NTP
NANOTECH PROJECTS
DIGITAL IMAGING

NED MICRO DH

QUICK-START GUIDE

NED.Micro.DH

Nano Eye Device - Digital Hematology

ENG

V.4.3

NANOTECH PROJECTS

DIGITAL IMAGING

The journey into digital hematology...

Made in Italy

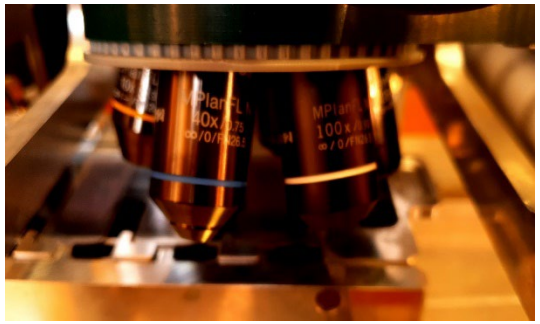
DEFINITIONS AND ACRONYMS

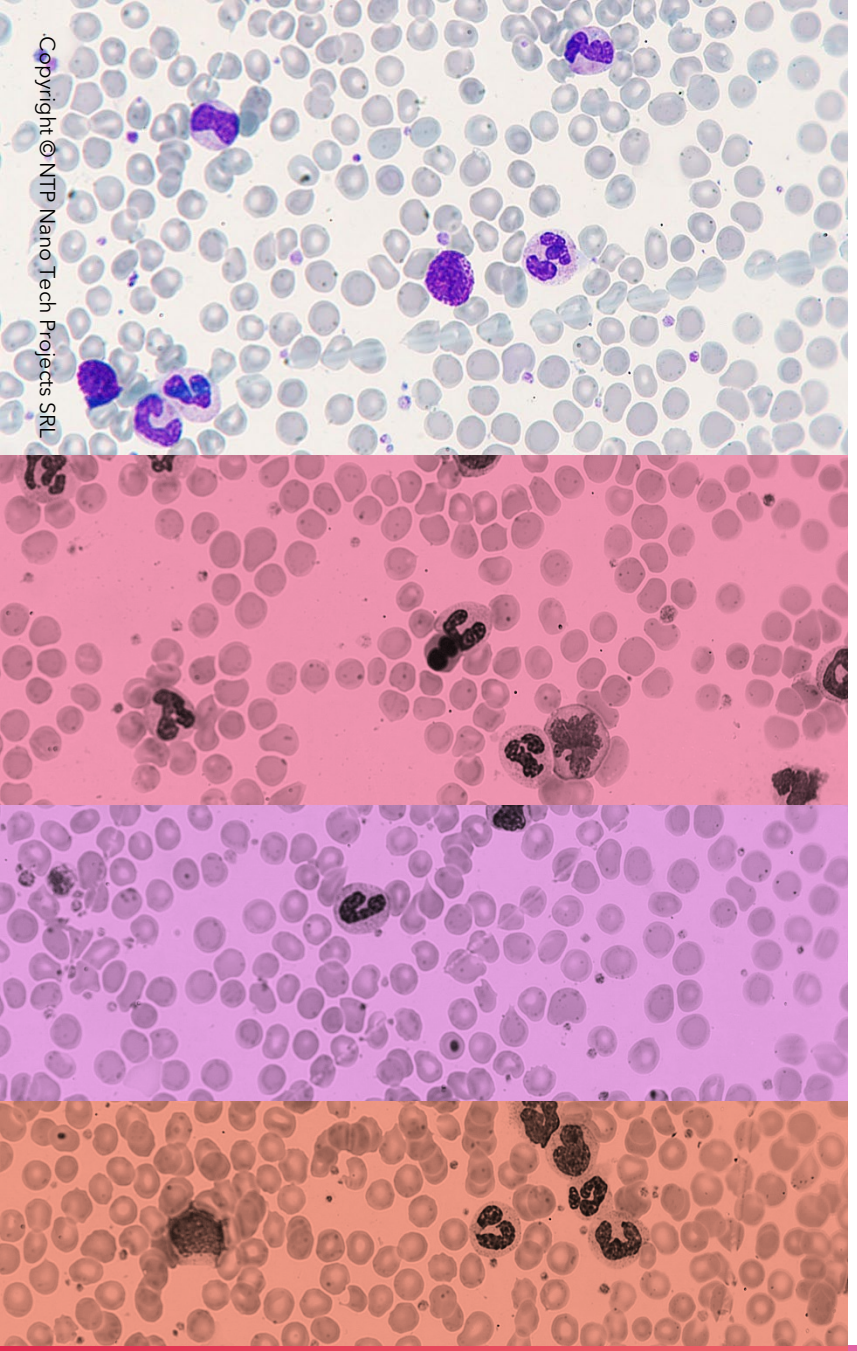
«NTP» NTP Nano Tech Projects SRL.
«NED.Micro.DH» Nano Eye Device for Digital Hematology.
«NED.Micro.DP» Nano Eye Device for Digital Pathology.
«WBC» White Blood Cell.
«RBC» Red Blood Cell.
«AIC» Automatic Images Collector.
«QC» Quick Counting.
«AF» Autofocus.
«FHD» Full High-Definition screen.

Type of Cell [Tag]

[M] Monocyte
[L] Lymphocyte
[N] Neutrophil
[E] Eosinophil
[B] Basophil
[MIEL] Myelocyte
[MET] Metamyelocyte
[PROM] Promyelocyte
[BL] Blast
[PL] Plasm
[LA] Lymph-Abnormal
Erythrocyte (Red Blood Cell)
Platelet

INDEX





INTRODUCTION

The future of image analysis of peripheral blood smear in real time

NED.Micro.DH is a digital microscope for hematology developed on the proprietary platform NED.Micro, the same developed and used for the NED.Micro.DP product for applications in Digital Pathology, thus inheriting many of its characteristics and features.

NED.Micro.DH is a tangible catalyst for hematology digitization making it easy to approach thanks to a real-time image transmission system that employes a dedicated streaming application and proprietary management software.

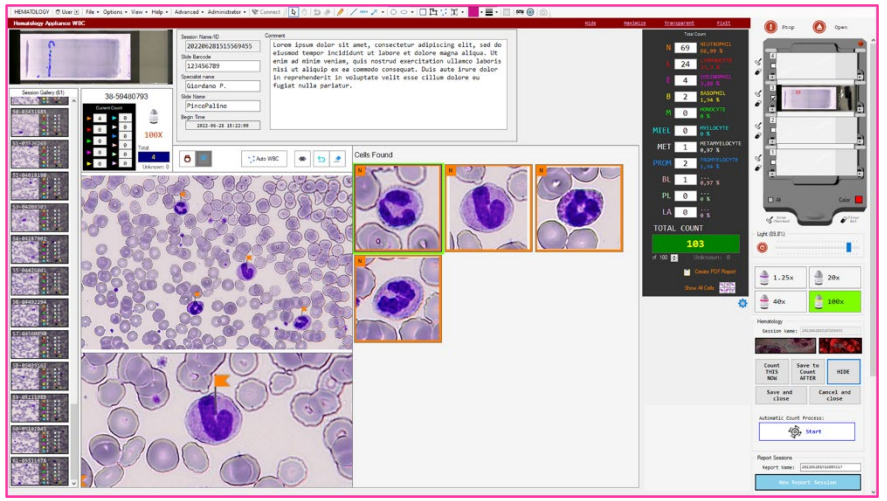
Through the software dedicated to white blood cell differential, both data and images for each WBC are stored and can be called back for a possible review of the case.

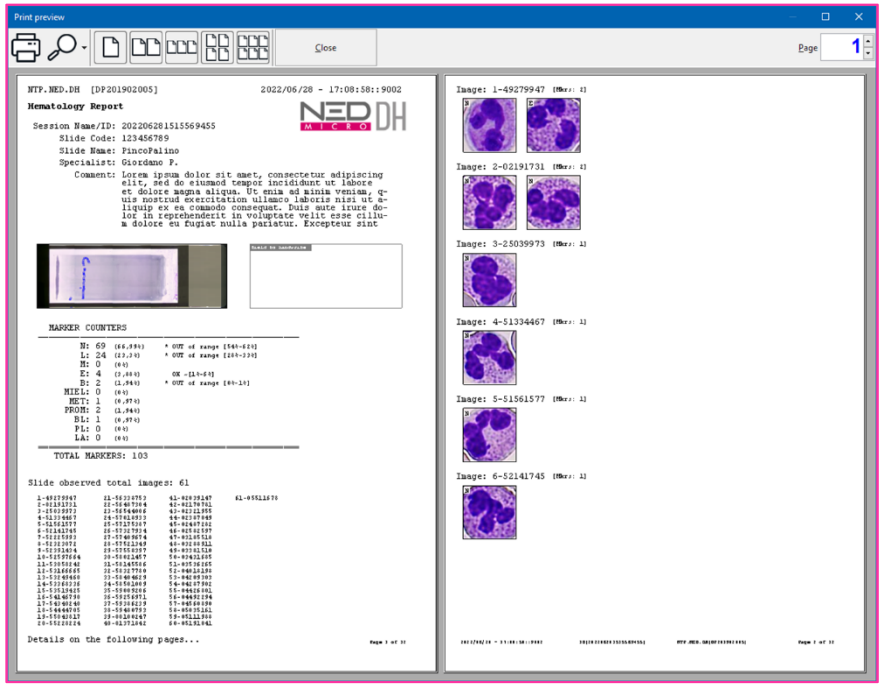
NED.Micro.DH can be used instead of the classic light microscope through the use of an external keypad, allowing connection to the LIS and data transfer without the need of manual transcription.

NED.Micro.DH can be proposed as the ideal tool to connect peripheral laboratories with hub hospitals where hematology specialists are located, to control, verify, and validate data, even in real time.

WBC COUNT SESSION

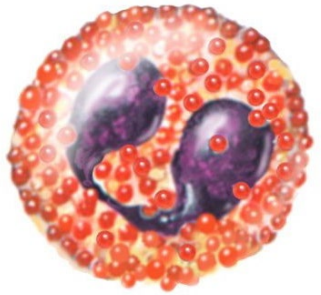
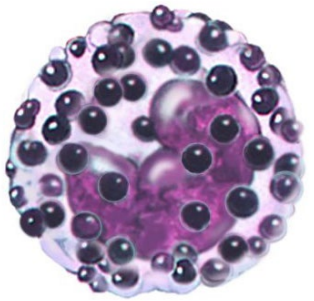
White Blood Cells





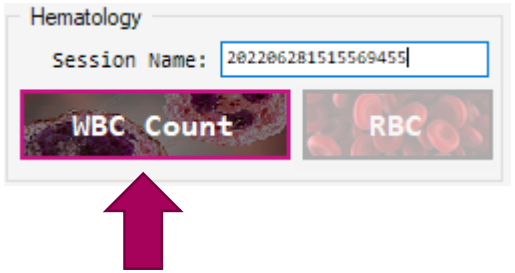
TYPES OF WHITE BLOOD CELLS



- Neutrophil [N]
- Lymphocyte [L]
- Monocyte [M]
- Eosinophil [E]
- Basophil [B]
- Myelocyte [MIEL]
- Metamyelocyte [MET]
- Promyelocyte [PROM]
- Blast [BL]
- Plasm [PL]
- Lymph-Abnormal [LA]

CREATE A WBC COUNT SESSION

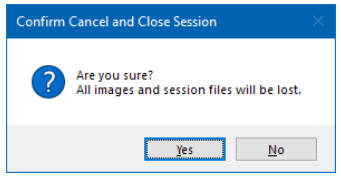


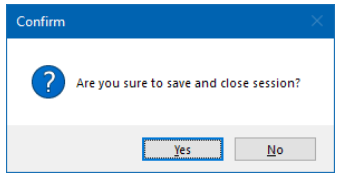
On the panel Hematology, in the main interface sidebar, enter a name for the entire session in the designated box and click «WBC Count».

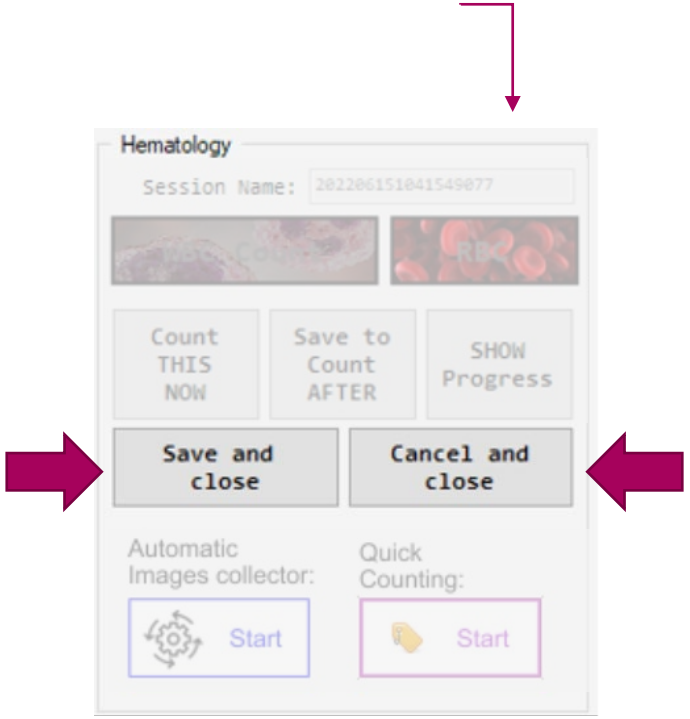
After the WBC session has been started the control panel will be displayed.

CANCEL THE SESSION TO START AGAIN OR SAVE AND CLOSE IT

Click «Cancel and Close» or «Save and Close» in the control panel and accept the confirmation message.

