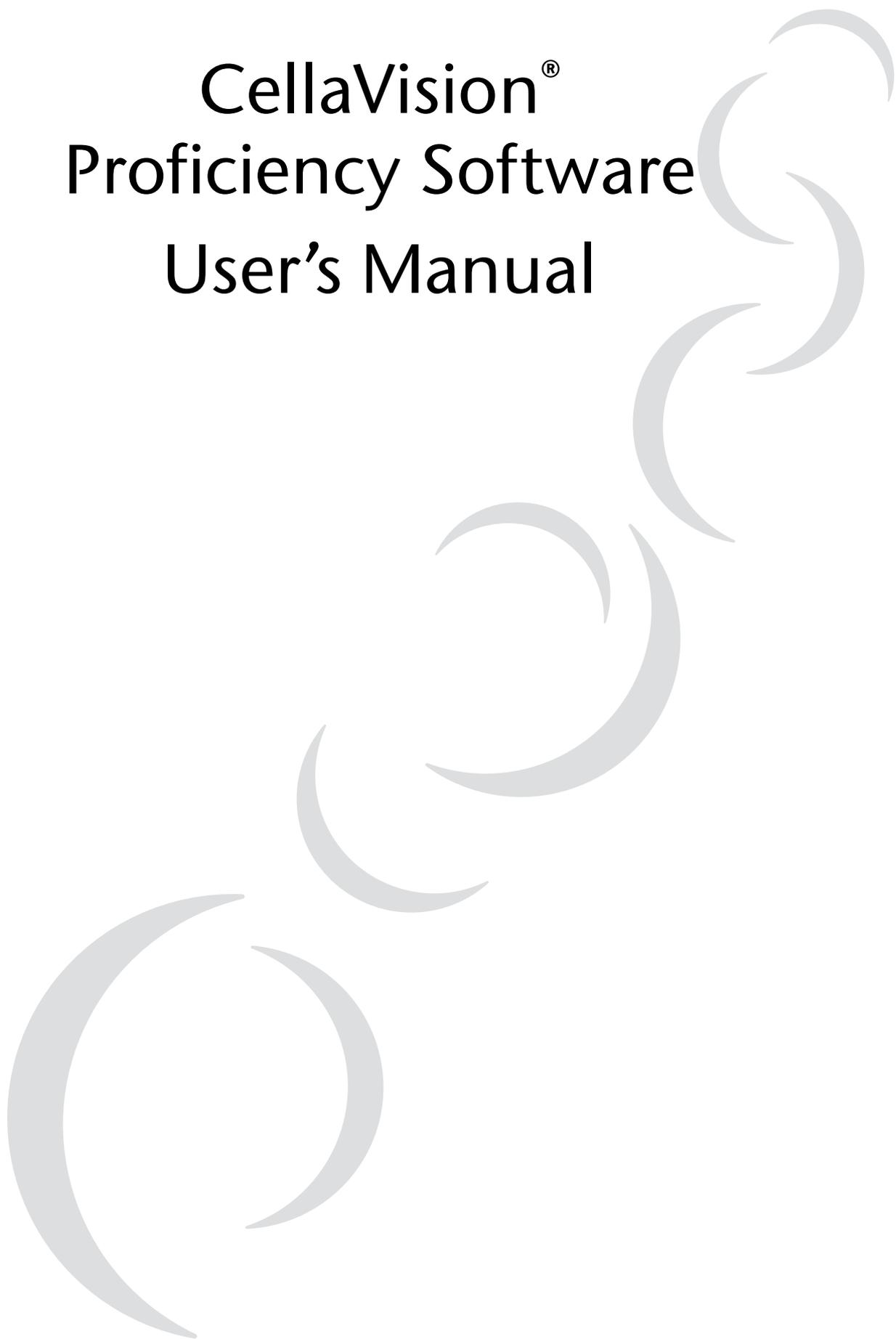


CellaVision® Proficiency Software



**CellaVision[®]
Proficiency Software
User's Manual**



Preface

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1 INTRODUCTION	1
1.1 General Description and Intended Use	1
1.2 About this User's Manual	1
1.3 Help	1
2 EXAMINER.....	2
2.1 GETTING STARTED	2
2.1.1 Creating a Free Trial Account.....	2
2.1.2 Requesting a Full Account.....	2
2.1.3 Logging in.....	3
2.1.4 Retrieving the Password	3
2.1.5 Customizing the Workspace.....	3
2.2 CREATING, MANAGING AND EVALUATING TESTS	4
2.2.1 The TESTS Tab	4
2.2.2 Creating a New Test.....	5
2.2.3 Monitoring Ongoing Tests	10
2.2.4 Viewing Test Results.....	11
2.2.5 Exporting Test Results.....	20
2.2.6 Attaching a Test Conclusion	20
2.2.7 Deleting Tests	20
2.3 VERIFYING AND MANAGING SLIDES.....	20
2.3.1 Uploading Slides	20
2.3.2 The SLIDES Tab.....	22
2.3.3 Managing Slides.....	22
2.3.4 Verifying Slides	24
2.3.5 Adding or Editing Slide Comments.....	28
2.3.6 Marking Slides as Done	29
2.3.7 Deleting Slides.....	29
2.4 ADDING AND MANAGING PARTICIPANTS	29
2.4.1 The PARTICIPANTS Tab	29
2.4.2 Adding Participants	30
2.4.3 Filtering the Participant List*	31
2.4.4 Managing Participants.....	31
2.4.5 Setting Lab Supervisor Privileges*	32
2.4.6 Deleting Participants.....	32
2.5 SETTINGS.....	33
2.5.1 Editing Account Information.....	33
2.5.2 License	33
2.5.3 Managing User-defined Classes.....	34
2.6 TROUBLESHOOTING	35
2.6.1 No Slides Shown in Wizard Step 1	35
2.6.2 Missing Slides in Wizard Step 1	35
2.6.3 No Participants Shown in Wizard Step 2	35

2.6.4 No Results Available in Test Results View	35
3 PARTICIPANT	36
3.1 GETTING STARTED	36
3.1.1 Logging in	36
3.1.2 Retrieving the Password	36
3.2 TAKING A TEST	37
3.2.1 The TESTS Tab	37
3.2.2 Viewing a Test.....	38
3.2.3 Verifying Slides	39
3.2.4 Signing Slides	44
3.3 VIEWING TEST RESULTS	44
3.3.1 Definitions.....	44
3.3.2 Opening a Completed Test	45
3.3.3 The Results View	45
3.3.4 Test Summary.....	47
3.3.5 WBC Classes.....	48
3.3.6 WBC Cells	49
3.3.7 RBC Characteristics	52
3.3.8 Test Conclusions	52
APPENDIX - A BUTTONS AND SYMBOLS	53
A.1 General.....	53
A.2 Buttons.....	53
A.3 Symbols.....	54
APPENDIX - B RECOMMENDED WORKFLOW	55
APPENDIX - C CALCULATIONS	57
APPENDIX - D GLOSSARY	59

1 INTRODUCTION

1.1 General Description and Intended Use

The CellaVision® Proficiency Software is a tool for education and proficiency testing of manual blood cell differentials in laboratories.

There are two types of users in the CellaVision® Proficiency Software: Examiner and Participants.

The Examiner performs the testing and education by creating and managing Participants, correct classifications and tests.

The Examiner can view the results of all Participants. Participants can view their own results and compare them to the correct result, the majority result, or anonymized fellow Participant results.

1.2 About this User's Manual

This User's Manual will guide you step-by-step through the operation of the CellaVision® Proficiency Software (also referred to as the software), aiming for an efficient way to give you a good understanding and knowledge of the program and its features. References are made to appendices providing additional information. Some self-explaining dialogs have been left out in the text.

Typographical convention:

Names of keys and on-screen objects are presented in bold; e.g. click **Print**.

1.3 Help

A help button  is located in the top right-hand corner.

Click it to open a window containing links to the following help resources:

- Online version of this manual
- Support community
- FAQ's

The Help window can be opened or closed at any time and does not affect the current state of work. Additional resources can be found at <http://www.cellavision-proficiency.com>.

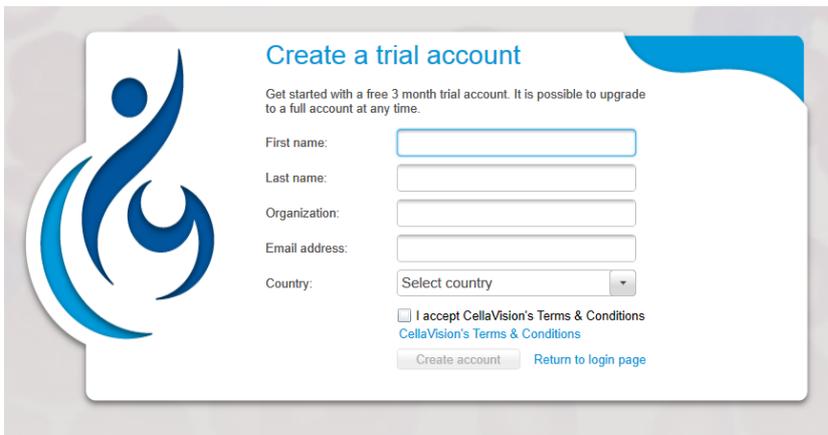
2 EXAMINER

The following chapters are intended for the Examiner. A Participant cannot access these parts of the program.

