

DISCLOSURE STATEMENT: The authors of this study have nothing to disclose

BACKGROUND

With the temporary eclipse of standard in-person teaching by the pandemic, digital histopathology served as an important alternative. While this modality has been used in Anatomic Pathology, the field of hematology has not yet witnessed an equivalent explosion in digital pathology. We aimed to develop and utilize an online, cloud-based hematology educational database with some degree of user interactivity.

METHODS

We utilized a novel full-field digital technology platform to scan peripheral blood smears that simulates real-life evaluation (<https://scopiolabs.com/>). Using this platform, residents are able to develop both localization and identification skills. Educationally valuable smears were scanned over a period of 6 months to establish a digital teaching set of 369 cases. A web-linked datasheet was compiled as an index, with linked flow cytometry and molecular results. A survey was subsequently conducted, in order to obtain resident feedback.

RESULTS

A total of 369 cases were scanned and uploaded to an online database. The average scan time was approximately 7 minutes per slide. Pancytopenic smears (defined as WBC <3.5x10³/uL) required the use of a full field-cytopenia mode for scanning. Residents were provided login credentials for accessing the database, the case index with the correct diagnoses, linked to flow cytometry results, and molecular results. Cases included benign entities, such as macrocytic anemia, neutrophilia, and eosinophilia, as well as examples of malignant entities, e.g., acute myeloid leukemia, with tagged features such as cup-shaped blasts, folded nuclei, etc.

Residents were able to freely assess peripheral smears at low power in order to identify optimal fields, with the ability to then observe areas of interest at up to x1000 magnification, to arrive at a diagnosis.

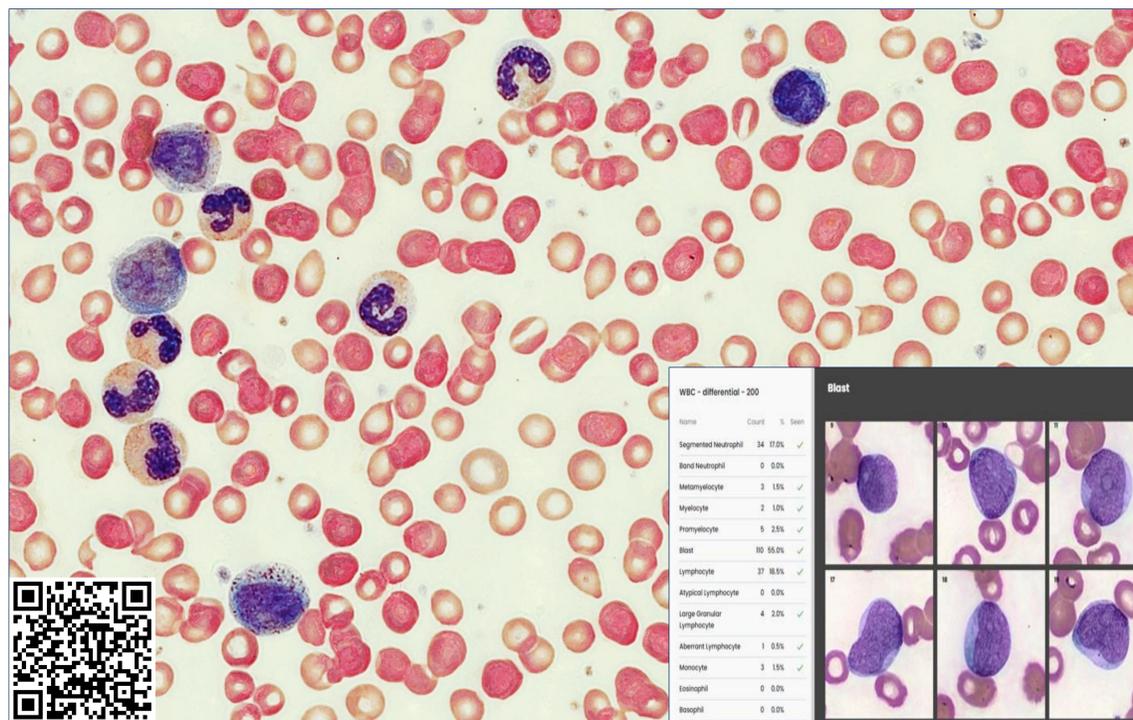


Figure 1a: Peripheral smear showing myeloid blasts in a case of AML. Inset: individual tagged cells. (scan QR code on bottom left for dynamic slide viewing)