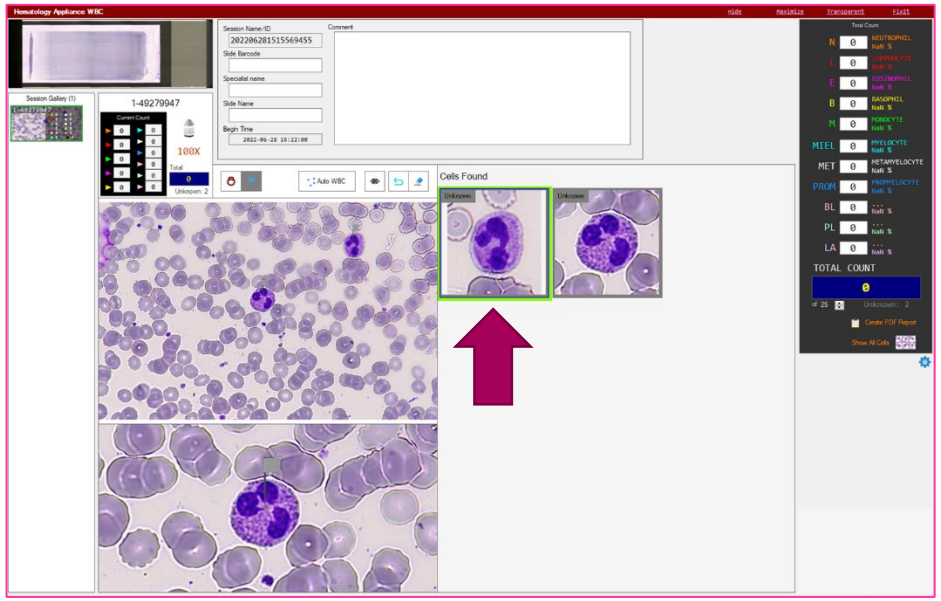




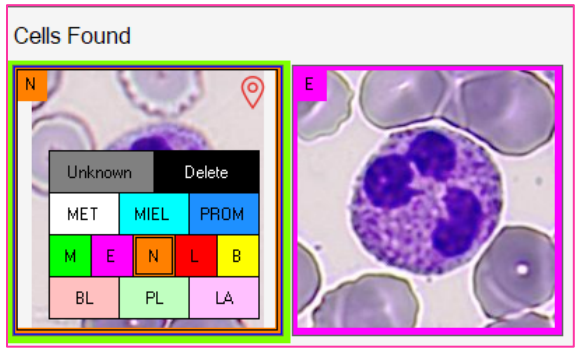


HOW TO COUNT THE WBCs ?

On the control panel click «Count This Now» to freeze the real-time image and switch to the count WBC interface.



Placing the mouse pointer over one of the cells automatically detected (in the «Cells Found» area) a context menu will be displayed where the user can manually classifying the cell, indicating the type.

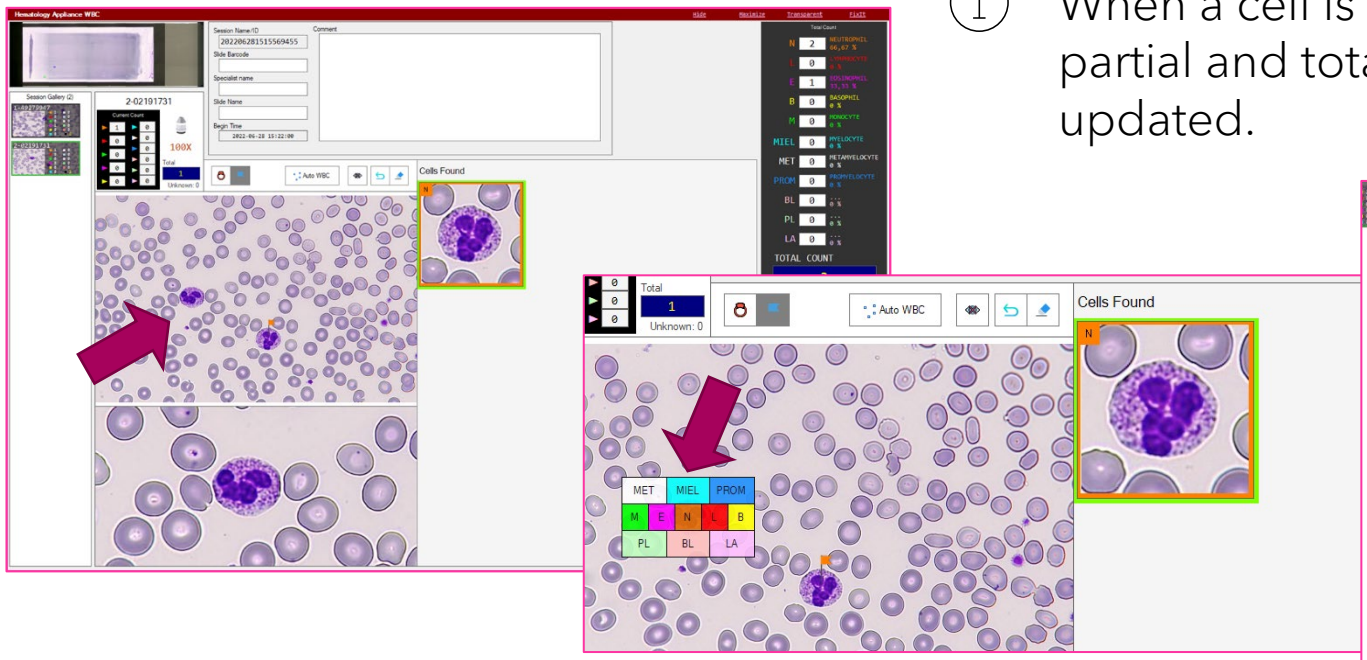


Repeat for every cell in the area.

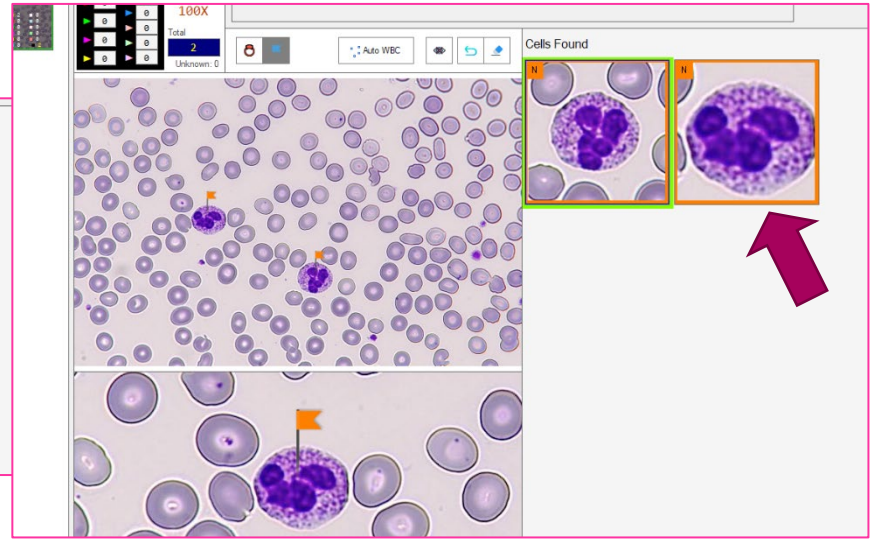
It is also possible to save the real-time image in the gallery and count the WBC later by clicking on «Save to Count After».

WHAT IF I DON'T FIND ALL THE CELLS IN THE IMAGE IN THE «CELLS FOUND» AREA ?

In this case the cells can be counted and added manually: place the mouse pointer on the desired cell and click to display the context menu to tag and possibly identify the cell.
Then it will be displayed in the «Cells Found» area.

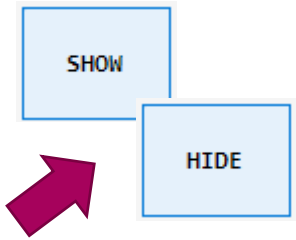


ⓘ When a cell is manually added or removed both partial and total count numbers are automatically updated.

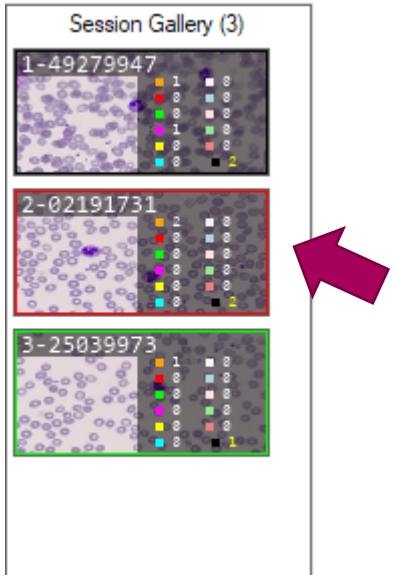


RETURN TO THE *REAL-TIME* IMAGE

It is always possible to switch between the count session interface and the real-time imaging by clicking the «Show/Hide» button in the control panel.



ⓘ Alternatively, also keybord shortcuts can be used.



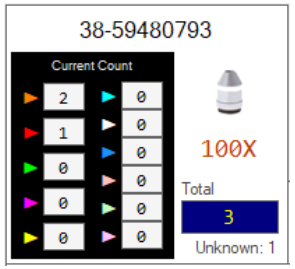
RECALL AN IMAGE PREVIOUSLY ANALYZED

Cick on the desired image in the gallery in the left side of the WBC count session interface.

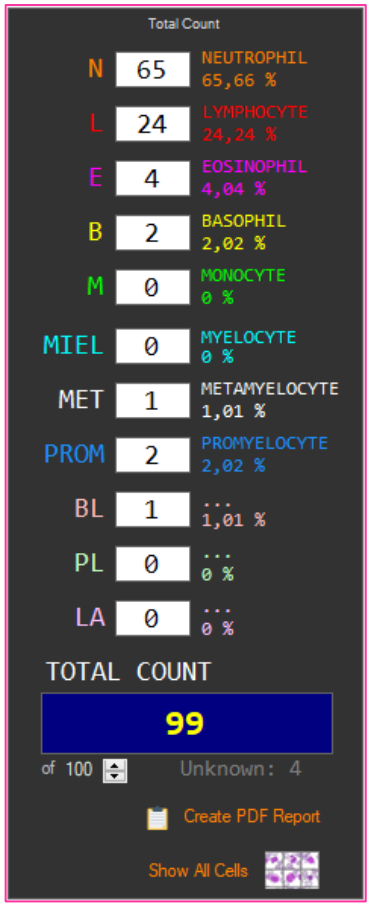
The image is displayed together with possible cells previously identified, and the markers can be modified or deleted. It is also possible to visualize the cell in *Real-Time*.

COUNTERS

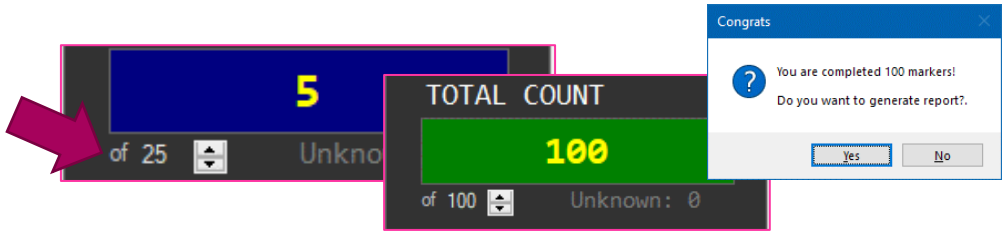
There are two panels in the WBC count session: one for the partial count referring only to the selected image; the other for the total count refering to all images of the session.



ⓘ In the partial count panel also image ID and the used objective are displayed.



ⓘ In the total count panel it is possible to change the total number of cells that must be detected; once this value is reached a message will appear.



SLIDE DATA

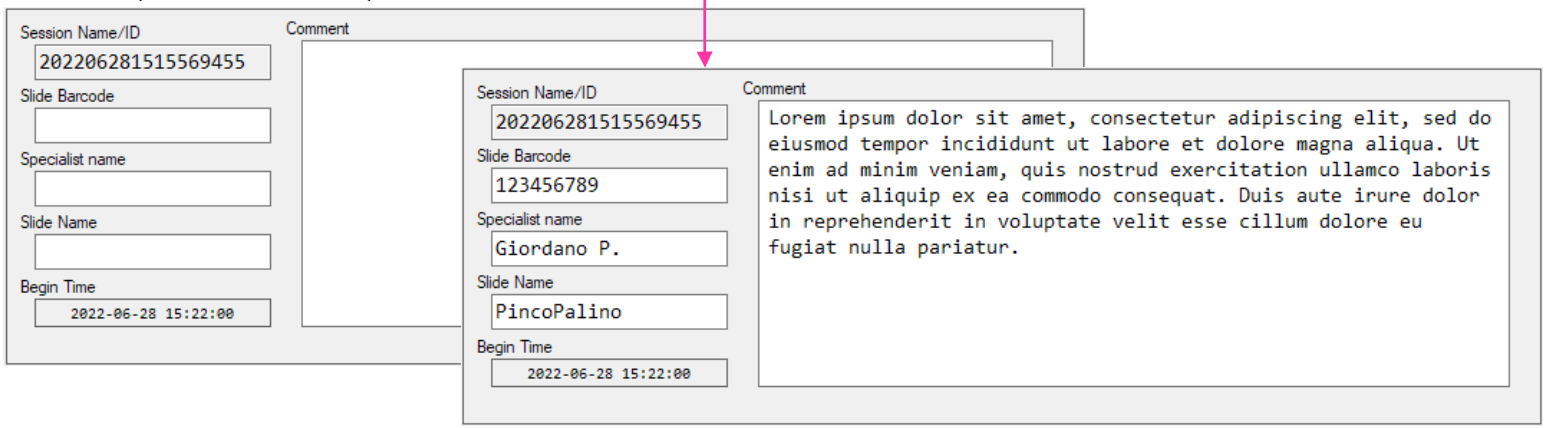
It is possible to add slide data; they eventually will be saved and displayed in the final *Report*.

ⓘ The name/ID of the session must be added at the beginning of the session and cannot be modified afterwards.