2.1 GETTING STARTED

2.1.1 Creating a Free Trial Account

1. Open an internet browser window and go to <https://www.cellavision-proficiency-software.com>.
2. Click the **Create a free trial account** link.



Create a trial account

Get started with a free 3 month trial account. It is possible to upgrade to a full account at any time.

First name:

Last name:

Organization:

Email address:

Country:

I accept CellaVision's Terms & Conditions
[CellaVision's Terms & Conditions](#)

3. Fill out the form and accept CellaVisions Terms & Conditions.
4. Click **Create account**.

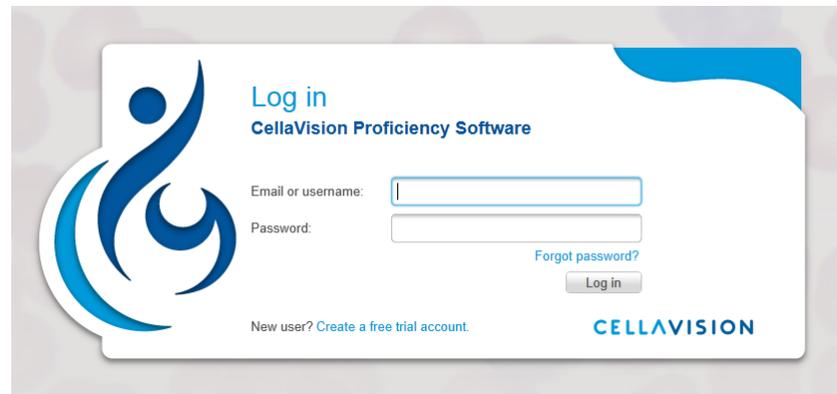
The trial account will be active for 90 days during which time it is possible to view the results of completed example tests, add up to two Participants and create tests using example slides.

2.1.2 Requesting a Full Account

A full account requires the purchase of a CellaVision® Proficiency Software license. Find out more at <http://www.cellavision-proficiency.com/licenses>.

2.1.3 Logging in

1. Open an internet browser window and go to <https://www.cella-vision-proficiency-software.com>.



2. Enter your email/username and password.
3. Click **Log in**.

If more than one account are associated with the login credentials a drop-down menu will be shown after logging in where the desired account can be chosen.

2.1.4 Retrieving the Password

1. In the login screen click the **Forgot password?** link.
2. Enter your email address and click **Reset password**.
3. A new password will be sent to this email address.

2.1.5 Customizing the Workspace

The first log-in to a CellaVision® Proficiency Software account prompts the Customize your account window to open.

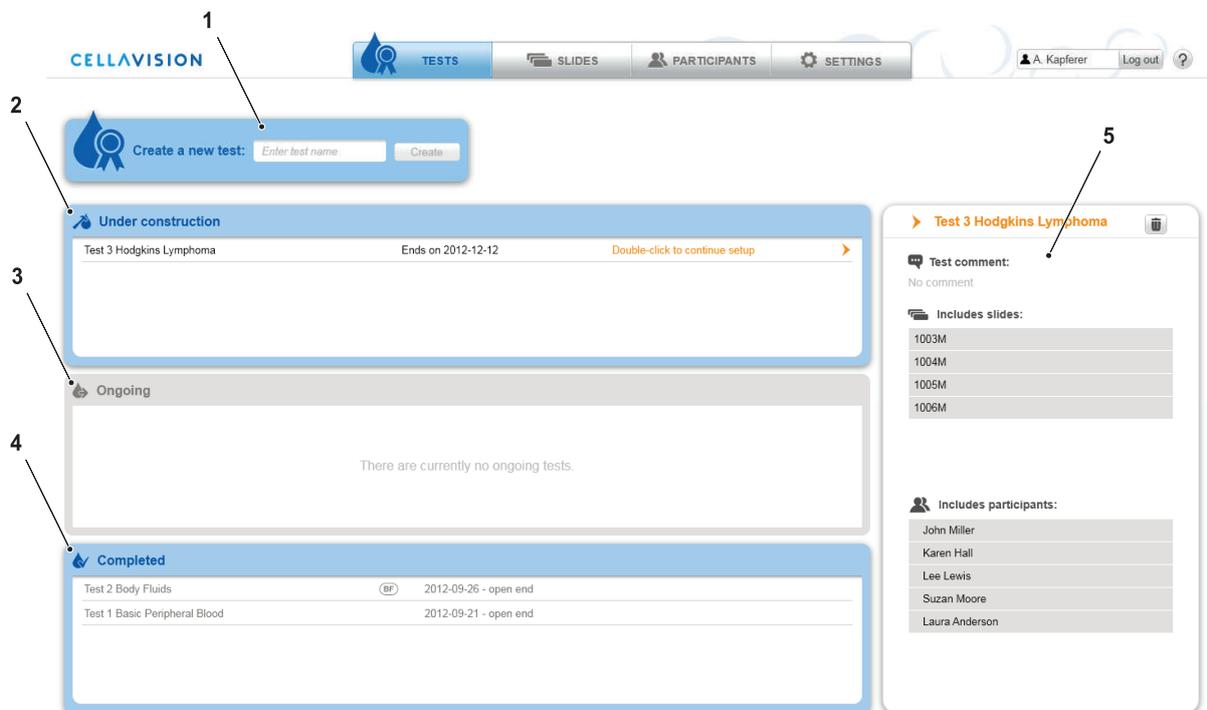
Take a minute to:

- **Choose a new password** to replace the temporary password.
- Set the preferred **Language** for the user interface.
- Check that the **Email address** is correct.

Account settings can be changed at any time later in the **SETTINGS** tab. See 2.5 *SETTINGS* for more information.

2.2 CREATING, MANAGING AND EVALUATING TESTS

2.2.1 The TESTS Tab



1. Create a new test
2. Under construction
3. Ongoing
4. Completed
5. Detailed view

The **TESTS** tab is the starting point for creating a new test (1). It also displays a list of all tests that are currently either under Construction (2), Ongoing (3) or Completed (4), sorted by test creation date.

Test results can be accessed from this tab by double-clicking on a completed test. See also 2.2.4 *Viewing Test Results* for more information.

Click on any test in the list to view more detailed information in the detailed view (5).

2.2.1.1 Under Construction Tests

A test stays under construction until the creation of the test is finished and the test is distributed to the Participants.

Double-click on an under construction test to continue working on it.

Under construction tests are not visible to the Participants.

2.2.1.2 Ongoing Tests

Once test creation is finished the test is flagged as ongoing and becomes visible to its Participants.

Participants can now classify and/or characterize cells.

Double-click on an ongoing test to view the Participants' progress (see also 2.2.3 *Monitoring Ongoing Tests*).

2.2.1.3 Completed Tests

A test is flagged as completed when one of the following applies:

- The completion date of the test has been reached.
- All Participants have completed and signed all slides in the test.
- The test is manually set to completed by the Examiner (see also 2.2.3.2 *Stop an Ongoing Test*).

An email is sent to both the Examiner and the Participants when a test is completed.

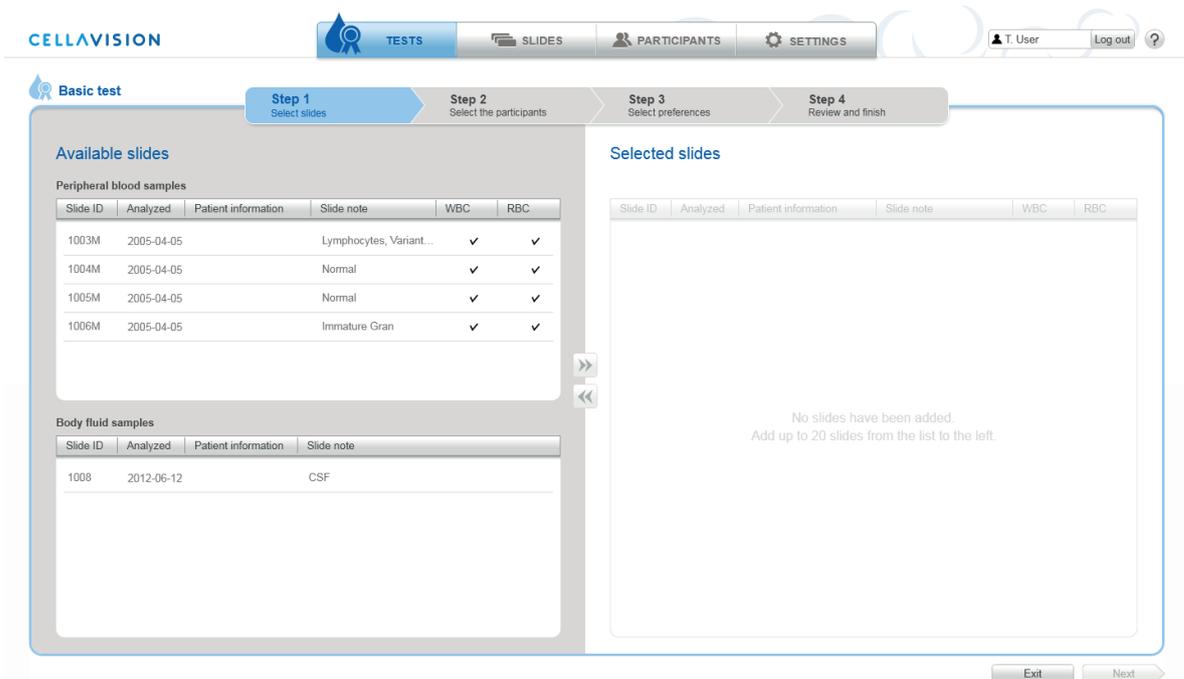
Double-click on a completed test to view the results (see also 2.2.4 *Viewing Test Results*).

