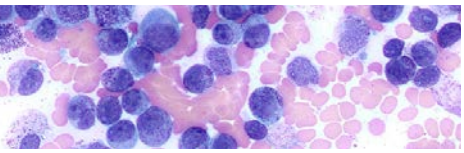
ZENTRUM FÜR
LABORMEDIZIN

Swiss center for laboratory medicine reduces peripheral blood smear analysis turnaround time by up to 57%

Scopio enables ZLM to achieve fully digital remote workflows, accelerate diagnosis, and improve patient care



CASE STUDY

Dr. Lukas Graf
Head of Department of Clinical Chemistry, Hematology, Immunology; Consultant Hematologist at ZLM

Joyce Richardson
Lead Biomedical Scientist for Morphology and Immunohematology, Division of Hematology at ZLM

Scopio

Overview

Complete blood counts (CBC) requiring morphological examination are vital tests in the hematology laboratory and essential to diagnosis and monitoring of disease. But these analyses are often a bottleneck in the lab. They are personnel- and expertise-intensive and require time-consuming manual microscopy and workflows.
The Center for Laboratory Medicine (ZLM) was looking for an automated digital solution that would make the process faster and more efficient at its six locations in Switzerland. They tested Scopio's Full-Field digital cell morphology solution, and the results were transformative.

About ZLM

ZLM offers 24-hour medical laboratory services to various institutions including public and private hospitals, independent physicians, and university hospitals across Switzerland. ZLM's main lab is located at the cantonal hospital in St. Gallen, and it operates five additional satellite locations. Its hematology department specializes in morphology, flow cytometry, hemostasis, and immunohematology.

"At the spoke sites, we have less specialized personnel. They see difficult blood smears infrequently. We wanted to be able to standardize the quality of patient care and bring morphology in every lab in our system to the same level."

Dr. Lukas Graf,
Head of Department of Clinical Chemistry, Hematology, Immunology; Consultant Hematologist at ZLM

The Challenge

ZLM faces rising demand for its services alongside staffing shortages. Morphology analysis was a particular productivity drain.

1. **Manual workflows**
   Manual peripheral blood smear reviews (PBS) using traditional light microscopy were labor-intensive and slow, requiring highly trained laboratory personnel to review results and hematology experts to validate anomalies.

2. **Lack of standardization**
   Expertise varied across the ZLM sites, particularly at the smaller satellite labs where there were fewer qualified lab technicians. They saw difficult blood smears infrequently; the inter-variability among technicians was high, and the review process differed among the different sites.

3. **Wasted time transporting slides**
   If a PBS review at a satellite lab required a secondary consultation, the physical slide was transported to the main lab at St. Gallen which could take one to 24 hours (or one to three hours in the case of an emergency). During off hours, this became particularly problematic and PBS review TAT was increased even further.

4. **Time consuming referral validation**
   When experts were not on-site to manually review slides, the final report would frequently be delayed until the next day. This was the case even for PBS reviews originating at St Gallen, where lab staff would have to email a snapshot of the slide image to the expert on-call. With only this "snapshot" as a reference, consultants were only confident enough to write an immediate remote report about 50% of the time.

The Solution

Facing slow throughput and ongoing staffing pressures, ZLM leadership began looking for more effective ways to automate and digitize morphology workflows.

They began testing technologies, but no existing solution solved the essential problems to fully meet ZLM's needs until the team was introduced to Scopio and the concept of **full-field digital morphology.**

ZLM performed morphology analysis on 50 PBS samples, comparing manual microscopy against the **Scopio X100** with **Full-Field Peripheral Blood Smear Application.** The goal was to determine whether the Scopio system could partially or fully replace manual microscopy and provide a more efficient, consistent, and remote-accessible method for PBS analysis.

"With full-field morphology, our experts and hematologists can perform analysis, then write and validate a report on a PBS scan without reverting back to the manual microscope."