Available boxes:

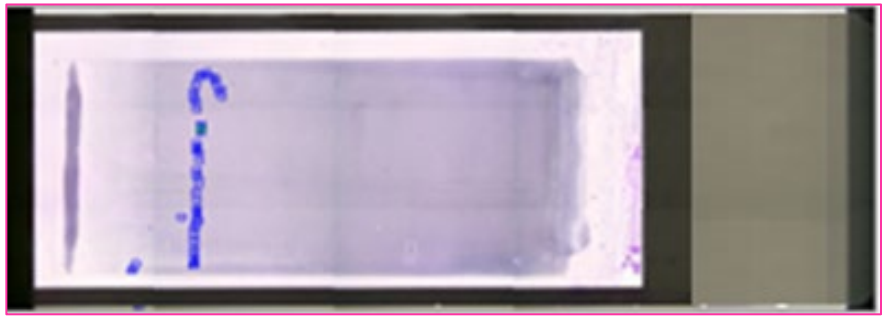
- Slide number (Slide Barcode) *
- Name of the specialist that is running the session (Specialist Name) *
- Name of the patient (Slide Name) *
- Notes/comments on the session (Comment) *

* Optional



MINIMAP

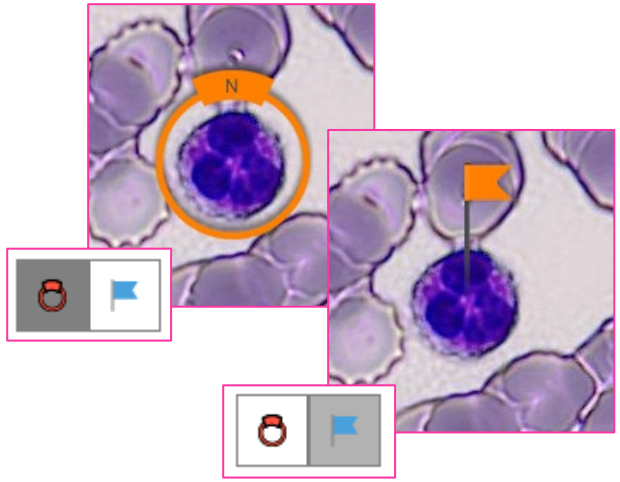
It is possible to understand where the image currently displayed has been detected within the slide through the minimap, placed on top left of the WBC count session interface.



ⓘ The region outlined in green corresponds to the image currently displayed; other regions outlined in blue correspond to the location of all the other images in the gallery. It is then possible to have an overall view of the path during the count session.

WBC MARKER

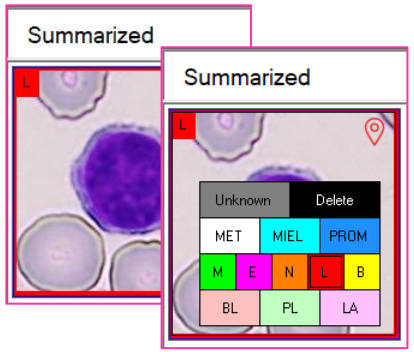
It is possible to choose among two possible markers to indicate the WBC in the displayed image: one with a ring shape, the other resembling a flag.

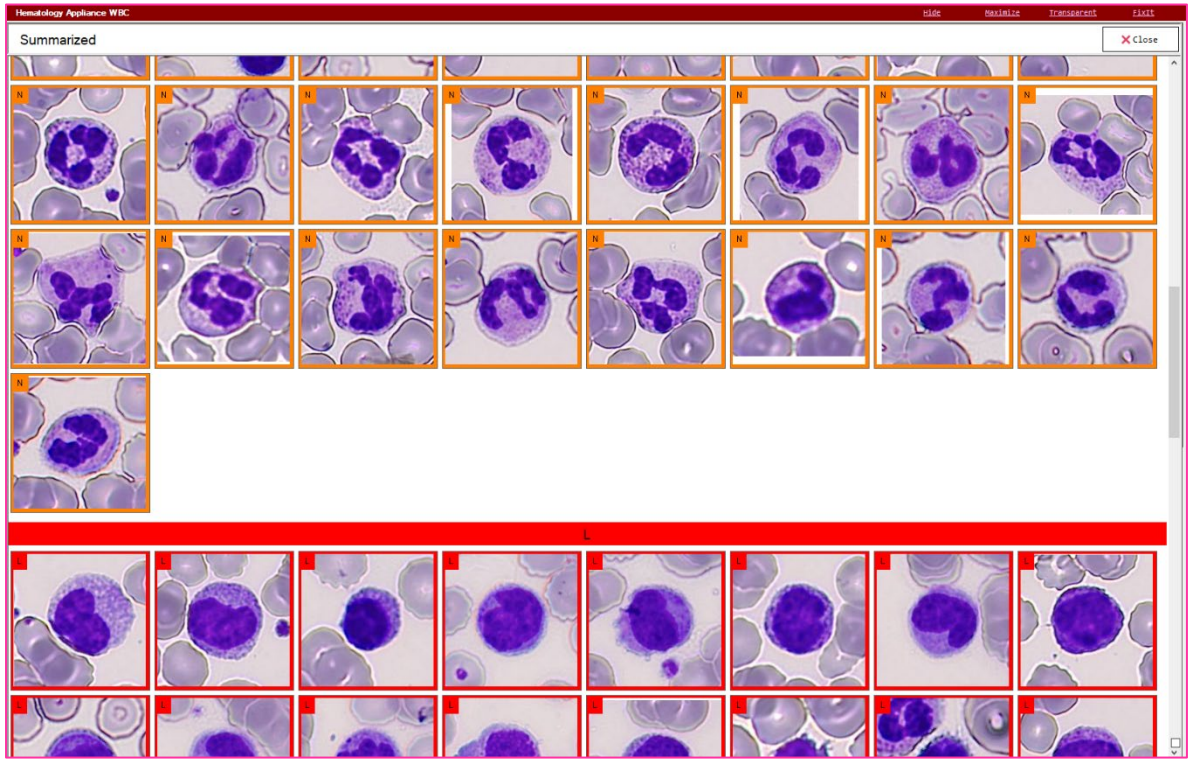


PANEL WITH ALL CELLS

Click the «Show all cells» button to open a summary panel showing all the identified cells..

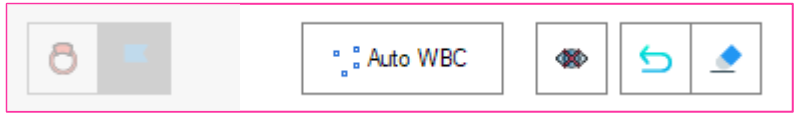
ⓘ Also in this panel it is possible to change the classification through the context menu by placing the mouse pointer and click on the desired cell.



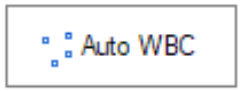


OTHER OPTIONS OF THE MENU *TOOLS*

Beyond the marker type, there are 4 more options in the menu *tools* of the current displayed image:



- Auto WBC delete all the markers in the current image and start again the automatic identification procedure of all the cells.



- Hide/Show hide or show all the markers in the current image.

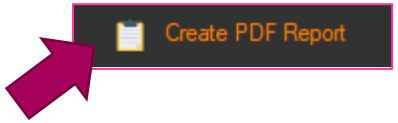
- Undo deletes only the last added marker in the current image.

- Clear All deletes all the markers in the current image.

ⓘ Everytime a marker is deleted, both partial and total count counters are updated automatically.

PRINT OR SAVE A REPORT

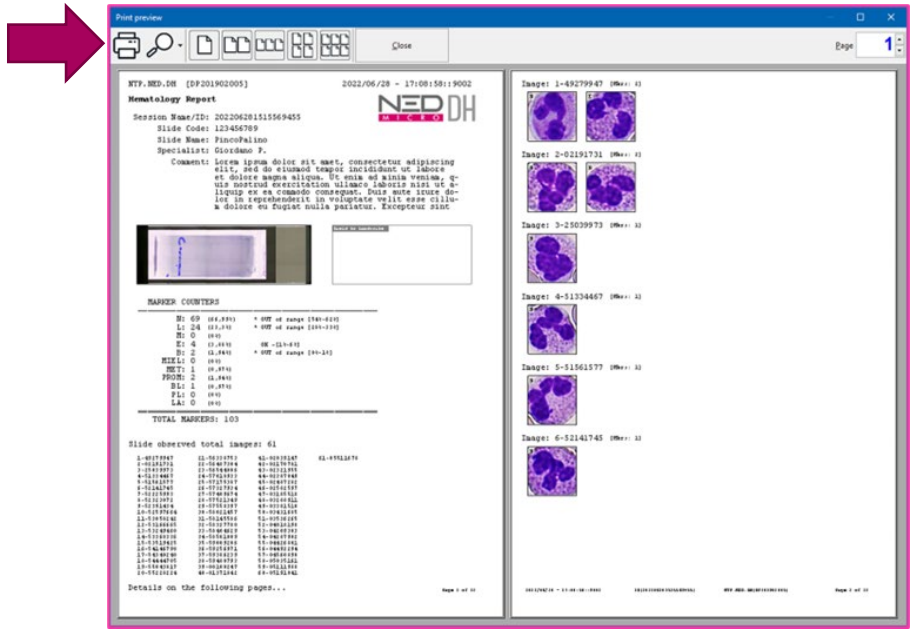
Click the button «Create PDF Report» in the WBC count session interface.



A preview of the report will be displayed.

ⓘ From this window it is possible to print the report or save it as a.pdf file

ⓘ In the first page of the report all the slide data are displayed.

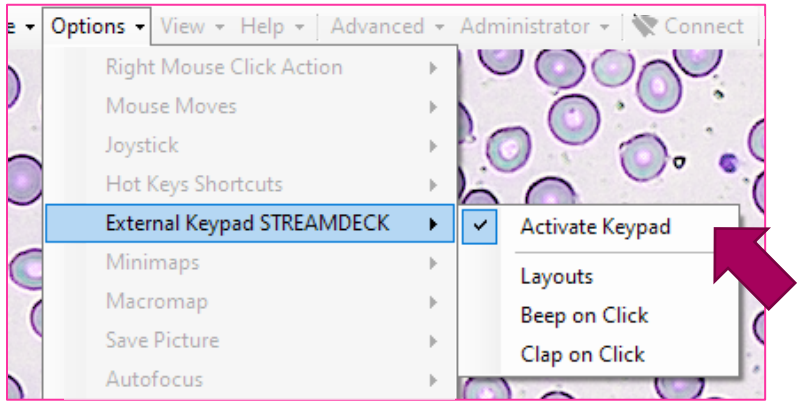


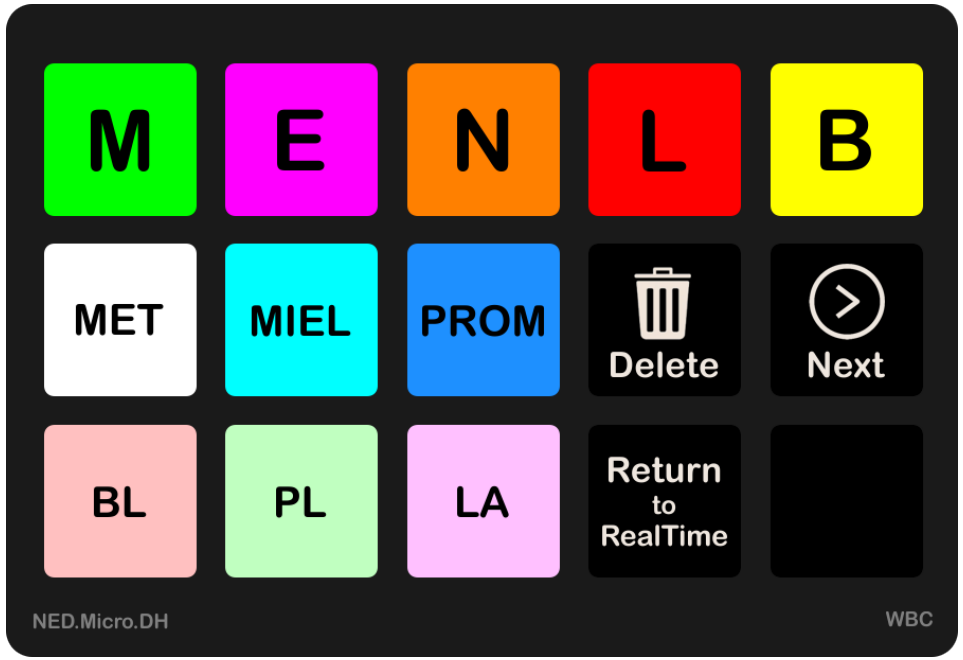
ⓘ In the following pages all the cells identified and classified during the session are displayed.

EXTERNAL KEYPAD

It is possible to use the external keypad to speed up the WBC counting procedure.

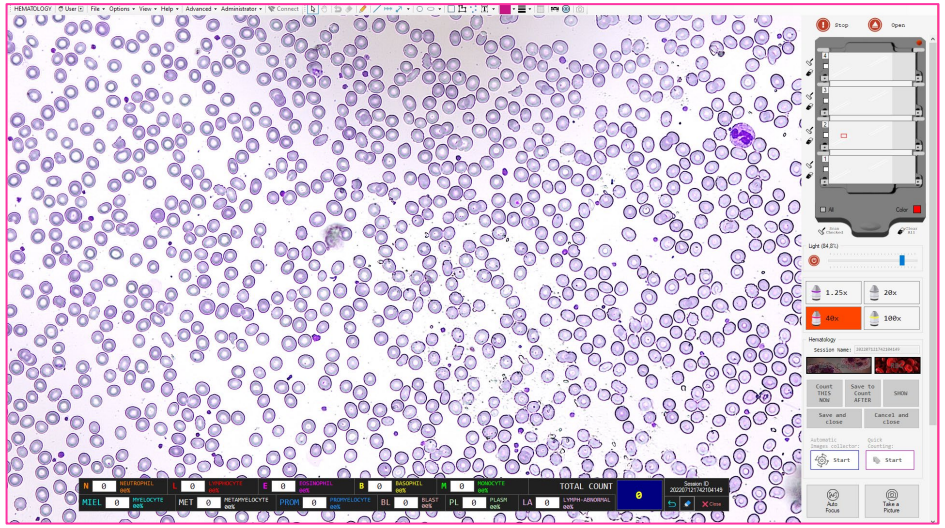
It can be activated in the menu *Options* of the main interface.

