Agilent Case Study: Dako Omnis Workflow

IHC Testing at Doncaster is Done Faster

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Doncaster Royal Infirmary: IHC Testing at Doncaster is Done Faster

The pathology laboratory at Doncaster Royal Infirmary processes approximately 90,000 H&E stains and 2,000 PAP (Papanicoulau) stains per year. The immunohistochemistry laboratory is responsible for staining approximately 15,000 immunohistochemistry (IHC) slides per year. All IHC stains are done on the Dako Omnis staining platform. The lab has benefitted from the Dako Omnis solution since 2014 and is using a menu of 50 different antibodies. Direct immunofluorescence (DIF) staining is also performed on Dako Omnis.

The Immunohistology lab conducts IHC, DIF and Special Stains under the experienced management of Senior Biomedical Scientist of Immunohistochemistry Laboratory Louise Shaw. During her tenure she has worked to continuously improve and hone the process from request to delivery of IHC results to the pathologist.

As part of the workflow optimization process, the lab has utilized both intelligent software distribution improvements, patient case management processes enabled by Dako Omnis, and new hardware for baking.

Before Dako Omnis the turnaround time would often be a minimum of 24 hours, but according to Ms. Shaw, the IHC results from their lab are now often completed the same day as they are requested, much to the surprise of the pathologists. This means the pathologist can finish the patient case report much sooner.

Doncaster Royal Infirmary

Doncaster Royal Infirmary is a large acute hospital with trauma unit status. The hospital has over 500 beds with a full range of hospital care. Together with three hospitals in Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust, it serves more than 420,000 people in the region across South Yorkshire, North Nottinghamshire and the surrounding areas.

The Pathology lab opens at 8.00, and the working hours of the IHC lab is usually from 9:00 to 17:00.

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Fast delivery of IHC results

Three representatives from Agilent Workflow Solutions Team met with Ms. Shaw, to determine how fast IHC results can be delivered to the pathologist after the request has been logged in the system. The study was not designed to measure capacity or throughput. We simply wanted to measure how fast IHC results can be delivered back to the requesting pathologist when using the Dako Omnis solution.

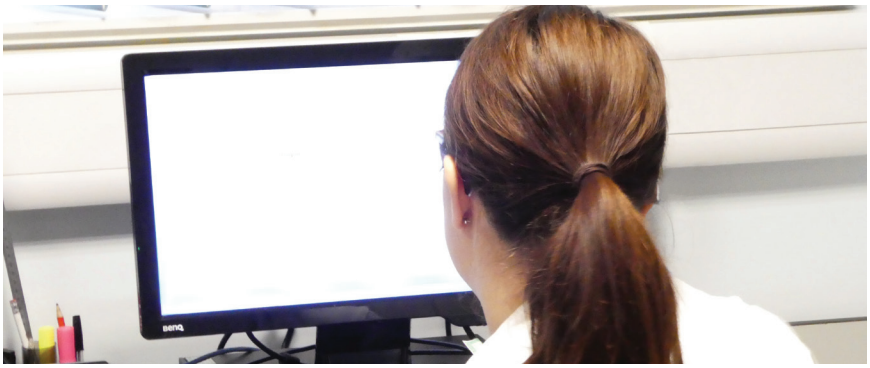

Figure 1. DakoLink Omnis software next to QC area is used to record audit trail and complete the cases.

How is the lab able to deliver IHC results so fast?

- Pathologists order the IHC tests via DakoLink Omnis Workbench software
- Slide labels are printed from Dako Omnis LAN seat prior to cutting
- Patient cases are kept together in same slide racks when possible
- Slides have on-slide QC tissue
- Patient cases are block checked and microscopically checked in mini-batches
- DakoLink Omnis software next to QC area is used to record audit trail and complete the cases
- New baking oven, reducing the pre-staining baking time from 60 minutes to 15 minutes
- Manual coverslipping process, reducing the time from ~10 minutes to ~2 minutes

Two cases suitable for patient case completion time measurement

To make the timing of patient case completion as reliable as possible, two cases were selected, requiring two and three antibodies, respectively. In addition, one of the antibodies used a low pH protocol, thus requiring a separate slide rack. As will be evident later, this did not impact the possibility to achieve very fast patient case completion times.

The two cases were requested from the pathologist's office using a Dako Omnis LAN seat, and as soon as the cases were displayed on the connected computer in the laboratory, the processing began. All hands-on times were timed using a stop watch and all major gate points were documented by time stamps in DakoLink Omnis Workstation software.