2.2.2 Creating a New Test

1. Enter a test name and click **Create**.



2. Select one or more slides in the Available slides list(s). Click on the column headers to sort the list. If no slides are shown click on the **SLIDES** tab and follow instructions (see also 2.6.1 *No Slides Shown in Wizard Step 1* and 2.6.2 *Missing Slides in Wizard Step 1*).



Peripheral blood samples

Slide ID	Analyzed	Patient information	Slide note	WBC	RBC
1003M	2005-04-05		Lymphocytes, Variant...	✓	✓
1004M	2005-04-05		Normal	✓	✓
1005M	2005-04-05		Normal	✓	✓
1006M	2005-04-05		Immature Gran	✓	✓

Body fluid samples

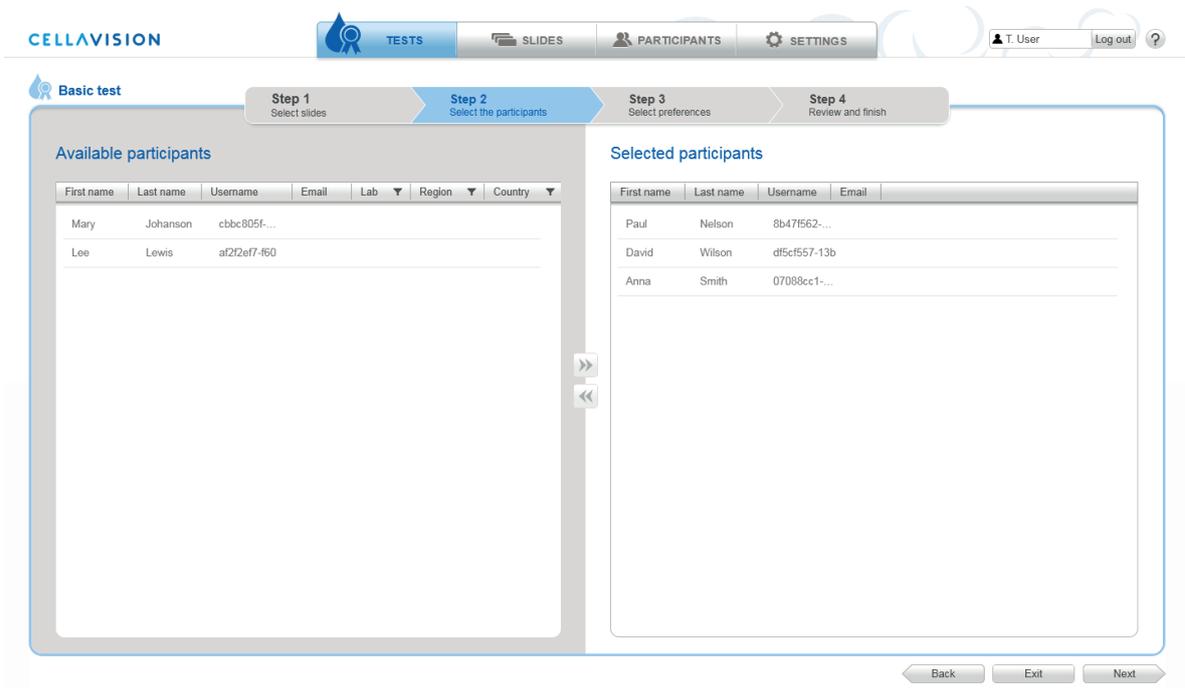
Slide ID	Analyzed	Patient information	Slide note
1008	2012-06-12		CSF

No slides have been added.
Add up to 20 slides from the list to the left.

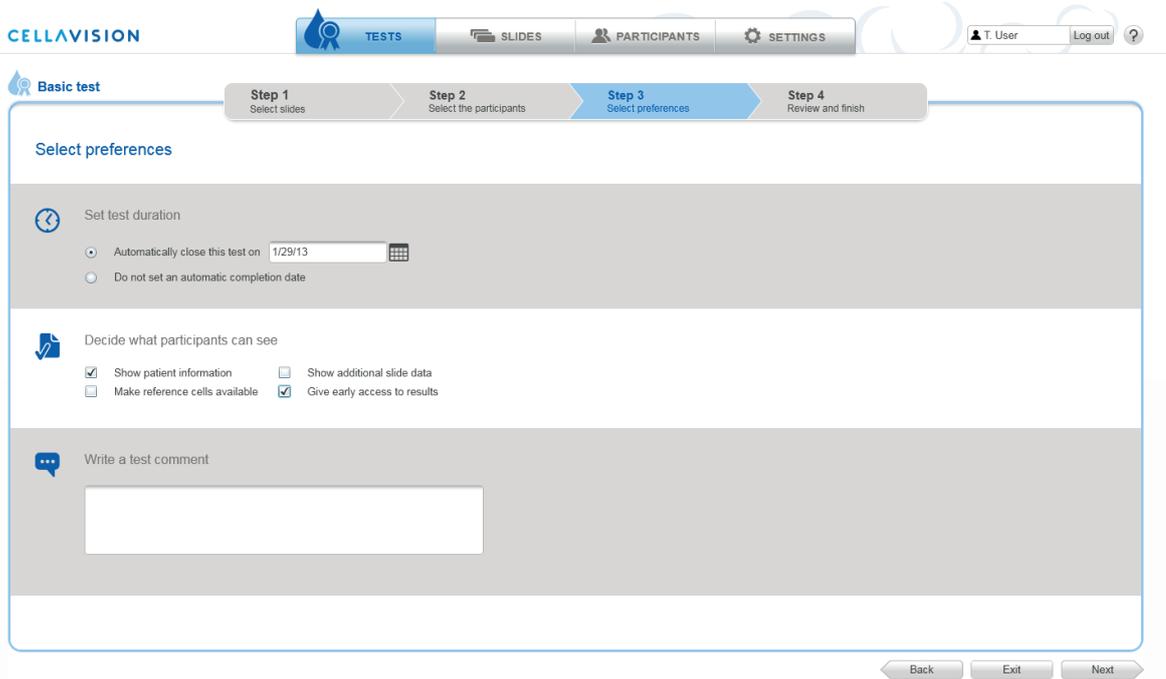
Note:

A maximum of 20 slides can be added per test. Tests can only include slides with either peripheral blood or body fluid samples, but not both.

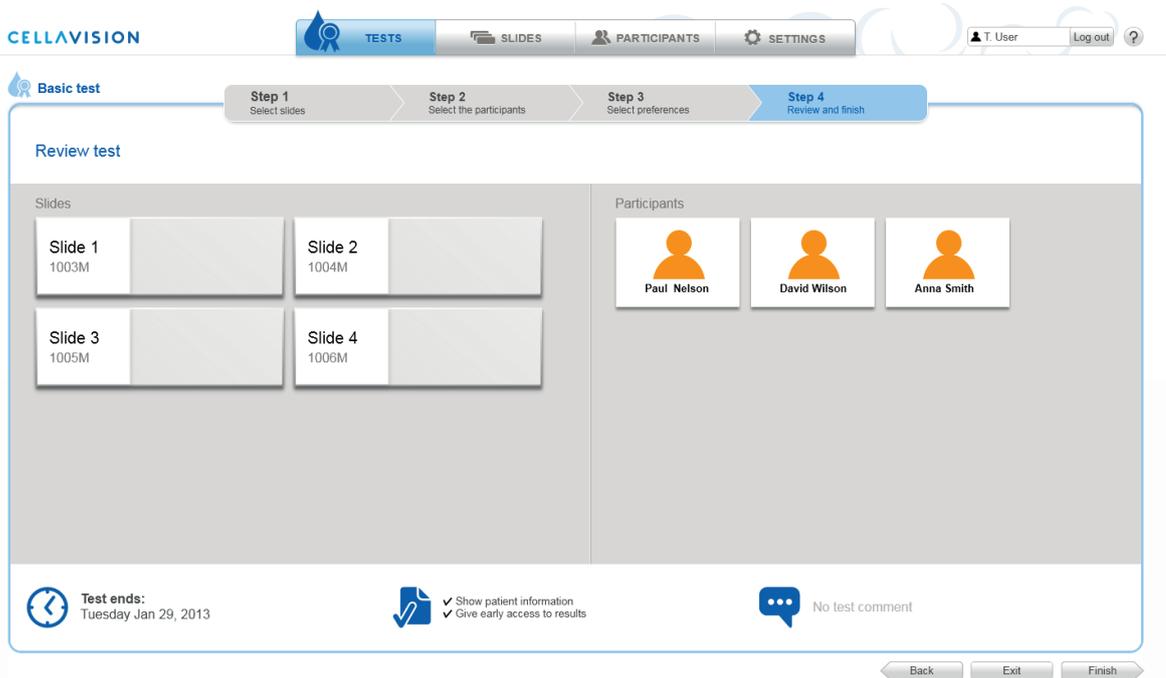
3. Click  to add the selected slides to the test and then click **Next** to proceed to Step 2 of the wizard.
4. Select one or more Participants in the Available Participants list. Click on the column headers to sort the list. Click ▼ to filter the list on Lab, Region or Country.* If no participants are shown click on the **PARTICIPANTS** tab and add Participants (see also 2.6.3 *No Participants Shown in Wizard Step 2*).
* Only available in the Enterprise version.