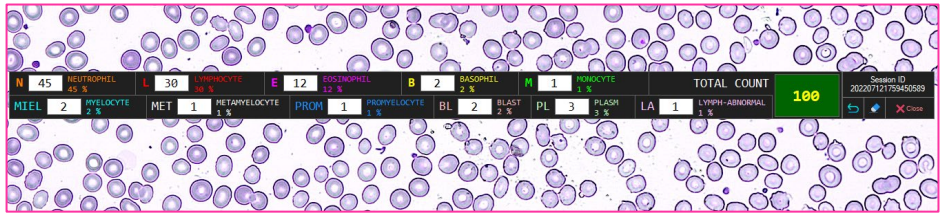




ⓘ In the keypad all the available functions are displayed; in addition to classify and delete the cell, it is possible to return to *Real-Time* navigation with a single key.

WBC QUICK COUNT SESSION



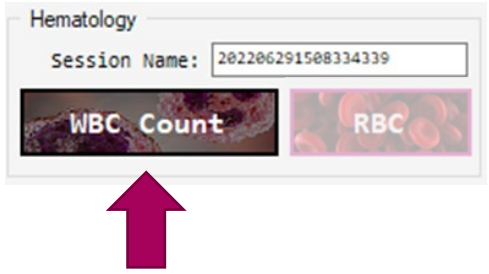


STILL WITH THE OLD METHODS?

When you will experience
our NED MICRO DH
you will never
come back to the
optical microscope...

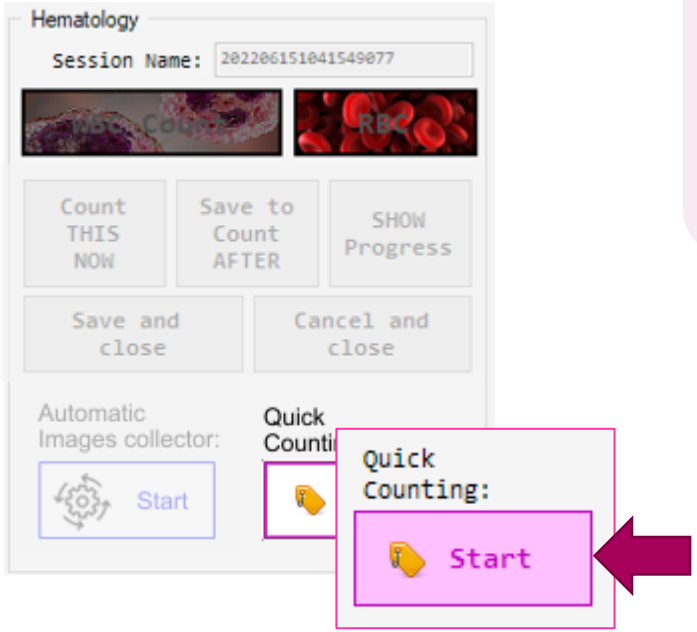
VS

CREATE A WBC QUICK COUNT SESSION



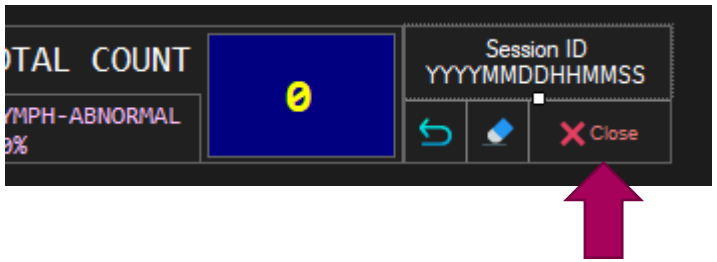
On the panel Hematology, in the main interface sidebar, enter a name for the entire session in the designated box and click «WBC Count».

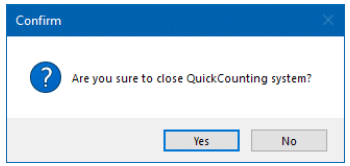
Once the WBC session has been created click the button «*Start*» under the title «Quick Counting».



CANCEL AND CLOSE THE SESSION

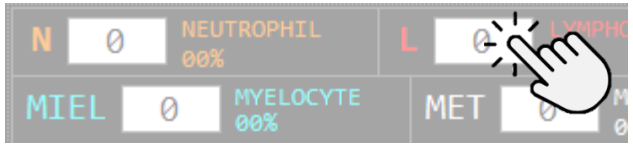
Click «Close» in the control panel and accept the confirmation message.



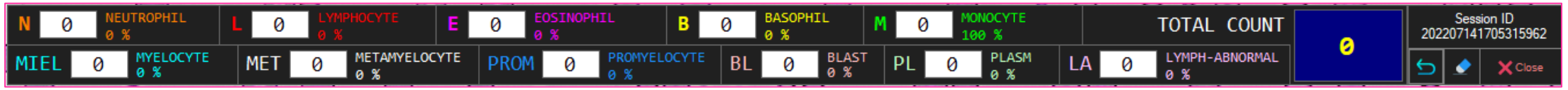


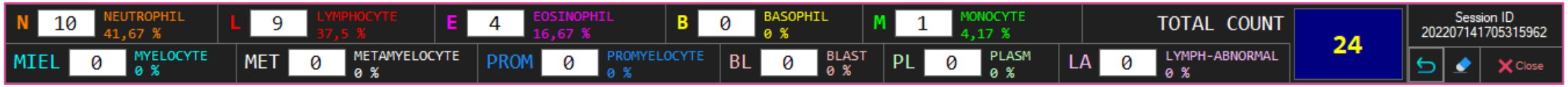
COUNT THE CELLS IN THE QUICK SESSION

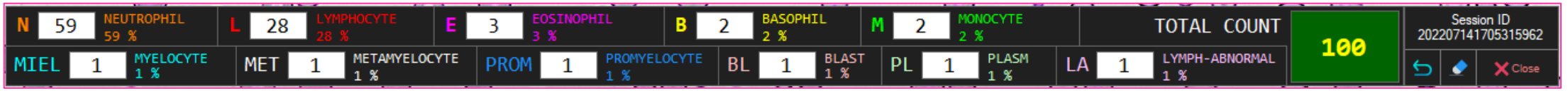
Use the external keypad or click in the box of the desired cell type in the quick count panel.



ⓘ Both absolute values and corresponding percentages will update at every click.







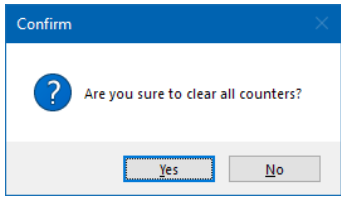
ⓘ The quick count panel is always visible while the session is running.

OTHER OPTIONS OF THE QUICK COUNT PANEL

«Undo» to delete the last counted cell.

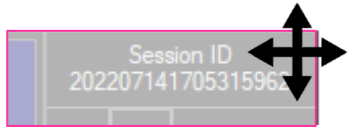
«Clear All» to delete all the cells and reset the counters.

ⓘ Message to confirm the reset.



Session ID

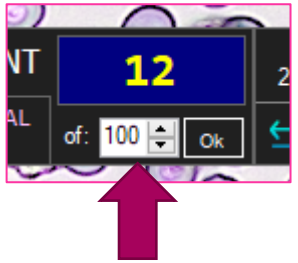
ⓘ Clicking and dragging on the session ID it is possible to move the panel to place it in the desired position of the screen.

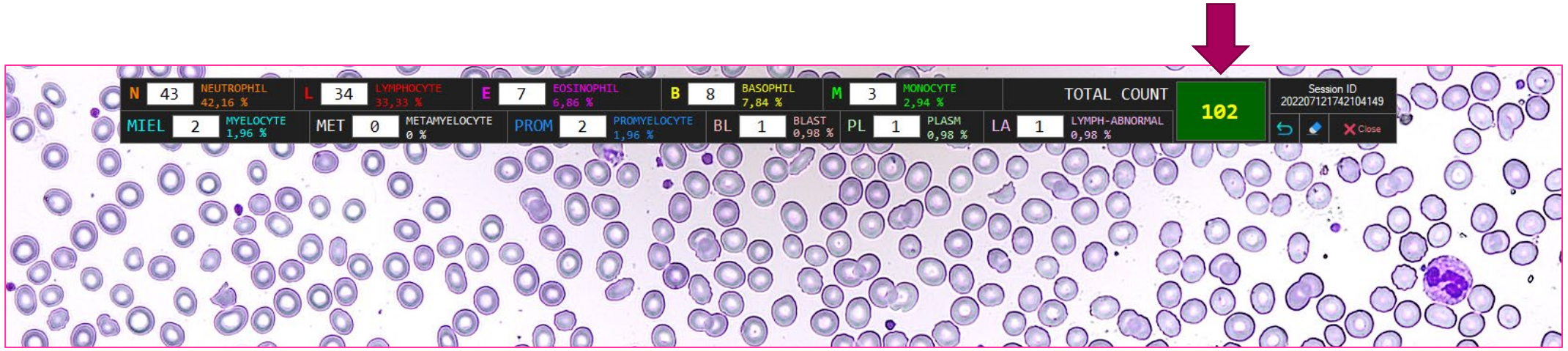


MODIFY THE TOTAL NUMBER OF CELLS TO COUNT

In the quick count panel by right-clickling on the present total number, a field will appear where the total goal number can be updated.

ⓘ Once the goal number is reached the box with the total counter will be highlighted in green to indicate that the count is completed.





EXTERNAL KEYPAD

The external keypad interface contains the same functionalities of the quick count panel.

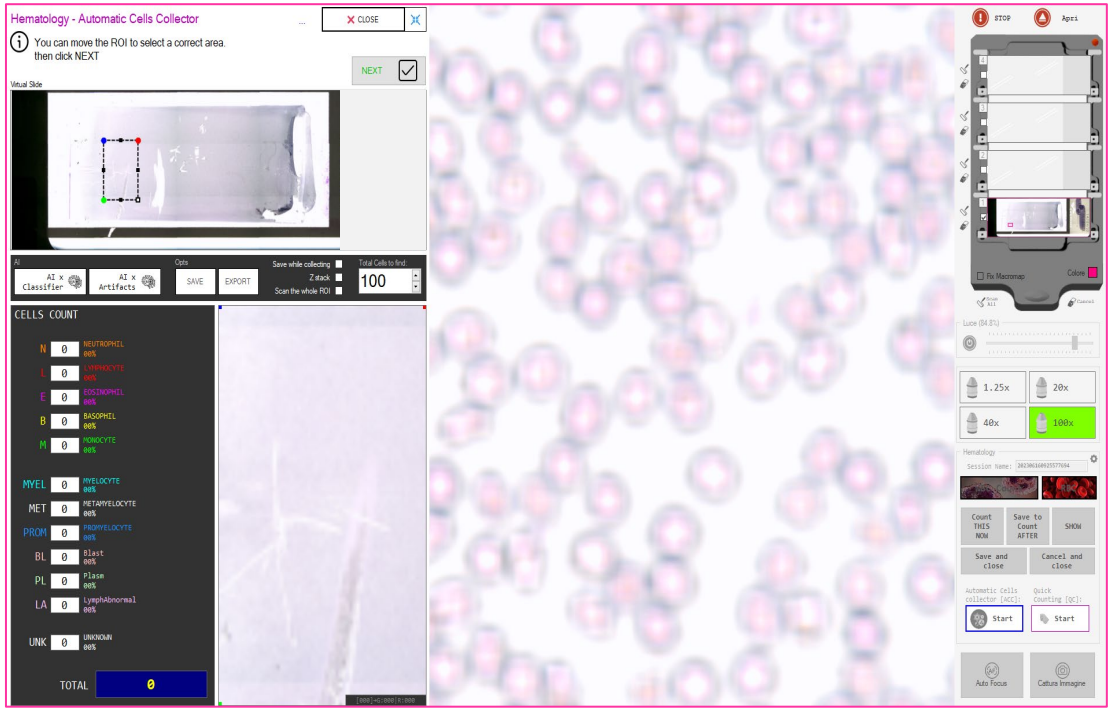
ⓘ Available buttons and boxes:
- the total count in the first button;
- the eleven buttons corresponding to the cell types;
- «Undo» e «Clear All» buttons.

AUTOMATIC CELL COLLECTION

for WBC count

RUO

For Research Use Only

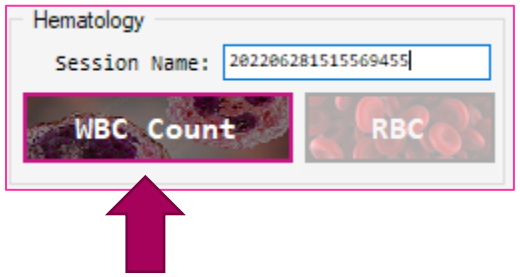


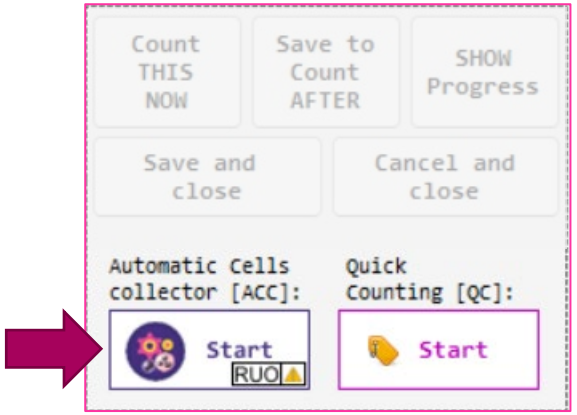
AUTOMATIC CELL COLLECTION (ACC)

The automatic cell collection is a sub-function of the WBC count system; before using it, it is necessary to create a new WBC count session.

As shown previously, it is necessary to enter a ID session name and click the «WBC Count» button.

Then click the button « Start» under the title «Automatic Cells Collector» in the control panel, to open the interface of automatic collection.





ⓘ Since this is a sub-function of the WBC count session, all the images collected during the procedure can be exported to the count WBC interface.