Joyce Richardson,
Lead Biomedical Scientist for Morphology and Immunohematology, Division of Hematology at ZLM

ZLM's rigorous evaluation of Scopio's full-field high resolution imaging and built-in AI-driven decision support system showed that Scopio could deliver on the lab network's key goals.

Results reported include:

- **High degree of correlation for neutrophils, lymphocytes, monocytes, eosinophils, and platelets between Scopio and manual microscopy.**
- **Comparable correlation for the morphological analysis of platelets and red blood cells.**
- **Agreement between the test and reference method for RBC morphology of 99.77%.**
- **Accuracy for platelet estimation resulted in an efficiency of 94.89%, sensitivity of 90.00%, and specificity of 96.28%, with successful R&R tests.**
- **Overall satisfaction rate of about 90% for end users.**
- **Reduction in turnaround time for PBS reviews (TAT).**
- **WBC accuracy with an efficiency of 96.29%, sensitivity of 87.86%, and specificity of 97.62%.**

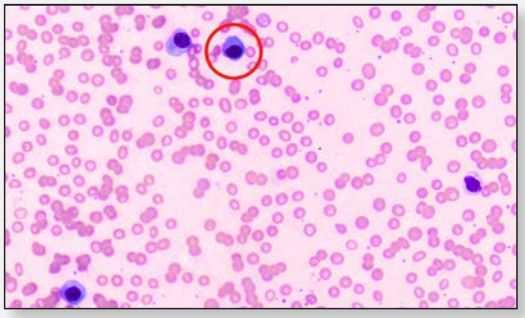
The Results

1.	**57% improved review turnaround time at St. Gallen main lab**	Full-field digital cell morphology review of peripheral blood smears showed a 57% Improvement over manual light microscopy review in St. Gallen's hub lab.
2.	**97% improved review turnaround time at satellite labs**	A remarkable improvement of 97% in the Turnaround Time (TAT) was observed in the review of pathological samples originating from the satellite laboratories at the main branch of St. Gallen.
3.	**50% improvement in lab staff productivity**	Before Scopio was introduced, ZLM required the physical presence of two team members at the DIFF workstation every day. After the implementation, only one biomedical lab scientist is now necessary.
4.	**100% remote review capability**	With Scopio installed, the lab shares the full-field image digitally, so the consulting expert has the full field of view, providing all the information needed to report confidently without returning to the lab to view the physical slide.
5.	**Standardized workflow across the organization**	Scopio technology enabled ZLM to standardize its morphology workflow and service levels for clinicians and patients. ZLM now sees less inter-variability across labs and faster diagnoses, especially at satellite locations.

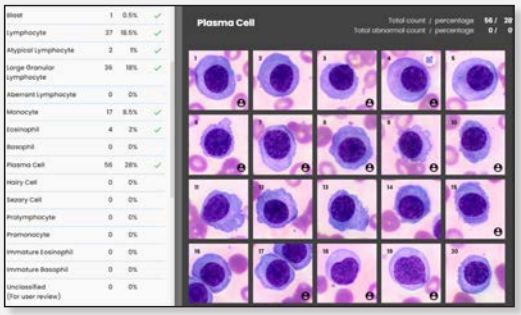
"The successful implementation of the Scopio system has enabled our hematologists to work remotely from anywhere around the world in real time. Being able to provide state-of-the art morphology results 24/7 is a game changer for lab personnel, clinicians, and ultimately patients."

Dr. Lukas Graf,
Head of Department of Clinical Chemistry, Hematology, Immunology; Consultant Hematologist at ZLM

Example of PCL diagnosis using Full-Field technology

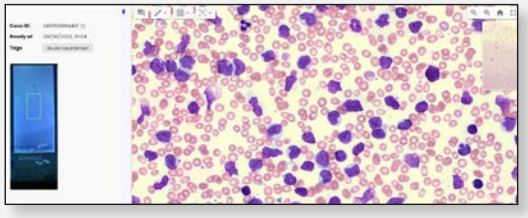


Full-field image of PCL:
This is a snap from a full-field image. You can see plasma cells that are not normally in a peripheral blood smear.