5. Click  to add the selected participants to the test and then click **Next**.
6. Choose the test preferences (see 2.2.2.2 *Test Settings* for more information) and then click **Next**.



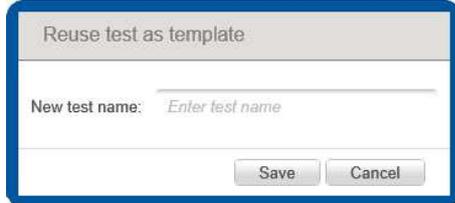
7. Review the test to ensure that the correct slides and Participants were added and the correct preferences were set.



8. Click **Finish** to distribute the test to all Participants. A notification email will be sent to all Participants who have an email address associated with their account. Participants with no email address need to be notified manually.

2.2.2.1 Create a New Test Using a Completed Test as Template

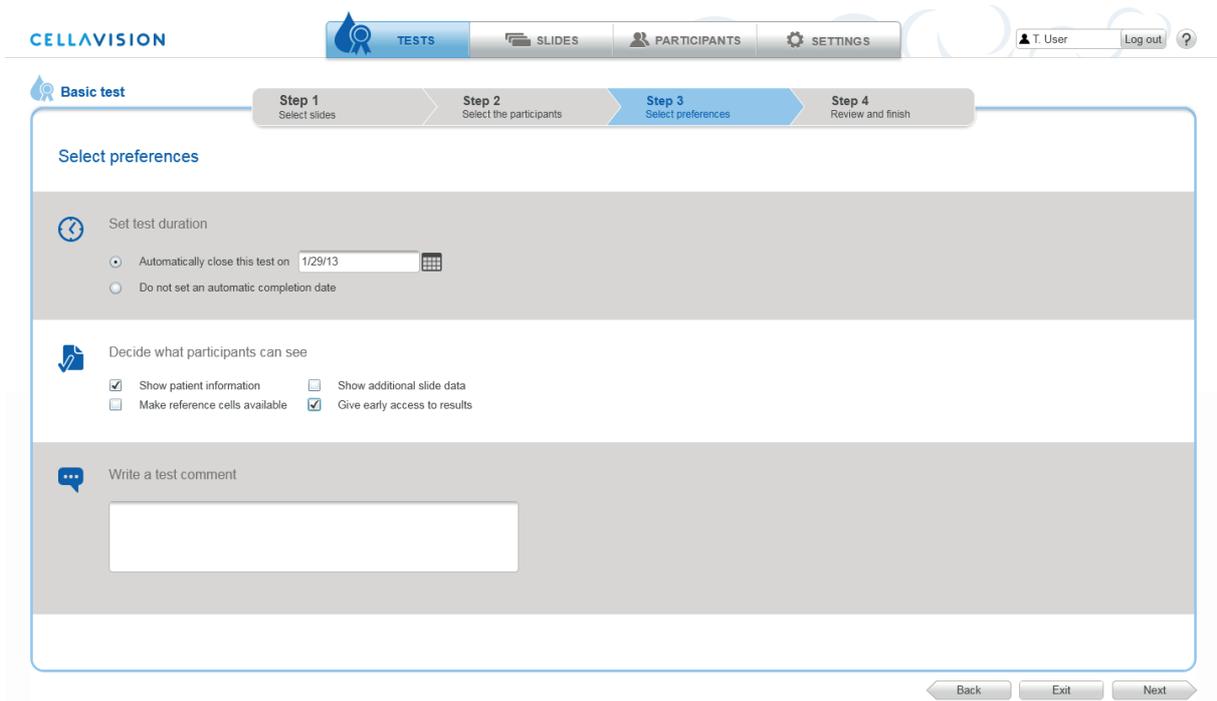
1. Go to the **TESTS** tab and click the completed test you want to use as a template for the new test.
2. In the detailed view of that test click .
3. Enter a test name of the new test and click **Save**.



The new test now in **Under construction**.

4. Double click on the under construction test.
5. Follow the steps in the wizard in the same way as when creating a new test, see 2.2.2 *Creating a New Test*.

2.2.2.2 Test Settings



Test Duration

<p>Automatically close this test on</p>	<p>Specify an end date using the drop down menu or calendar. At the end of the chosen day the test will close automatically independent of the Participants progress and be flagged as completed. Test end dates will be visible to the Participants.</p> <p>Note: <i>If a test closes before all Participants have verified all slides it will reduce the data available for the results statistics. Any slide a Participant has not completed will be excluded from the results for that particular Participant.</i></p> <p>End dates of ongoing tests can be extended as described in 2.2.3.3 <i>Extending the Test End Date.</i></p>
<p>Do not set an automatic completion date</p>	<p>If no end date is set the test will be flagged as completed as soon as all Participants have verified all slides.</p>

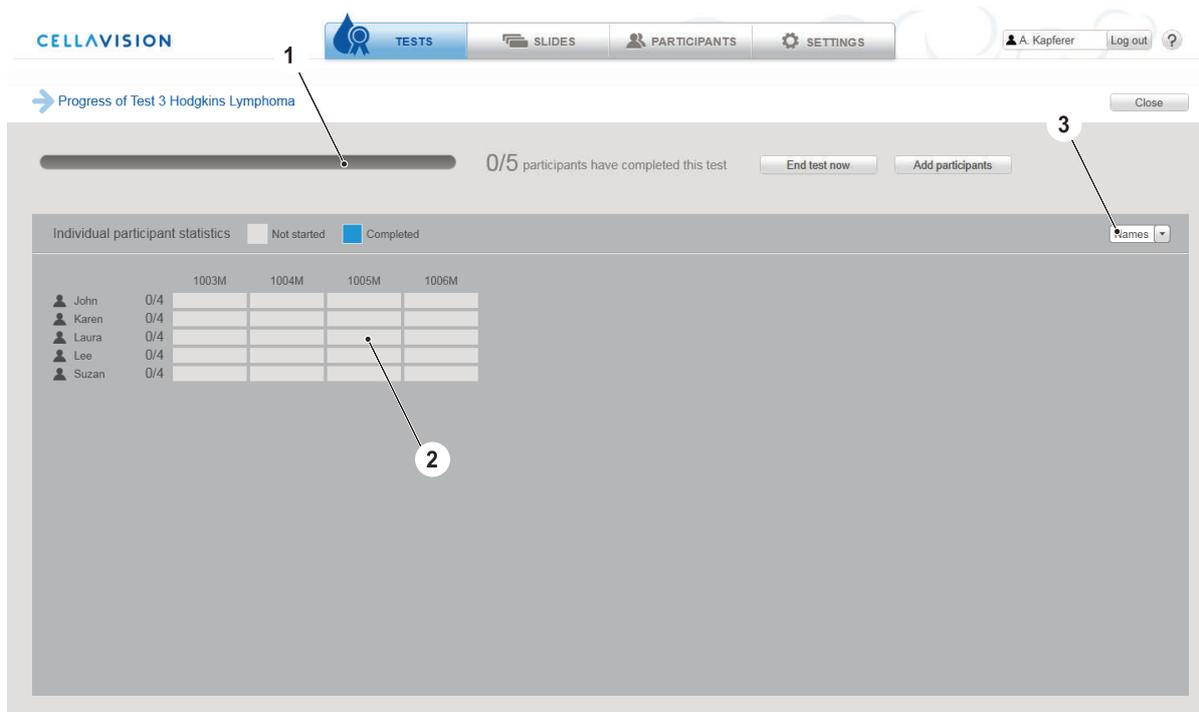
Visible Information

<p>Show patient information</p>	<p>If checked, patient information associated with a slide (if available) will be visible to all Participants. See 2.3.3.5 <i>Add or Edit Patient Information</i> for more information.</p>
<p>Make reference cells available</p>	<p>If checked, Participants are able to open reference cell libraries whilst they are verifying slides. If no reference cells are available this setting is disabled. See 2.3.4.4 <i>White Blood Cell Classification</i>, for more information.</p>
<p>Show additional slide data</p>	<p>If checked, additional data associated with a slide (if available) will be visible to all Participants. See 2.3.3.6 <i>Add or Delete Additional Slide Data</i> for more information.</p>
<p>Give early access to results</p>	<p>If checked, individual Participants who have completed the test will be able to view their results even before the test is completed by the entire group.</p> <p>Early access results only show that particular Participants results compared to the Examiner results. No incomplete results from fellow Participants are shown.</p>

Test Comment

Write a test comment	Add a comment about the test. Test comments are visible to all Participants taking this test.
----------------------	---

2.2.3 Monitoring Ongoing Tests



1. Progress bar
2. Progress grid
3. Sort

2.2.3.1 View an Ongoing Test

Double-click on an ongoing test in the **TESTS** tab to view its progress.

Progress Bar

The progress bar (1) indicates how many Participants have completed the test. Participants are only classed as having completed the test once they have verified and signed all slides.

Progress Grid

The progress grid (2) shows which slides each individual Participant has completed. Participants are shown on the y-axis and slides on the x-axis of the progress grid.

Sorting

Choose to sort (3) the progress grid on names, completed or not completed.

2.2.3.2 Stop an Ongoing Test

Stop an ongoing test at any time by clicking **End test now**. This will immediately close the test for all Participants, independent of their progress.