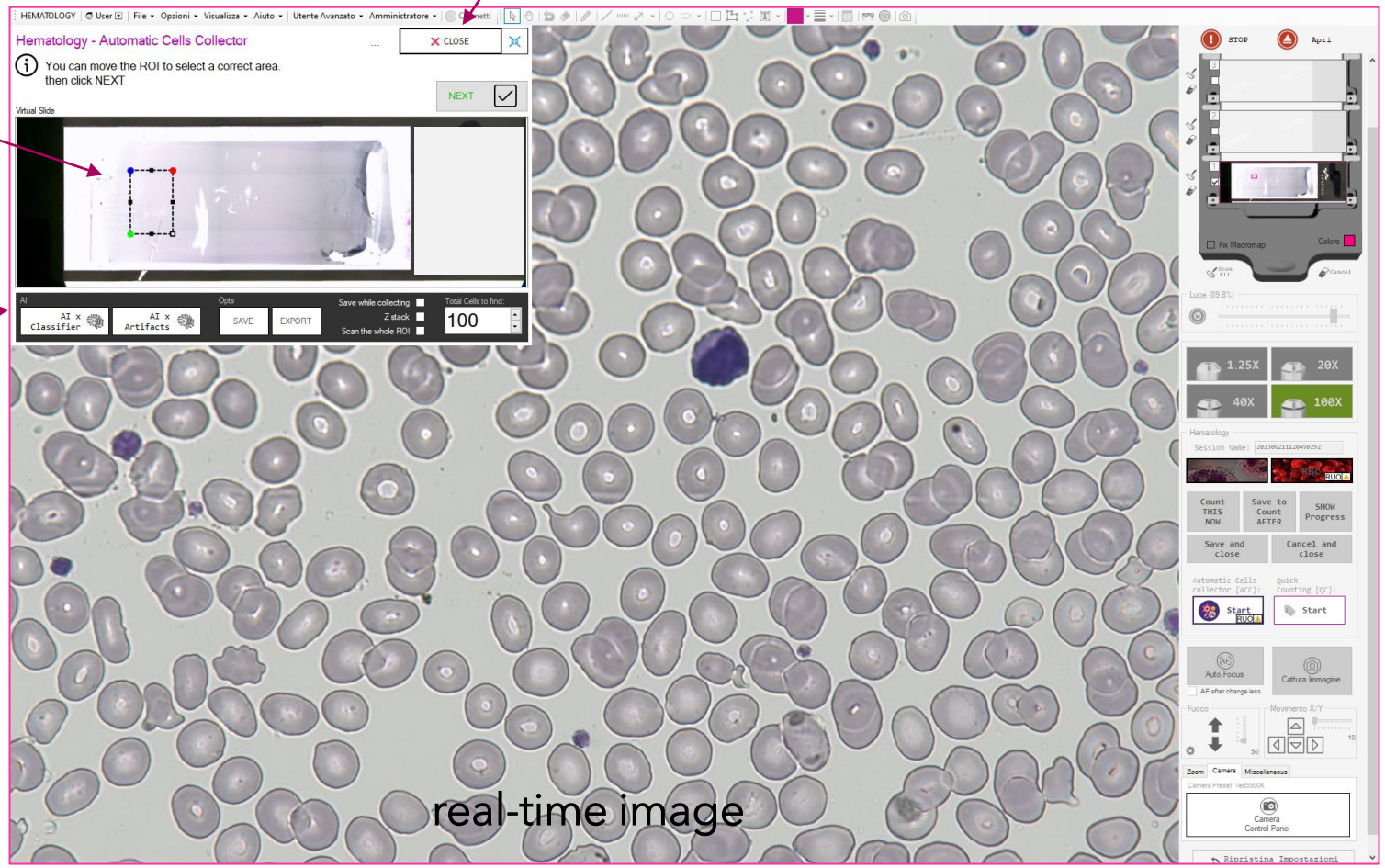
RUO ⚠

HOME INTERFACE

Buttons to close and finish the procedure or minimize the window

Virtual slide (minimap)

Menu for setup, save/export images

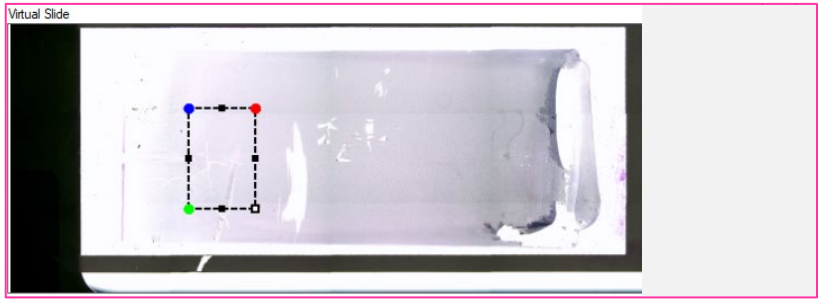


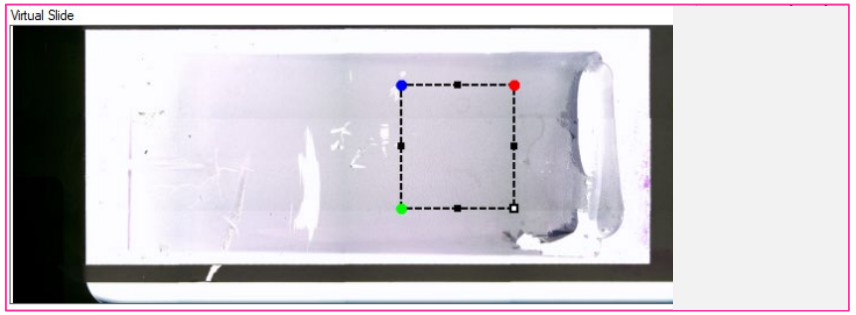
real-time image

RUO

SELECT THE REGION OF INTEREST (ROI)

It is possible to place and size the ROI inside the virtual slide, so the user can choose which region of the blood smear to analyze.



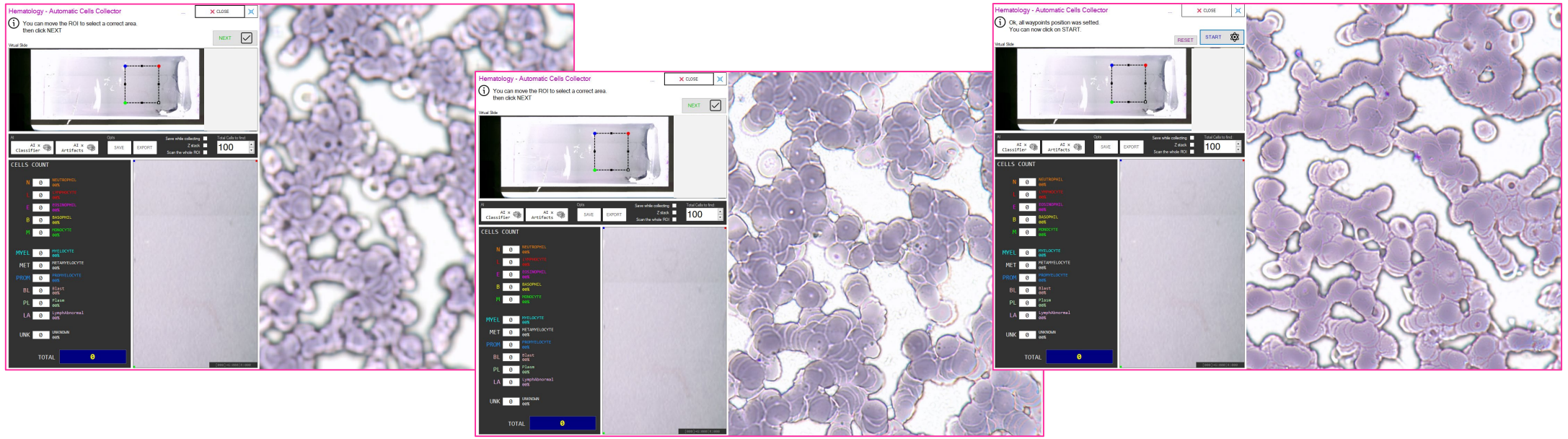


ⓘ By clicking the button «Next» the next step is initiated, consisting in focusing the real-time image in three vertices of the ROI.

RUO ⚠

PRELIMINARY STEP

Focusing the image at three vertices of the ROI and then click the button «Next»; after the third point the same button changes to «Start». By clicking it the ACC will start.



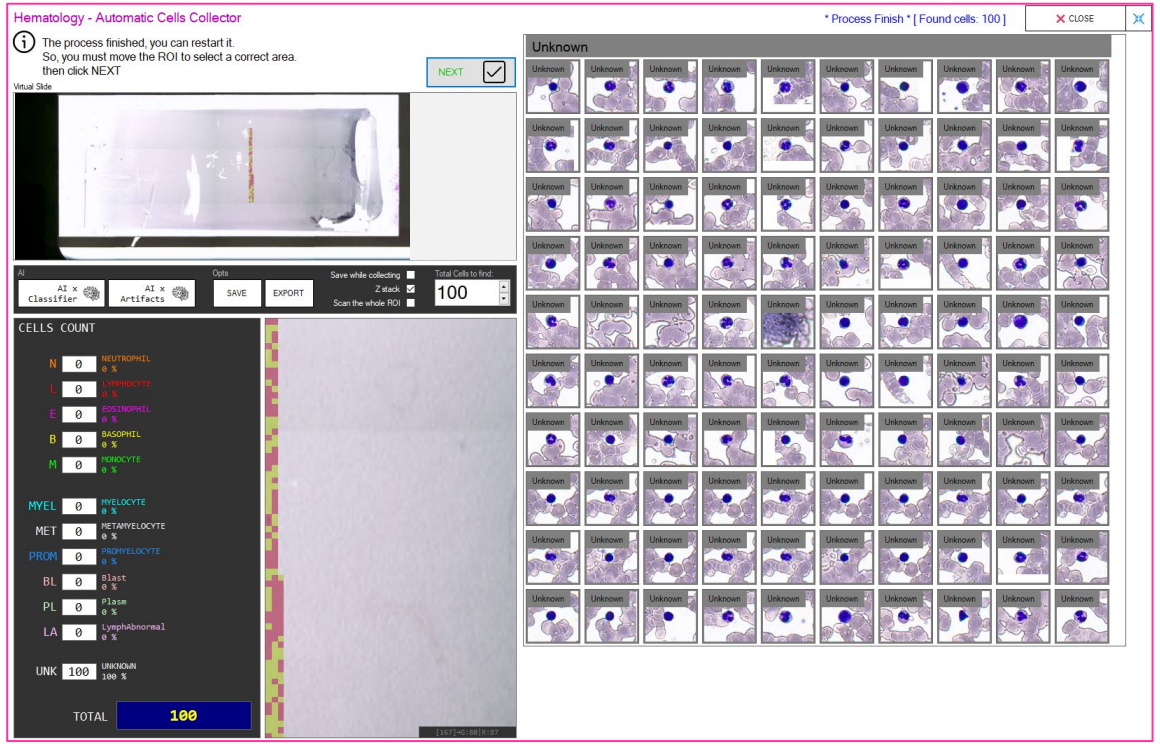
ⓘ At any time the user can return to the ROI choice by clicking the button «Reset»

RESET

RUO

START THE AUTOMATIC CELL COLLECTION

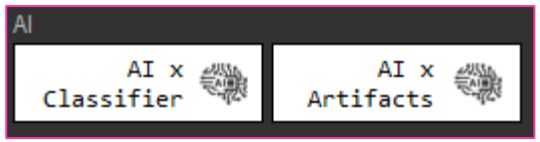
Once the ROI has been chosen, the images at the three vertices have been focused, and the procedure parameters have been setted, the ACC will start by clicking the button «Start».



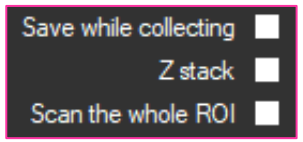
ⓘ The completion percentage of the procedure will appear on the top right.
Anytime it is possible to abort the procedure by clicking the button «Stop».

RUO

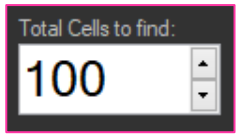
WHICH PARAMETERS CAN BE SET?



AI-based pre-classification of WBC and automatic removal of artifacts (currently available at 100x only).



Save while collecting: when selected the images of the cells will be automatically saved during the collection in a default folder.
Scan the whole ROI: when selected the system will scan the whole map, otherwise the procedure stops when the number of cells defined by the user is collected.
Z stack: when selected the system will collect for every cell several images at different focus position; the collection time increases but the quality of images increases.



The following buttons are activated at the end of the collection procedure.
Save: save all the cell images in a default folder (not necessary when «Save while collecting» is activated.
Export: export all the images to the interface of WBC count session; when the export is over the ACC interface is replaced by the WBC count session interface where all the collected images and the identified (and possibly pre-classified) cells are shown.

RUO

DETAILS ON EACH IDENTIFIED WBC

Durante il processo di raccolta o al termine, se l'utente ha attivato l'opzione z-stack, cliccando su ogni cellula potrà vedere l'immagine a diverse condizioni di fuoco.