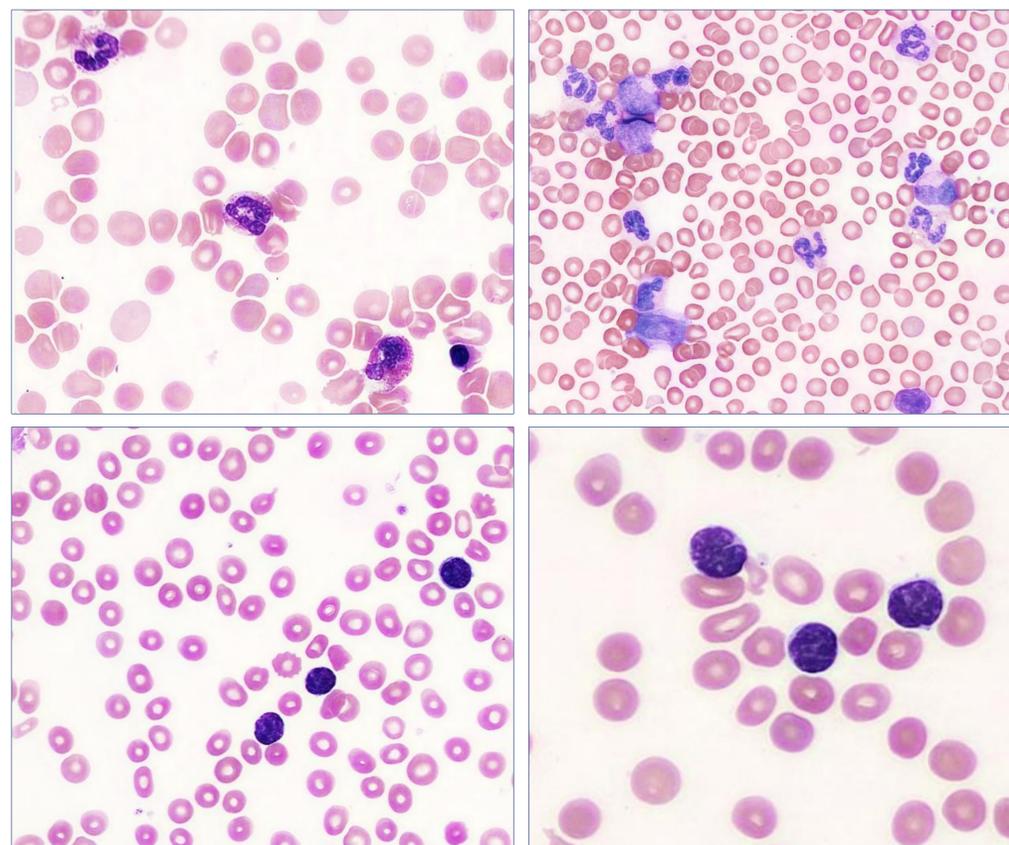
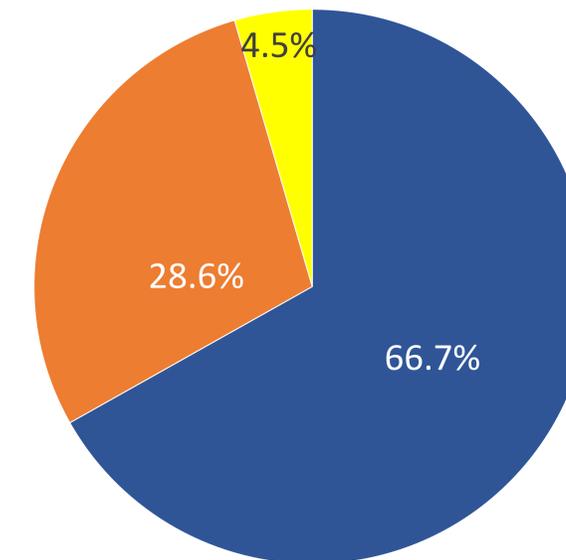


Figure 2a: Normal peripheral smear (PS) 2b: PS from a CML case, 2c: PS from a case of CLL. 2d: PS from a case of ALL showing lymphoid blasts

Survey results



- Interactive cloud based atlas
- Both of equal value
- Textbook atlas (4.5%)

RESULTS

Out of a total of 23 resident respondents, 66.7% preferred this online teaching set over traditional hematology atlases, 28.6% considered textbook and hematology atlases to be of equivalent educational value, while 4.5% preferred a textbook atlas. All but one respondent (95.4%) preferred the use of full field scanned images for daily sign-outs as well.

CONCLUSION

Full field digital morphology provides a more comprehensive educational alternative to textbook atlases. The ability to interact with scanned images provides a better learning experience than static images of cells alone, and can thus serve as an important educational tool for residents.