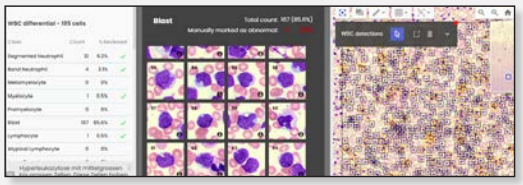


Single-cell view of PCL:
You can see what the differential looks like and that the patient has more than 20% plasma cells, so this is a plasma cell leukemia.

Example of a challenging MCL diagnosis using Full-Field technology



Full-field image of MCL:
Here is an example of a more tricky situation. This patient has hyperleukocytosis, so a very high white blood count. You can see here on the Full-field image that there are cells that do not belong in the peripheral blood.



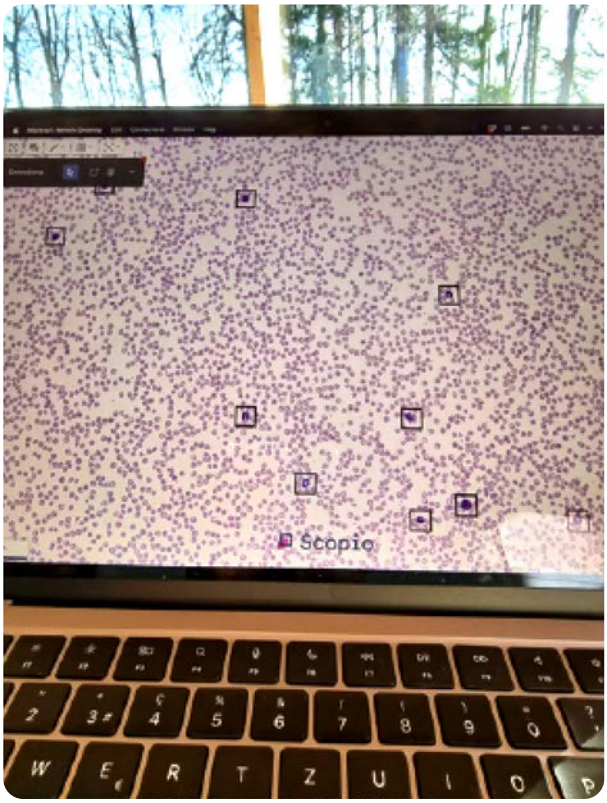
Single-cell view of MCL (blastoid variant):
If we have a closer look at the differential, they look a little bit like blasts. So the AI identified some of them as blasts and some as atypical lymphocytes, so we decided to put them all together as blasts. We commented that we weren't sure if it's a more mature lymphoid neoplasm that looks blastoid or an acute leukemia that looks a little bit mature.

Expert's comments from the Scopio platform to LIS:
What's important is that you can write your conclusions and recommendations. For example, the recommendation was to do Immunophenotyping by FACS analysis. You annotate and comment on the digital image and complete your report in one tool. Then, you can sign off, and everything is pushed into the LIS.

> “The excellent performance of the Scopio system has completely transformed our method of blood morphology beyond our expectations - not just in our main lab, but also across all our sites. It has enabled our hematologists to work fully remotely from anywhere around the world in real time. It has accelerated diagnosis and treatment and improved the quality of our patient care.”