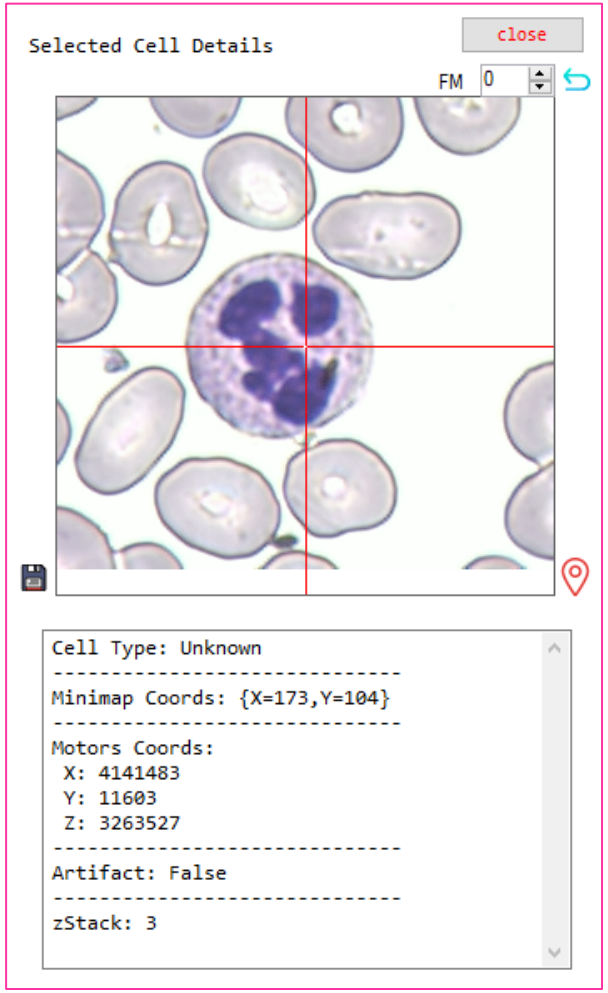
In questa finestra può svolgere determinate azioni:

close: chiude l'interfaccia.

undo: torna al primo valore di z-stack della cellula.

save: salva l'immagine della cellula nel percorso predefinito.

location: il microscopio si sposta sulla cellula nell'interfaccia di lavoro real-time.

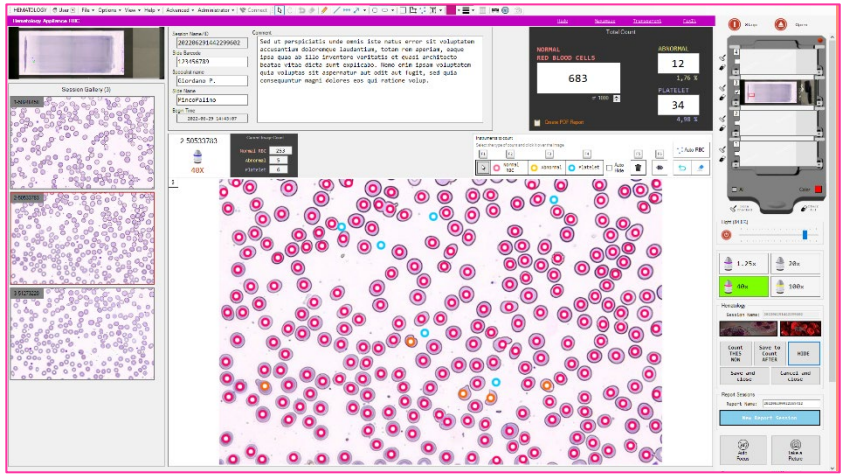


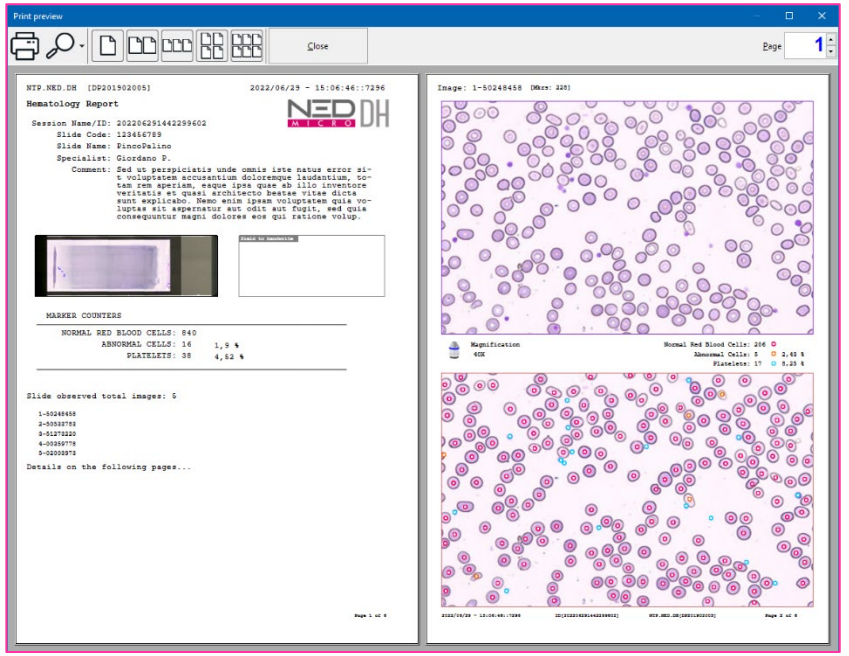
RUO

RBC COUNT SESSION

Red Blood Cells and Platelets

RUO For Research Use Only





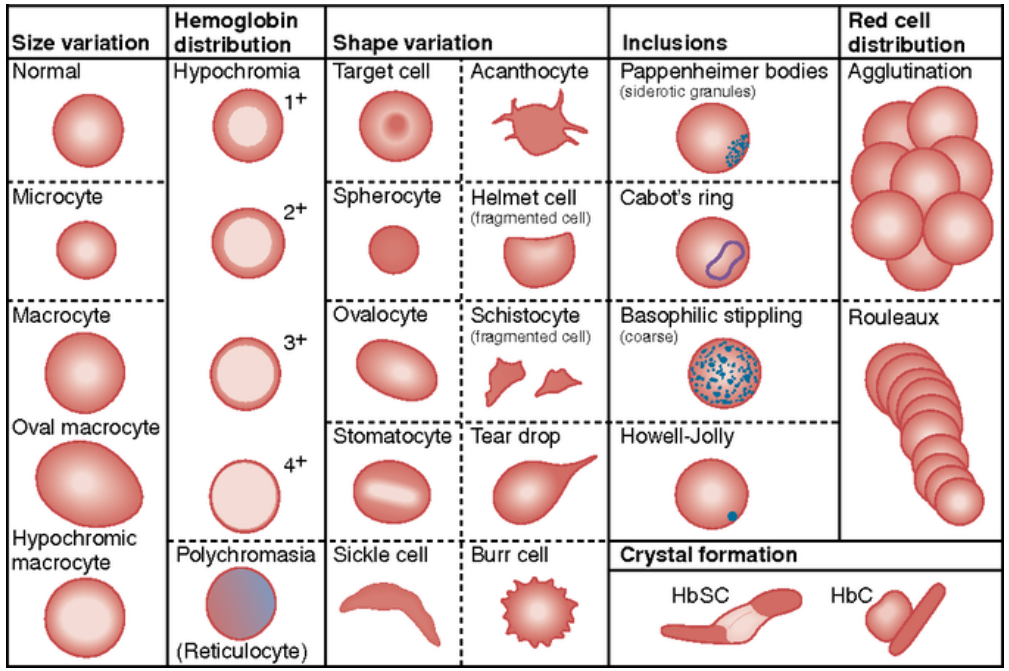
RED BLOOD CELLS & PLATELETS

Our cells tags:
[Normal RBC] – [Platelet] – [Abnormal Cell]

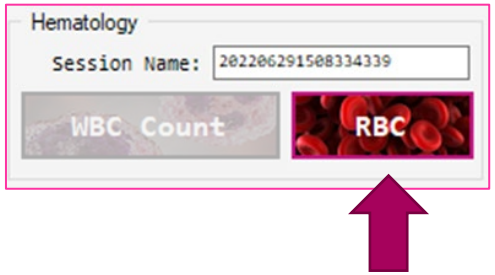
Red Blood Cell

Platelet

Globuli Rossi Anomali



CREATE A RBC COUNT SESSION

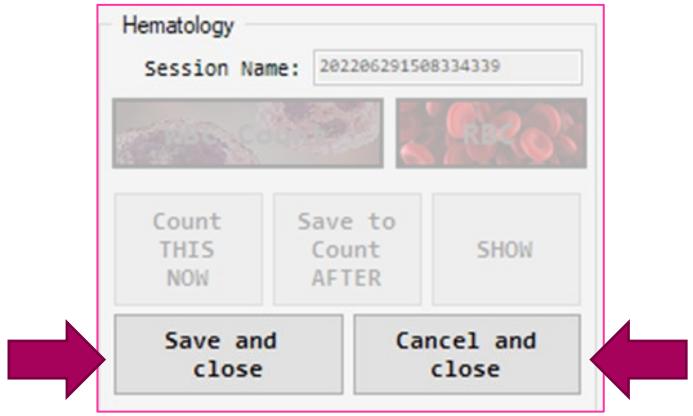


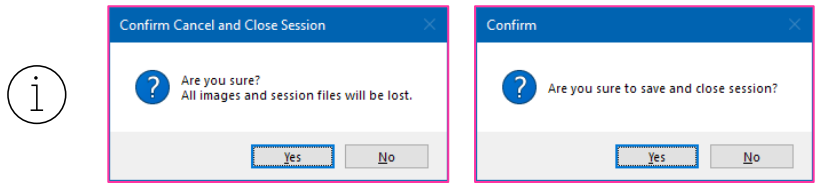
On the panel Hematology, in the main interface sidebar, enter a name for the entire session in the designated box and click «RBC».

After the RBC session has been started the control panel will be displayed.

CANCEL THE SESSION TO START AGAIN OR SAVE AND CLOSE IT

Click «Cancel and Close» or «Save and Close» in the control panel and accept the confirmation message.

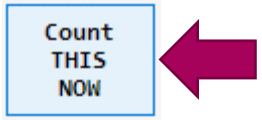


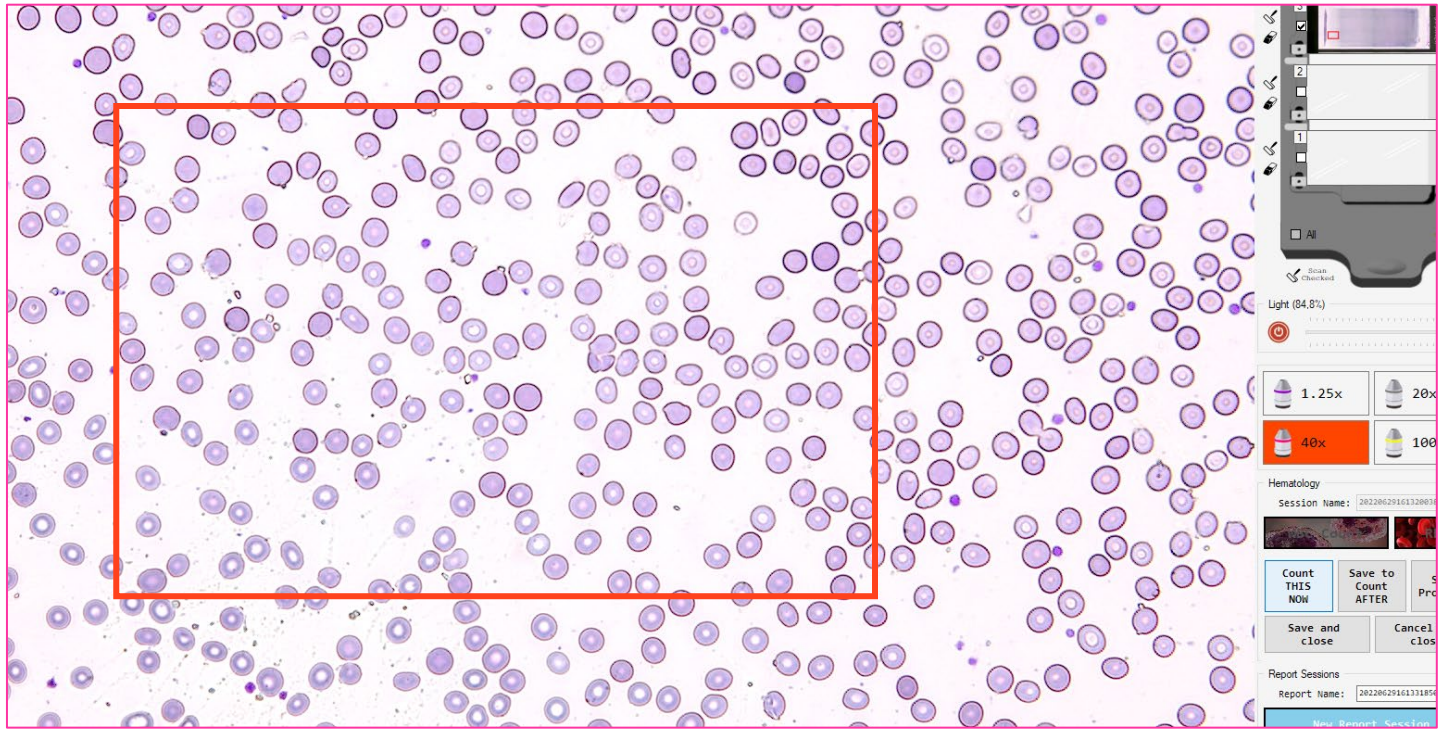


RUO

COUNT RED BLOOD CELLS AND PLATELETS

On the control panel click «Count THIS NOW» to freeze the real-time image and switch to the RBC count interface.



