays an alert message to urge the user to exchange solutions (**Figure 5**). The user can set its own default number of slides. For example, when you select HE staining, the display prompts you to enter the default number of slides to be stained. At our hospital, the default is set to “20” because we normally use 20-slides staining baskets.

At our hospital, reagents are exchanged on Fridays to prepare for staining operations starting next Monday. Hematoxylin 3G, which we are currently using, is a two-solution mixture staining solution. After mixing solution 1 and solution 2, the mixture is stored for at least a day to make it chemically stable.

In our daily operations, we mix the solutions on Friday and stabilize the mixture by storing it over the weekend. As for the management of Hematoxylin 3G, we use one small solution reservoir (that contains approx. 290 mL) to comfortably cover one week of HE staining. The number of slides range from 200 to 300 slides per day.

We currently use Hematoxylin 3G (Prisma package) consisting of 8.5 mL of solution 1 and 283 mL of solution 2, as well as 285 mL of Tissue-Tek® Eosin (Prisma package). The staining solutions come in just the right amount to fill a small Prisma solution reservoir (**Figure 6**).

Management of staining reagents can now be performed easily using barcodes. Pressing the barcode button on the menu screen and scanning the barcode on the solution package automatically inputs the lot number, shelf life and expiration date.

With the Prisma *Plus*, all information that helps manage the staining solutions and processes, including the information above are recorded in the compact flash memory card inserted to the side of the instrument. The solution name, set time, soak time, staining start and end time, staining method, staining sequence are recorded. The number of actually stained slides, versus the maximum number of slides that can be stained is also recorded. Furthermore, the lot number, shelf life and expiration date are also recorded for each staining solution. This is an excellent function from the viewpoint of ensuring traceability.

With the old Prisma, the setting screen for each solution station on the monitor supported a simple color palette. The Prisma *Plus*, on the other hand, lets us set 50 different colors (**Figures 7 and 8**) so that we can visually differentiate the reagent configuration for each staining solution to pre-