Once stopped, the test is flagged as completed and its results will be available for viewing. See also 2.2.4 *Viewing Test Results* on how to access test results.

Note:

Closing a test before all Participants have verified all slides will reduce the data available for the results statistics. Any slide a Participant has not completed will be excluded from the results for that particular Participant.

Note:

Once a test has been stopped it cannot be returned to an ongoing status.

2.2.3.3 Extending the Test End Date

1. Go to the **TESTS** tab and click on an ongoing test.
2. In the detailed view of that test click on the date underneath **Test end date**.
3. Enter a new date and click **Save**.

Note:

The test end date can never be set to a more recent date than the previous end date. It is only possible to extend the test end date if a test end date has been set from the beginning.

2.2.3.4 Add Participants to an Ongoing Test

1. Go to the **TESTS** tab and double click on an ongoing test.
2. Click **Add participants**.
3. Add participants in the same way as when creating a new test, see 2.2.2 *Creating a New Test*.
4. Click **OK**.

2.2.4 Viewing Test Results

2.2.4.1 Definitions

Examiner Result

The Examiner result is the WBC classification and/or RBC characterization performed by the Examiner.

Majority Result

For WBC, it is the cell class assigned to a particular cell by the majority of Participants.

For RBC, it is the characterization grade chosen by the majority of Participants.

If the majority cannot be decided unanimously one of the cell classes/characterizations is at random used as majority.

Reference

The reference is either the Examiner result or Majority result depending on the selection made by the viewer.

WBC Agreement

WBC Agreement shows how well the Participant's classification agrees (percentage) with the reference.

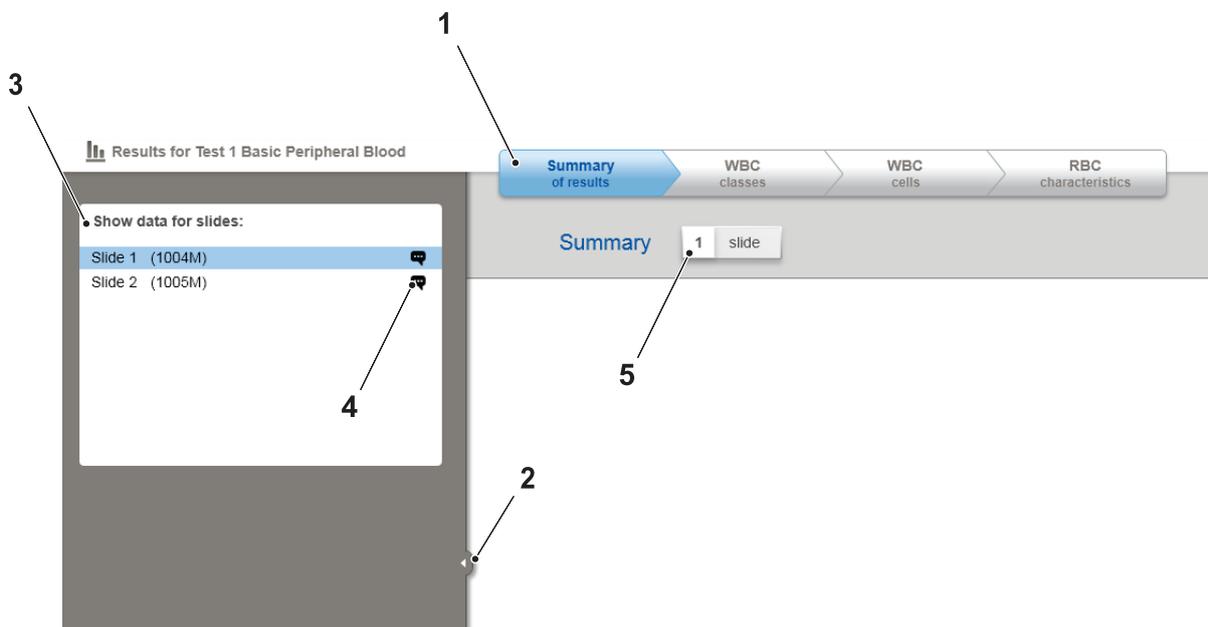
RBC Agreement

The RBC Agreement shows how well the Participant's characterization agrees (percentage) with the reference.

2.2.4.2 Opening a Completed Test

In the TESTS tab double-click on a completed test to open the results view.

2.2.4.3 The Results View



1. Summary of results
2. Collapse/Expand
3. Slide list
4. Slide comments
5. Slide counter

Results View Navigation

In the results view the test results are automatically compiled to show:

- A summary of results.
- WBC classification statistics on a class level.
- WBC classification statistics on a cell level.
- RBC characterization statistics.

Click the results view navigation tabs to browse the results.

Collapse/Expand

Click on the arrow to collapse/expand (2) the side panel.

Slide List

The slides list (3) shows all slides in the test that contribute to the current results view. Include and exclude slides from the results by clicking on the slide.

Hold down CTRL or SHIFT whilst clicking to select multiple slides.

Only results from selected slides (*i.e.* highlighted in blue) are presented.

Slide Comments

If one or more slide comments (4) exist for a slide the comment icon  will be shown next to the slide in the slide list. Click on the comment icon to open a window with all comments.

Slide Counter

The slide counter (5) shows how many slides are currently selected and contributing to the shown results.

2.2.4.4 Test Summary



1. Bar chart
2. Compare to
3. Agreement percentages
4. Infographics

Click the **Summary of results** tab to see an overview of how Participants performed in the test.

Bar Chart

The bar chart (1) shows the average WBC and RBC agreement for each Participant displayed as percentage values. The higher the agreement the better a Participant is considered to have performed in the test.

Switch between using either the Examiner or Majority result as a reference for the agreement using the radio buttons in the Compare to (2) box.

The Agreement percentages (3) box shows the values used for drawing the bars in the bar chart.

Sort the bar chart using the drop-down menu.

Filter the bar chart using the drop-down menus.*

* *Only available in the Enterprise version.*

Infographics

The infographics (4) displays the following key metrics of the test:

- Total Participant number.
- Average WBC and RBC agreement for all Participants compared to the reference selected in the Compare to box (Examiner or Majority result).
- Highest and lowest WBC and RBC agreements compared to the reference selected in the Compare to box (Examiner or Majority result).

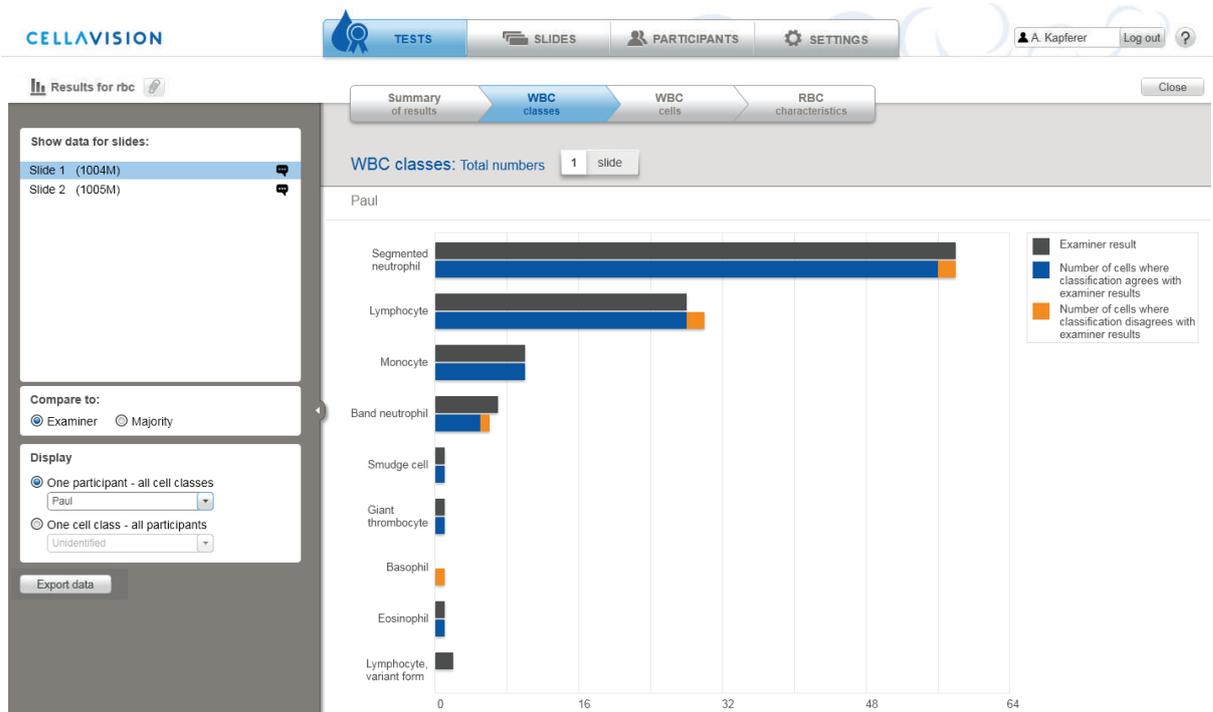
2.2.4.5 WBC Classes

Click the **WBC classes** tab to see the results of WBC classification on a class level.

Switch between **Examiner** and **Majority** in the Compare to box to change the reference classifications.

Switch between showing **One participant - all cell classes** and **One cell class - all participants** in the Display box to show different views of the data.