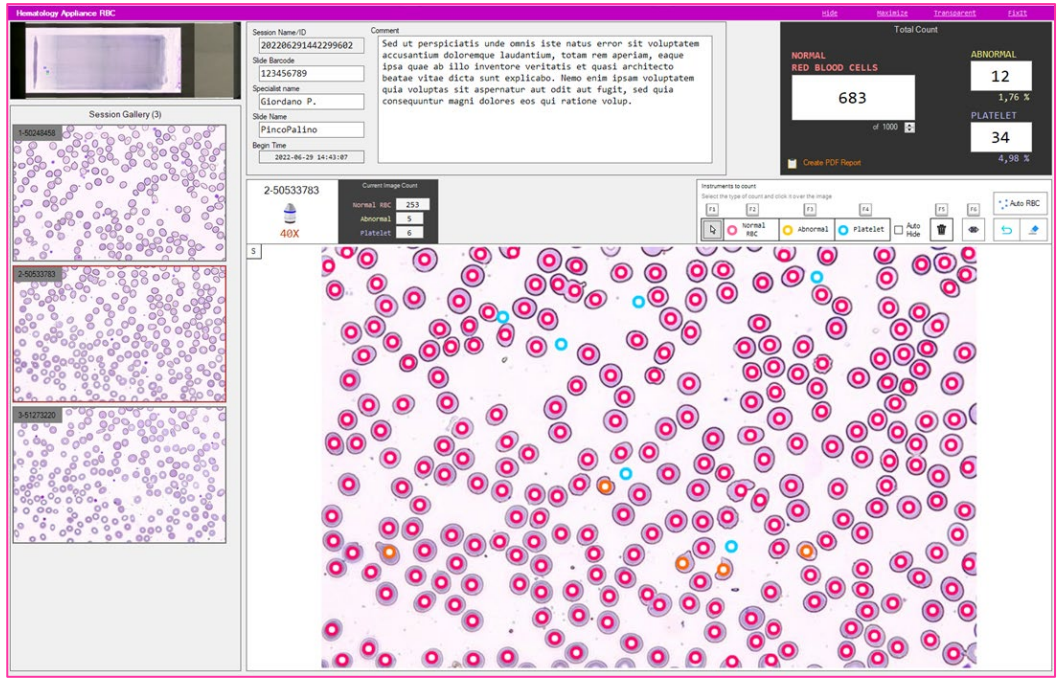


ⓘ When the mouse pointer is on the button «Count THIS NOW» a red rectangle in the *Real-Time* image will be displayed, indicating the region of the field image that will be saved and considered for RBC count.

RUO

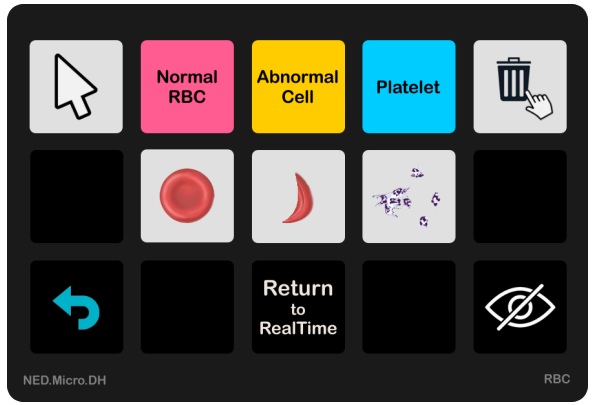
COUNT RED BLOOD CELLS AND PLATELETS

When the RBC count interface will open all the identified cells (both red blood cells and platelets) will be highlighted with a colored marker.



ⓘ All the markers can be deleted or modified, and possibly added.

ⓘ To speed-up the procedure it is possible to use the external keypad.



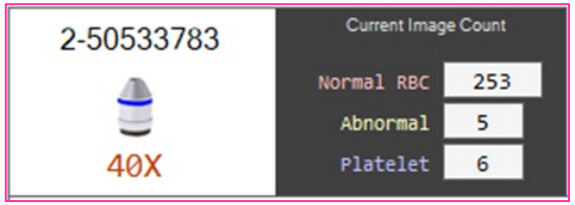
RUO ⚠

ⓘ → Save to Count AFTER

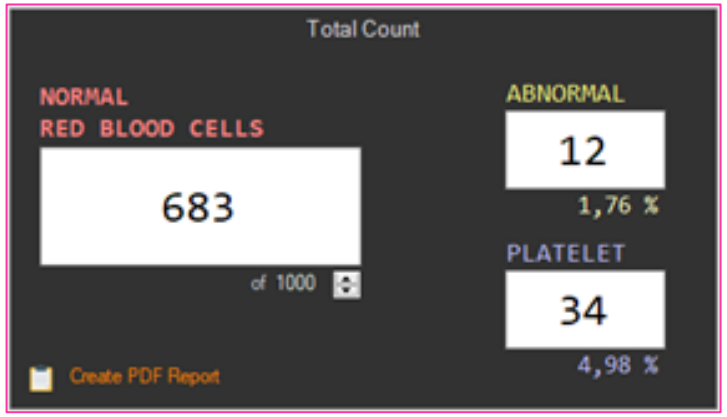
It is also possible to save the *Real-Time* image in the gallery and count the RBC later by clicking on «Save to Count After».

COUNTERS

There are two panels in the RBC count session: one for the partial count referring only to the selected image; the other for the total count refering to all images of the session.

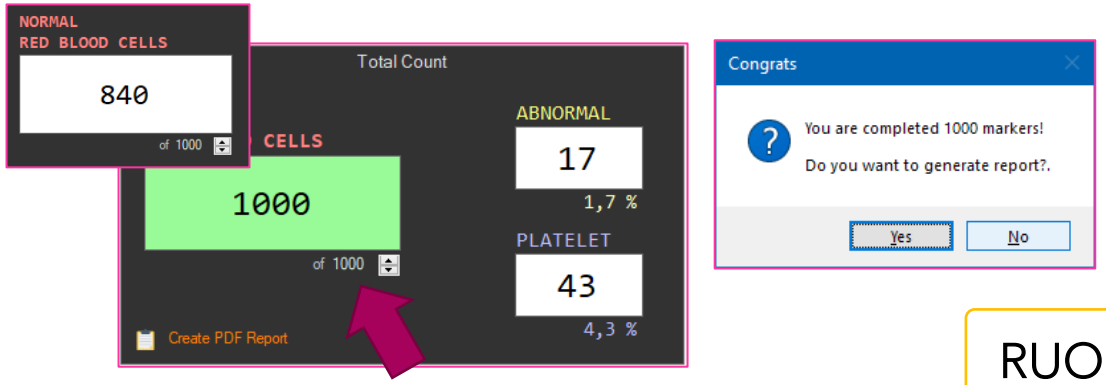


ⓘ In the partial count panel also image ID and the used objective are displayed.



ⓘ In the total count panel it is possible to change the total number of red blood cells that must be detected; once this value is reached a message will appear.

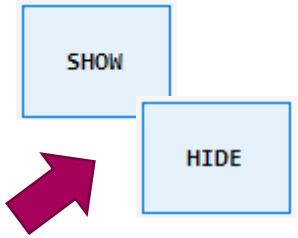
ⓘ The absolute number and relative percentage of abnormal red blood cells and platelets is also displayed.



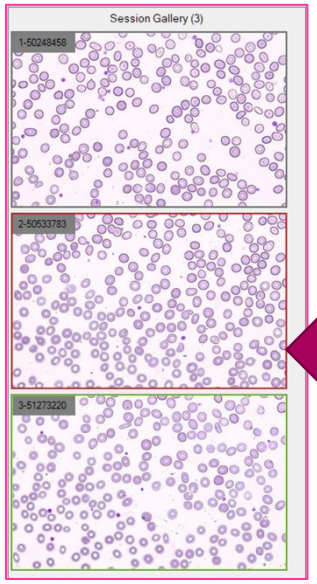
RUO

RETURN TO THE *REAL-TIME* IMAGE

It is always possible to switch between the count session interface and the *Real-Time* imaging by clicking the «Show/Hide» button in the control panel.



ⓘ Alternatively, also keybord shortcuts can be used.



RECALL AN IMAGE PREVIOUSLY ANALYZED

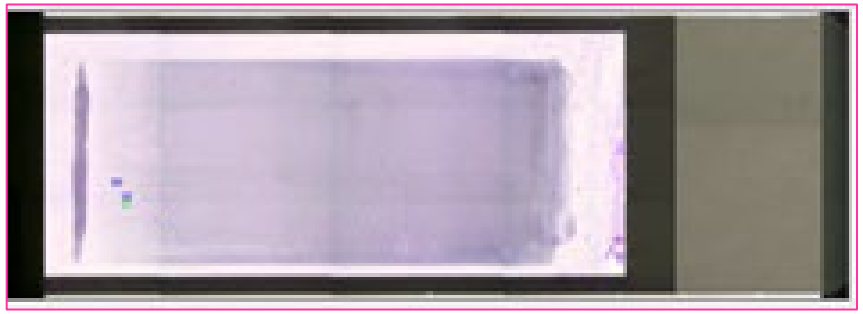
Cick on the desired image in the gallery in the left side of the RBC count session interface.

The image is displayed together with all the markers of identified cells; they can be deleted, modified or added, and the counters will update.

RUO ⚠

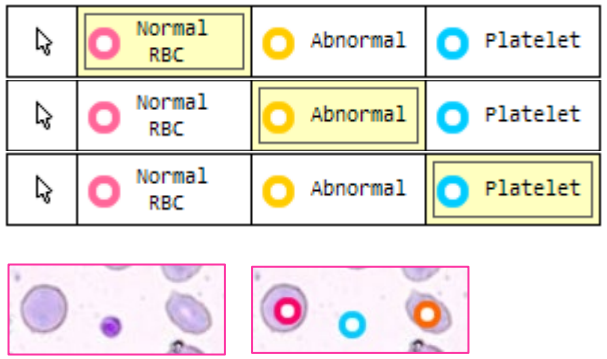
MINIMAP

The position where the image has been detected within the slide is shown in the minimap, placed on top left of the RBC count session interface.



ⓘ The region outlined in green corresponds to the image currently displayed; other regions outlined in blue correspond to the location of all the other images in the gallery. It is then possible to have an overall view of the path during the count session.

CHOOSE THE TYPE OF CELL



In the panel *tools* it is possible to choose the type of cell to be added:

- **Normal RBC**: normal red blood cell.
- **Abnormal**: abnormal red blood cell.
- **Platelet**: platelet.

ⓘ Each type of cell is identified by a different color

After choosing the type of cell simply click the desired cell to add the marker.

RUO

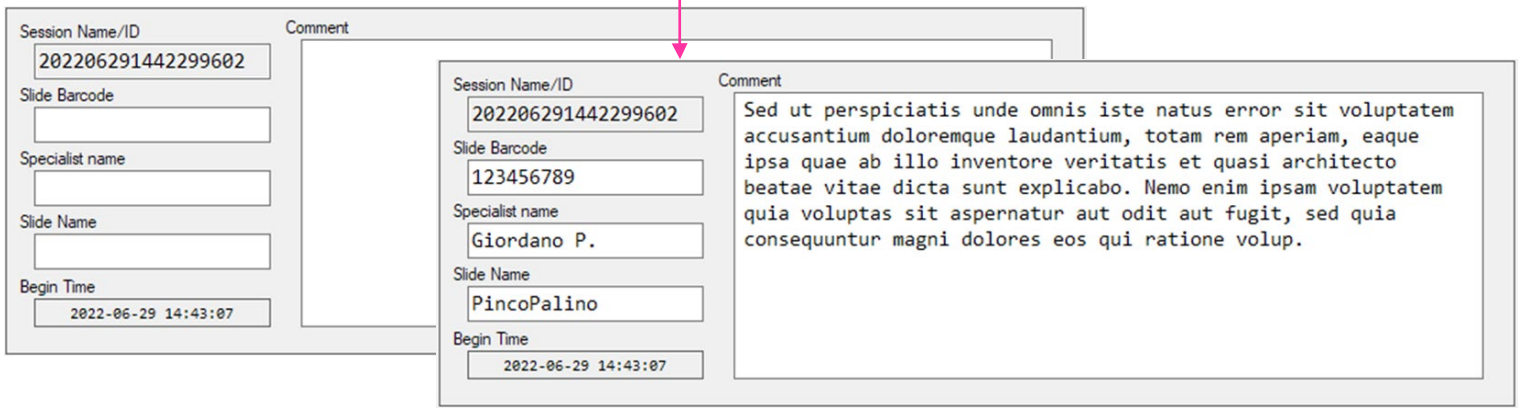
SLIDE DATA

It is possible to add slide data; they eventually will be saved and displayed in the final *Report*.

ⓘ The name/ID of the session must be added at the beginning of the session and cannot be modified later.

- Slide number (Slide Barcode) *
- Name of the specialist that is running the session (Specialist Name) *
- Name of the patient (Slide Name) *
- Notes/comments on the session (Comment) *

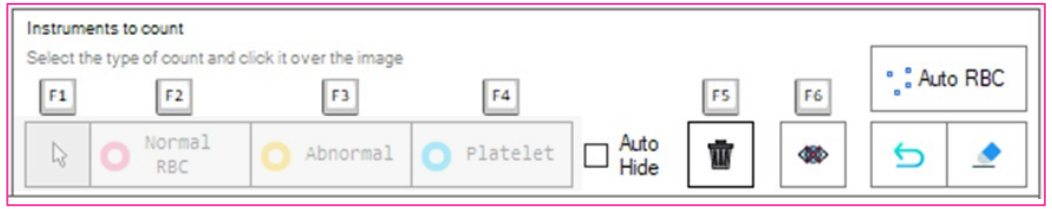
* Optional



RUO

ALTRE OPZIONI DEL MENU *TOOLS*

Beyond the marker type, there are 6 more options in the menu *tools* of the current displayed image:



- Auto Hide hides all the markers of the cells different from the type selected, to facilitate the vision of the main image.
- Delete cell (F5) when selected deletes a marked cell by clicking the marker of the cell to be deleted.
- Hide/Show (F6) hide or show all the markers in the current image.
- Auto RBC delete all the markers in the current image and start again the automatic identification procedure of all the cells.
- Undo deletes only the last added marker in the current image.
- Clear All deletes all the markers in the current image.

ⓘ Everytime a marker is deleted, both partial and total count counters are updated automatically.

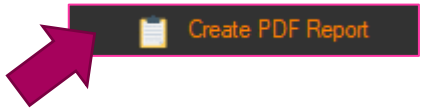
ⓘ All the options associated with a function key can be activated straight using the keyboard.