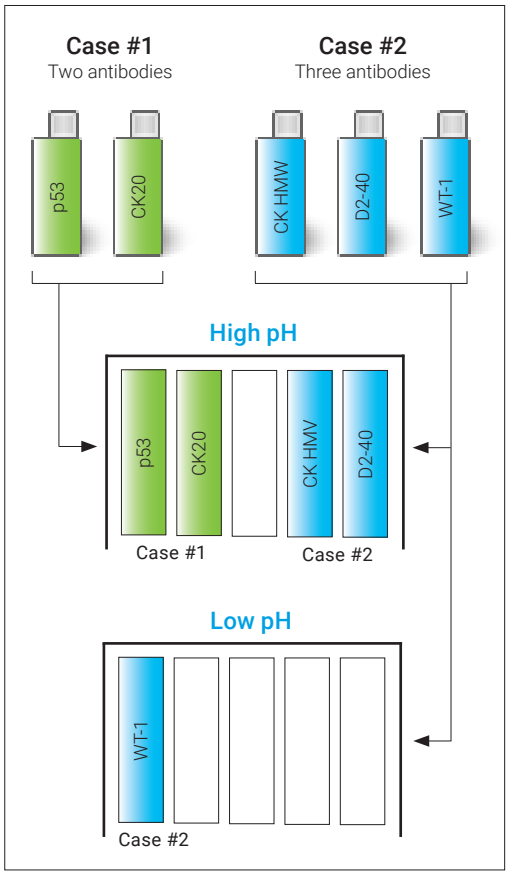

Figure 2. The two patient cases were tested with two and three antibodies, respectively. One protocol required low pH pretreatment, thus requiring a second slide rack.

Table 1. Hands-on times for two cases, five slides. Steps in blue are not included in total hands-on time.

Step	Time (minutes:seconds)	Time stamp
Add data to LIS	0:40	1:02 p.m
Print labels	0:29	
Get blocks	0:30	
Cool blocks	2:00	
Cut sections	1:51	
To/from baking oven	0:32	
Baking	15:00	
Load slides on Dako Omnis	1:00	1:24 p.m.
Add reagents on Dako Omnis	0:52	
Staining protocol	160:00	4:04 p.m.
Unload slides/transfer rack	0:20	
Dehydration and coverslipping	2:15	
Sorting in cases	0:45	
Block check	0:59	
QC of staining quality	1:34	
Add notes Dako Omnis + LIS	0:38	4:11 p.m.
Delivery to pathologist	0:16	4:12 p.m.
Total hands-on time	**12 min 41 s**	
Patient case completion time		**3 hrs 10 min**

The total hands-on time was 12 minutes 41 seconds for the five slides in two cases, which is 6 minutes 20 seconds per case or 2 minutes 30 seconds per slide.

Total patient case completion time was 3 hours 10 minutes from the pathologist's request until delivery of IHC-stained slides for two cases.

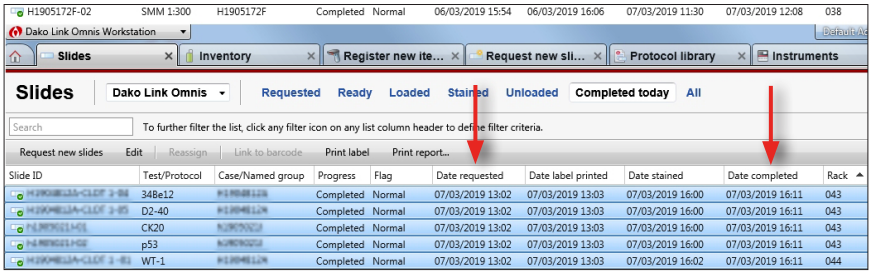

Figure 3. The two patient case requests were logged in Dako Omnis software at 1:02 p.m. The processing of the requests began immediately after. After the slides were marked completed in Dako Omnis Workstation software, data had to be logged in the hospital's LIS and slides delivered to the pathologist, thus final patient case completion time was at 16:12 (4:12 p.m.). Due to EU General Data Protection Regulation (GDPR), all identification IDs are blurred.

Conclusions

The data shown in Table 1 presents the achievable hands-on time and patient case completion times for a lab that optimized all aspects of the workflow and uses the potential of Dako Omnis in the IHC staining process. The Immunohistochemistry Laboratory at Doncaster Royal Infirmary was able to deliver complete patient case IHC results to the pathologist in just 3 hours and 10 minutes using roughly 2:30 minutes hands-on time per slide. The team at Doncaster Royal Infirmary Immunohistology Lab takes great pride in delivering fast and accurate IHC results for complete patient cases knowing that patients anxiously await their diagnoses.

Although not representative of all labs on all days, the results are achievable with Dako Omnis in a laboratory that has implemented a LEAN and optimized IHC workflow.

Acknowledgments

Agilent Technologies would like to thank Laboratory Manager Alison Hall and the Doncaster Royal Infirmary Pathology Services Department for allowing us access to observe and time the workflow in the Immunohistochemistry Lab. A special thanks to Louise Shaw and the team for their commitment to continuously improve the IHC workflow process while maintaining high-quality results.

Figure 4. Ms Louise Shaw, Senior BMS of Immunohistochemistry Laboratory.

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Published in the USA, October 22, 2019
29299 2019OCT22

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