One Participant - All Cell Classes



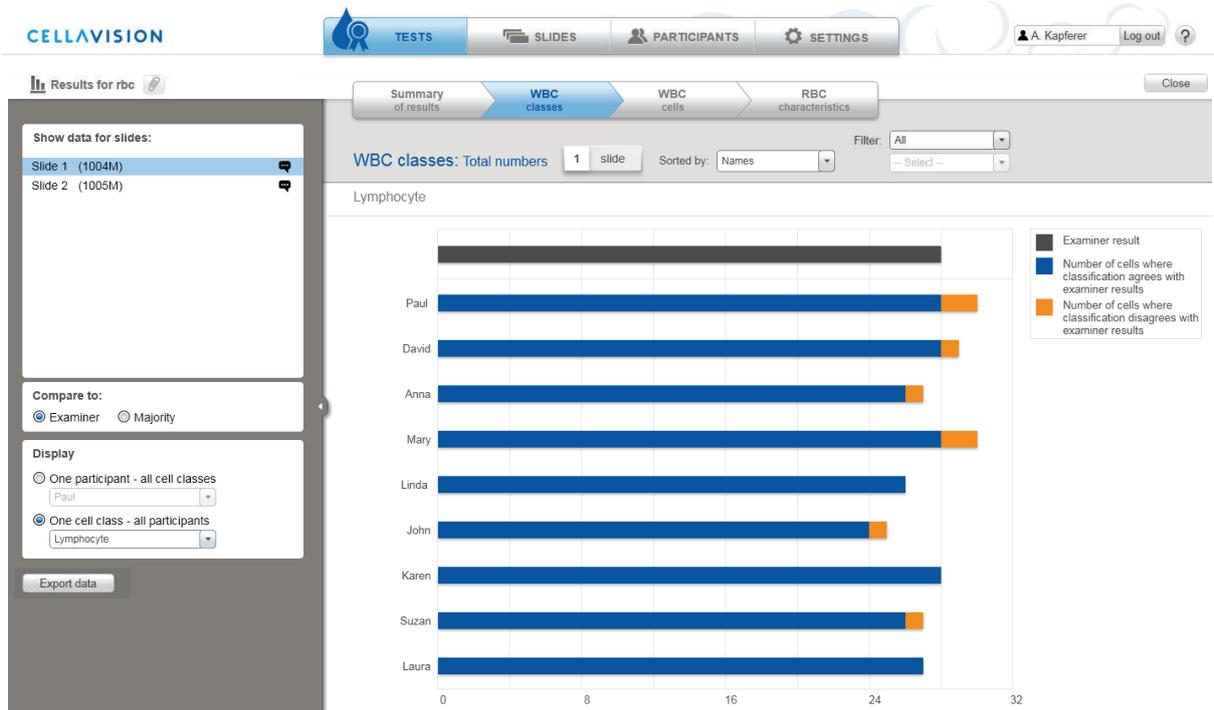
When selecting **One participant - all cell classes** the selected Participant's classification results are shown as a total number of cells per cell class compared to the reference classification.

Each cell class is shown with a top and bottom bar. The top bar (dark grey) shows the total number of cells classified to this class by the reference.

The bottom bar shows the total number of cells classified to this class by the Participant. The blue part of the bar indicates the number of cells where the Participant and reference agreed on the classification. The orange part indicates where they disagreed.

Change Participant using the drop down menu in the Display box.

One Cell Class - All Participants



When selecting **One cell class - all participants** the total number of cells classified to the selected cell class by all Participants as well as the reference is shown.

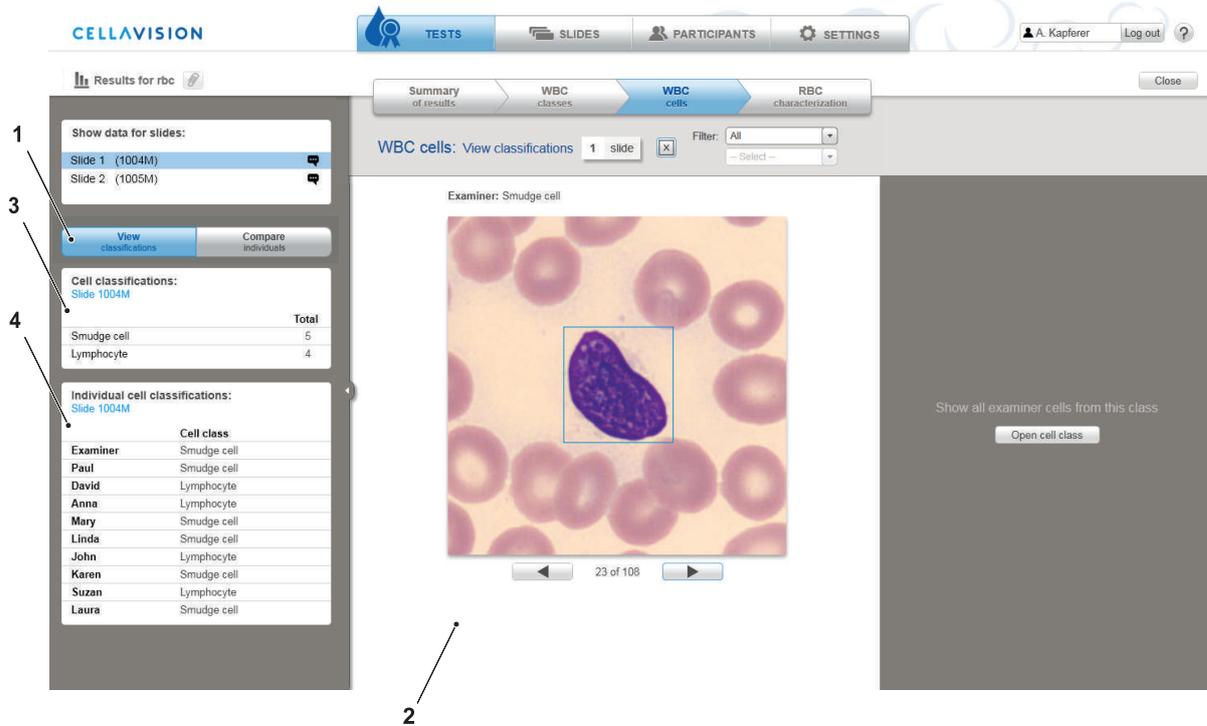
The top bar (dark grey) shows the reference result.

The following bars show the Participant results. The blue part of the bar indicates the number of cells where the Participant and reference agreed on the classification. The orange part indicates where they disagreed.

Change cell class using the drop down menu in the display box.

2.2.4.6 WBC Cells

Click the **WBC cells** tab to see the results of WBC classification on a cell level.
View Classifications



1. View classifications
2. Main view
3. Cell classifications
4. Individual cell classifications

Click on the **View classifications** (1) tab in the side panel to see which WBCs caused the most classification disagreements.

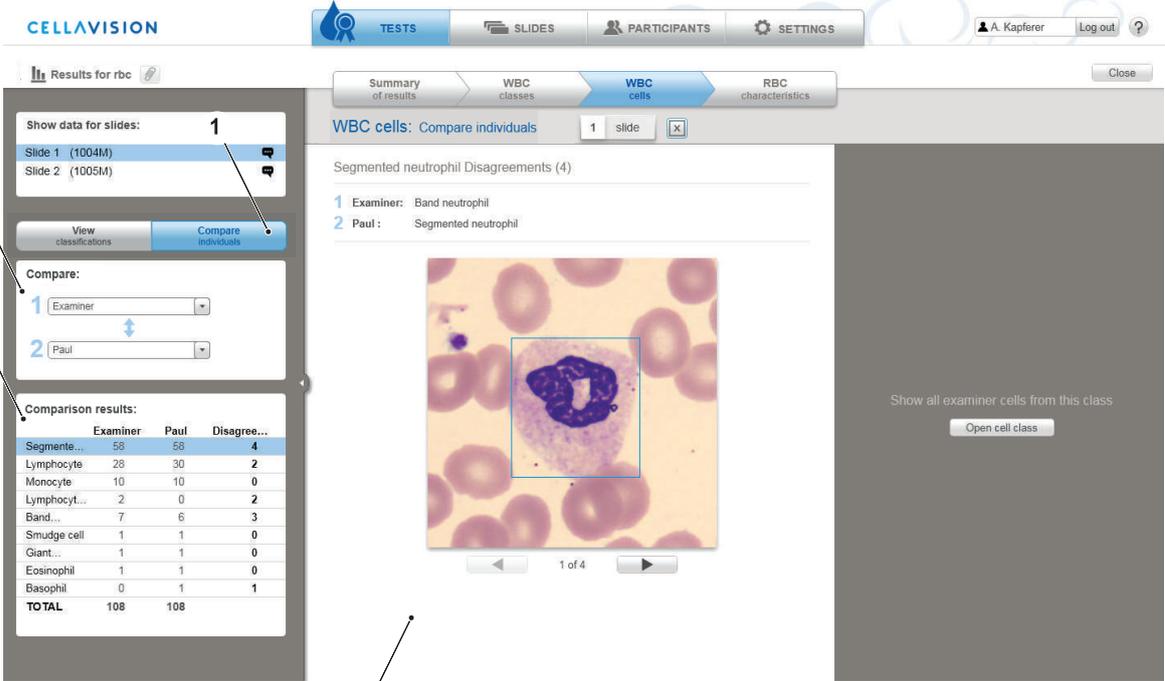
All cells from the currently selected slides are compiled and shown in the main view (2), starting with the cell that has the highest number of disagreements. The total number of cells in the current list is shown in brackets next to the heading All cells above the cell image.