RUO

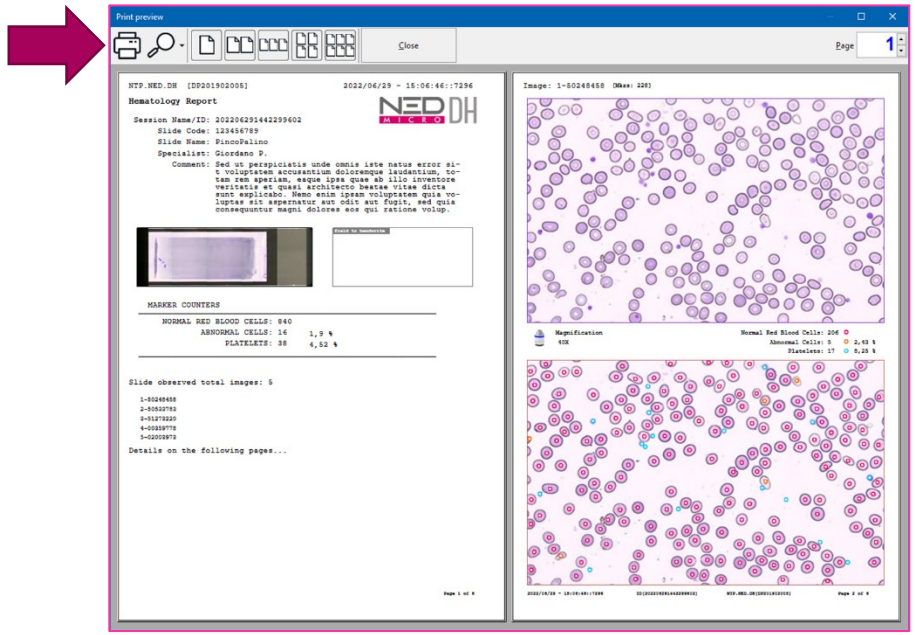
PRINT OR SAVE A REPORT

Click the button «Create PDF Report» in the RBC count session interface.

A preview of the report will be displayed.



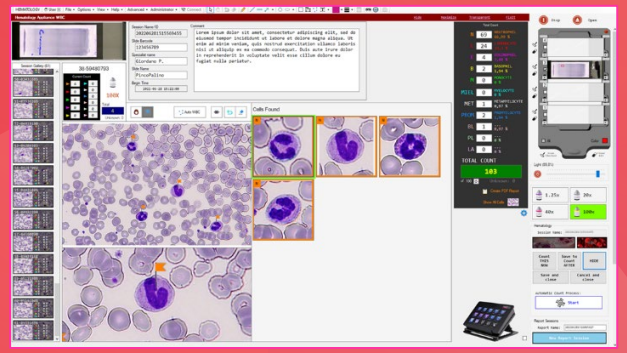
ⓘ From this window it is possible to print the report or save it as a.pdf file

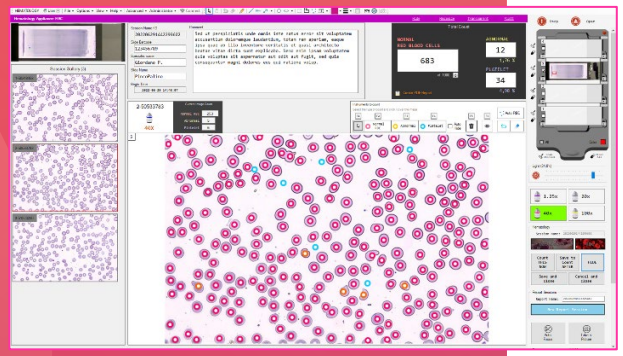


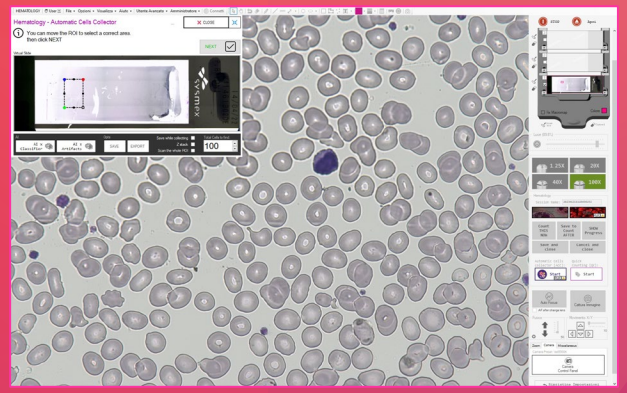
ⓘ In the first page of the report all the slide data are displayed.

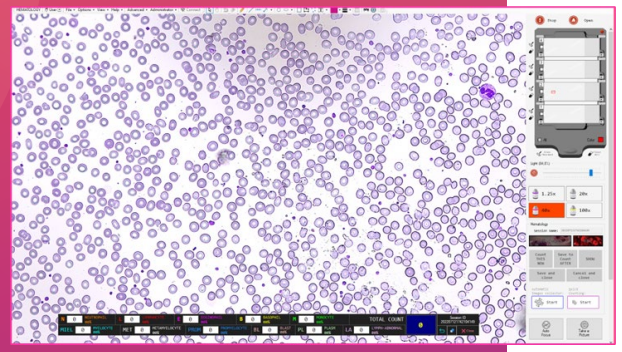
ⓘ In the following pages all the cells identified and classified during the session are displayed.

RUO ⚠









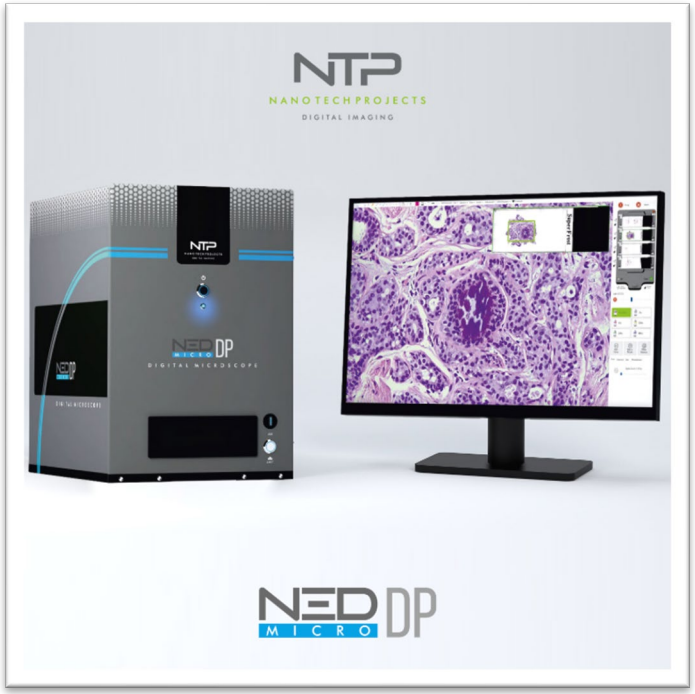
With NED.Micro.DH you can:

- perform manual leukocyte counting;
- use the WBC quick counting system;
- automate the WBC collection process;
- count normal and abnormal red blood cells, and platelets.

A set of *tools* will allow you to achieve all of this with great ease.

… and much more…

NED.Micro.DH will guide you in the exciting journey towards digital hematology.



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Nano Eye Device

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…multiple products for multiple applications…

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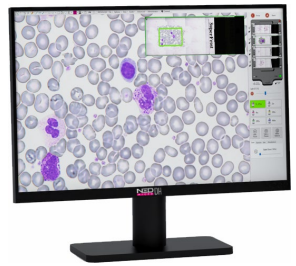
ACCESSORIES

External keypad
Up to 15 interactive buttons

Joystick
XYZ axes
6 buttons



Monitor FHD
(24″-32″)
Dicom Ready

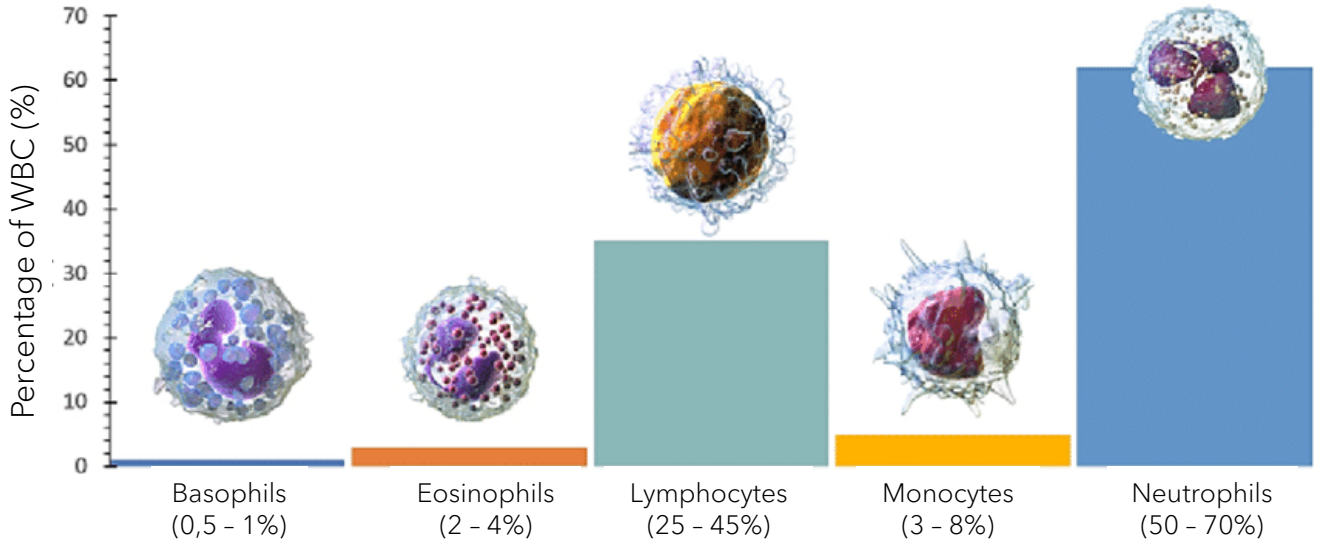
External keypad interfaces:

. . .

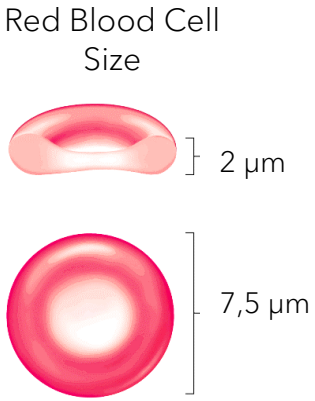
USEFUL INFORMATION

Average concentration of white blood cells in adults

Reference: https://it.wikipedia.org/wiki/Leucocita



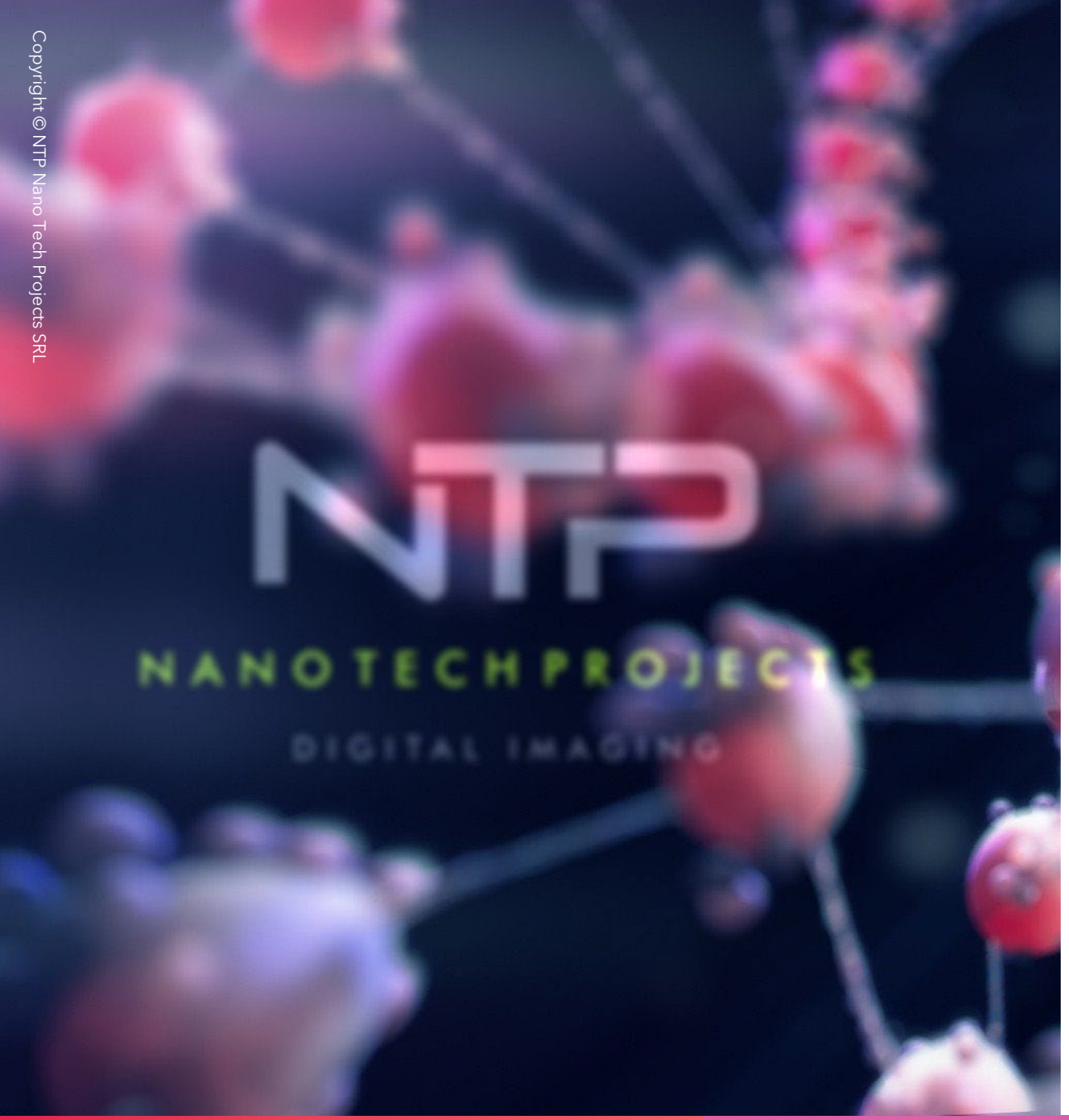
Average size:	10-14µm	10-14µm	8-10µm	15-20µm	10-24µm



Normally, the average number of red blood cells is 4,5 - 6 millions/mm^3, and 4 - 5,5 millions/mm^3 for men and women respectively.

ANNOTATIONS

ANNOTATIONS



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