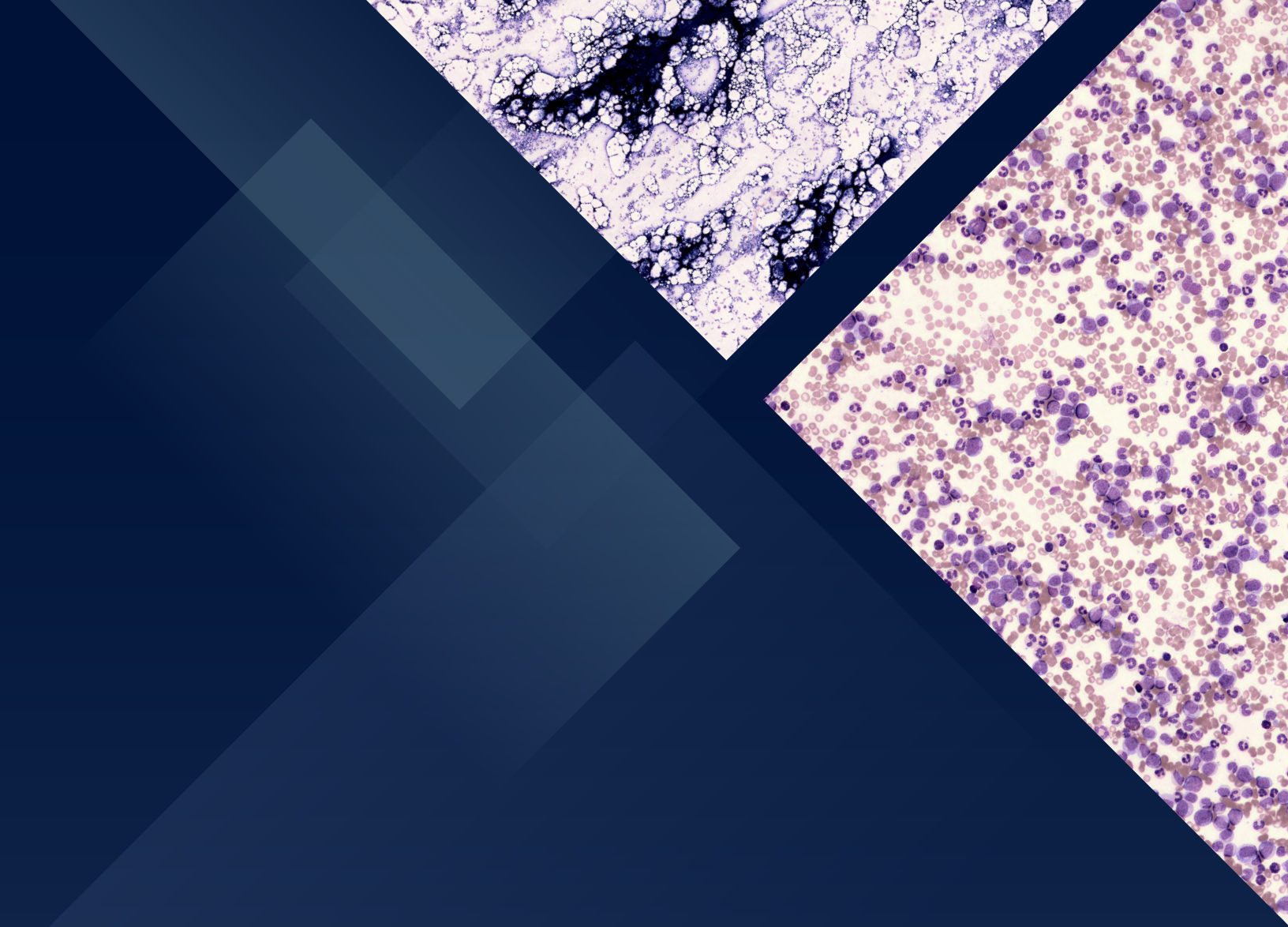
Dr. Lukas Graf,
Head of Department of Clinical Chemistry, Hematology, Immunology; Consultant Hematologist at ZLM

Lukas Graf @bennolukasgraf • 18. März
Reviewing cases from the comfort of my own home with the powerful @Scopio_Labs system. Mornings don’t get any better than this! ☕
#remotework #healthcare #AI #zlmsgch



DMS-46111 Rev. A

Disclaimers:
*Scopio’s Full-Field remote capabilities are available through the secure hospital network.
**Scopio Labs’ Full-Field Peripheral Blood Smear application is CE marked and FDA-cleared, and its commercially available across the U.S., UK and Europe and other territories.



The Scopio platform is now ZLM's standard of care for morphology diagnostics, delivering more consistent results and a smoother workflow.

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