The Cell classifications (3) box shows the cell classes and number of total classifications to each cell class for the currently shown cell. It also shows which slide the cell originates from.

The Individual cell classifications (4) box shows how the Examiner and each Participant classified the cell.

Use the arrow buttons underneath the cell or the arrow keys on the keyboard to go through all the cells. The cells are sorted so that the cells with highest number of different classifications are shown first.

Compare Individuals



The screenshot shows the 'Compare Individuals' interface. On the left, a side panel (labeled 3) has a 'Compare' section (labeled 4) with dropdown menus for 'Examiner' and 'Paul'. Below it is a 'Comparison results' table. The main view (labeled 2) shows 'WBC cells: Compare individuals' with a 'Segmented neutrophil Disagreements (4)' list and a cell image. A right panel shows a button to 'Open cell class'.

	Examiner	Paul	Disagree...
Segmente...	50	55	4
Lymphocyte	28	30	2
Monocyte	10	10	0
Lymphocyt...	2	0	2
Band...	7	6	3
Smudge cell	1	1	0
Giant...	1	1	0
Eosinophil	1	1	0
Basophil	0	1	1
TOTAL	108	108	

1. Compare individuals
2. Main view
3. Compare
4. Comparison results

Click on the **Compare individuals** (1) tab in the side panel to see how the WBC classification results compare between each individual Participant and a chosen reference.

Change the Participant or the reference using the drop-down menus in the Compare (3) box.

The first two columns in the Comparison results (4) table show the number of cells the two selected individuals have classified to each class. The third column shows the number of cells where the classification differs between the two individuals.

Sort WBC classes with the most disagreements to the top of the list by clicking on the table headers in the Comparison results (4) table.

Click on a cell class name to show cell images with disagreements in the main view (2). The two differing classifications are shown above the cell image. Use the arrow buttons underneath the cell image or the arrow keys on the keyboard to go through all disagreements of that class.

Cell comments (if available) are shown underneath the cell image.

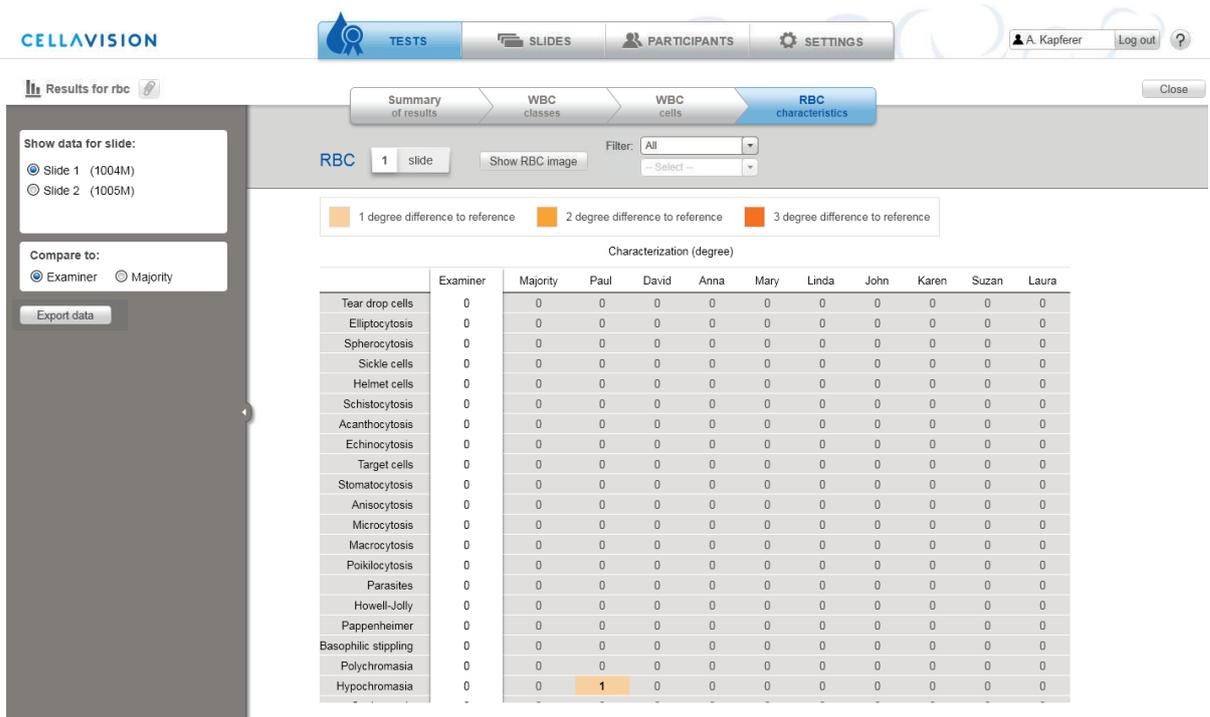
Showing Examiner Cells

Click **Open Cell Class** to show all cells for that slide that were classified to this class by the Examiner. Use the drop-down menu to change to a different class.

Note:

Examiner cells are not to be confused with WBC reference libraries. Cells from WBC reference libraries can be compiled from many different slides and serve as examples for their particular cell class (see for more information).

2.2.4.7 RBC Characteristics



The screenshot displays the 'RBC characteristics' tab in the software. On the left, there are controls for 'Show data for slide' (Slide 1 (1004M) selected), 'Compare to:' (Examiner selected), and an 'Export data' button. The main table shows characterization degrees for various RBC morphologies. The 'Hypochromasia' row is highlighted in orange, indicating a 1-degree difference from the reference.

	Examiner	Characterization (degree)									
		Majority	Paul	David	Anna	Mary	Linda	John	Karen	Suzan	Laura
Tear drop cells	0	0	0	0	0	0	0	0	0	0	0
Elliptocytosis	0	0	0	0	0	0	0	0	0	0	0
Spherocytosis	0	0	0	0	0	0	0	0	0	0	0
Sickle cells	0	0	0	0	0	0	0	0	0	0	0
Helmet cells	0	0	0	0	0	0	0	0	0	0	0
Schistocytosis	0	0	0	0	0	0	0	0	0	0	0
Acanthocytosis	0	0	0	0	0	0	0	0	0	0	0
Echinocytosis	0	0	0	0	0	0	0	0	0	0	0
Target cells	0	0	0	0	0	0	0	0	0	0	0
Stomatocytosis	0	0	0	0	0	0	0	0	0	0	0
Anisocytosis	0	0	0	0	0	0	0	0	0	0	0
Microcytosis	0	0	0	0	0	0	0	0	0	0	0
Macrocytosis	0	0	0	0	0	0	0	0	0	0	0
Poikilocytosis	0	0	0	0	0	0	0	0	0	0	0
Parasites	0	0	0	0	0	0	0	0	0	0	0
Howell-Jolly	0	0	0	0	0	0	0	0	0	0	0
Pappenheimer	0	0	0	0	0	0	0	0	0	0	0
Basophilic stippling	0	0	0	0	0	0	0	0	0	0	0
Polychromasia	0	0	0	0	0	0	0	0	0	0	0
Hypochromasia	0	0	1	0	0	0	0	0	0	0	0

Click the **RBC characteristics** tab to see the results of RBC characterization.

Switch between **Examiner** and **Majority** in the Compare to box to change the reference characterization.

The table shows the Examiner, Majority and Participant(s) characterization grades for the different morphologies.

Cells with an orange background color indicate where the characterization differs from the reference.

The stronger the orange color the greater the deviation.

Click **Show RBC image** to bring up the RBC image. Click outside of the image to close it.

Note:

RBC characterization results can only be viewed for one slide at a time.

2.2.5 Exporting Test Results

The Summary of results, WBC classes and RBC characteristics tabs allow exporting of the presented data to a CSV file.

1. In the **TESTS** tab double-click on a completed test to open it.
2. In the side panel click **Export data**.
3. Choose a location to save the file and click **Save**.

2.2.6 Attaching a Test Conclusion

Test Conclusions are reports created externally by the Examiner.

1. Save a test conclusion as either a PDF file, Microsoft Word document or JPG, PNG, GIF or BMP-file. The maximum allowed file size is 3MB. Only one test conclusion can be added per test.
2. In the **TESTS** tab click on the completed test relevant to the test conclusion so that test is highlighted.
3. In the detailed view of that test click **Attach conclusion**.
4. Navigate to the file.
5. Click **OK**.

Deleting a Test Conclusion

Click  (Delete) next to the test conclusion link.

2.2.7 Deleting Tests

1. In the **TESTS** tab click on any test to bring up the test information in the detailed view.
2. Click  (Delete) to delete the test.

Note:

Deleting an ongoing or completed test will remove it from all associated Participant accounts. Deleting a completed test will also delete its results.

2.3 VERIFYING AND MANAGING SLIDES

2.3.1 Uploading Slides

The CellaVision® Proficiency Software accepts slides from the following CellaVision® databases:

- CellaVision® Processing Database
- CellaVision® Competency Software Database

Step 1: Preparation

1. Go to the computer running the CellaVision® Remote Review Software and open an internet browser window.
2. Navigate to <https://www.cellavision-proficiency-software.com>.

3. Log in to your CellaVision® Proficiency Software account.
4. Click on the **SLIDES** tab.
5. Click **Get the Transfer Tool**.
6. Install the Transfer Tool.

Note:

Administrator privileges are required to install the Transfer Tool.

Note:

Steps 2-6 can be skipped if the Transfer Tool has previously been installed on the computer.

Step 2: Export

1. Start the Transfer Tool and select the database containing the slides (orders) to transfer.
2. Log in to that database.
3. Select individual orders by clicking on the check mark next to the orders. Select multiple orders at once by holding down SHIFT or CTRL whilst clicking on order rows.
4. Click **Mark all highlighted**. Select and add all orders in the database by clicking the checkbox in the column header.

Note:

Orders that have already been marked for transfer in a CellaVision® DM Software are indicated by the  (Mark for Transfer Tool) icon. The option to mark orders for transfer is only available in CellaVision® DM Software version 4.0 or higher. Right-click in the order list view to mark an order for transfer.

5. Click **Transfer** in the Transfer selection panel to the right.
6. Select a location on the hard-drive and save the files.

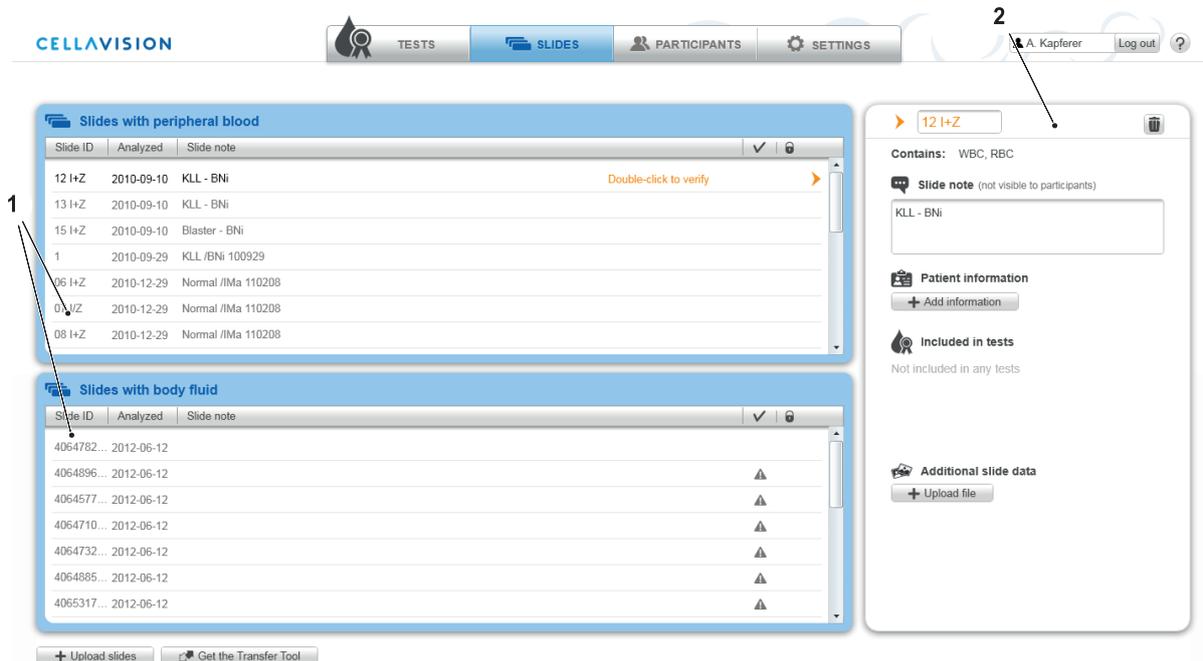
Step 3: Upload

1. In the CellaVision® Proficiency Software navigate to the **SLIDES** tab and click **Upload slides**.
2. Navigate to the previously saved slide files and select one or more slides for upload.
3. Click **Open**. The slides may take a few minutes to upload.

Note:

No patient identification information is transferred with the slides. All transferred cell images are copies from the original.

2.3.2 The SLIDES Tab



1. Slide list
2. Detailed view

Navigate to the **SLIDES** tab to:

- Upload slides to your CellaVision® Proficiency Software account.
- View and manage uploaded slides.
- Verify slides.

Slides are automatically grouped into distinct slide lists (1) according to their sample type.

Detailed View

Click on a slide in a slide list(s) to view the detailed view (2) of that slide.

2.3.3 Managing Slides

2.3.3.1 Slide States

✓	Done	
	Empty field	Slide has not been marked as done but all cells are classified.
	✓	Slide is marked as done (optional step).
	⚠	Slide contains unclassified cells.

	Locked	
	Empty field	Slide is not being used in an ongoing or completed test and is not locked.
		Slide is locked. Verification cannot be changed and the slide cannot be deleted.

2.3.3.2 Sorting

Click on the column headers to sort the list.

2.3.3.3 Edit the Slide Identifier

1. Click on a slide in the slide list to focus the detailed view to that slide.
2. Click on the slide identifier in the detailed view.
3. Edit the identifier and click **Save**.

2.3.3.4 Add or Edit Slide Notes

Slide notes are only visible to the Examiner and serve as an internal memo about that slide.

1. Click on a slide in the slide list to focus the detailed view to that slide.
2. Click on **Add note** or, if a slide note already exists, on the note itself.
3. Add or edit the note.
4. Click **Save** to save the change or **Cancel** to return the slide note to its previous state.

2.3.3.5 Add or Edit Patient Information

1. Click on a slide in the slide list to focus the detailed view to that slide.
2. Click on **Add information** or, if patient information already exists, on the information itself.
3. Add or edit the information.
4. Click **Save** to save the change or **Cancel** to return the patient information to its previous state.

2.3.3.6 Add or Delete Additional Slide Data

1. Click on a slide in the slide list to focus the detailed view to that slide.
2. Click **Upload file** in the detailed view.
3. Navigate to the files on the hard drive and click **Open**. A link to the file is generated in the detailed view. The file format must be either a PDF file, Microsoft Word document or TXT-, JPG-, PNG-, GIF- or BMP-file. The maximum allowed file size is 3MB and only two files can be added per slide.

4. Click on a link to open it. The file will open in a program suitable for that file type.

5. To delete additional slide data click on  (Delete) next to the link.

Note:

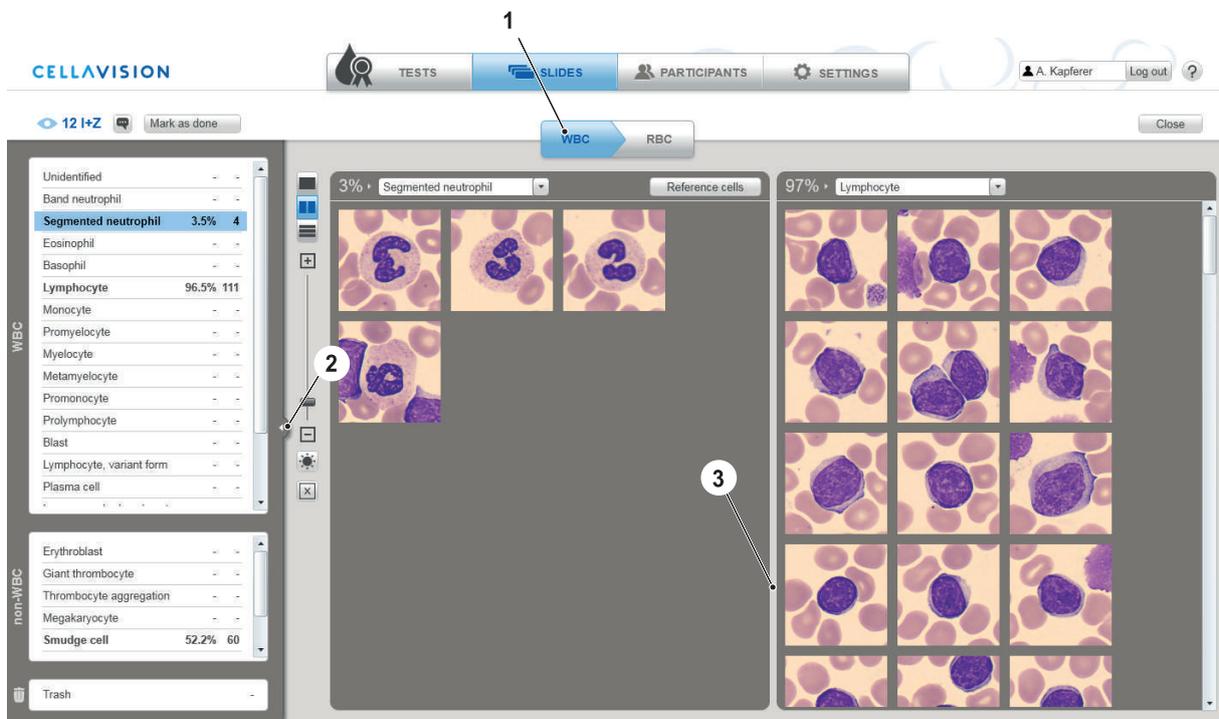
Additional slide data is only visible to the Participants if the setting “Show additional slide data” is selected in the test creation wizard.

2.3.4 Verifying Slides

2.3.4.1 Opening a Slide for Verification

In the **SLIDES** tab double-click on a slide to verify it.

2.3.4.2 The Verification View



1. WBC/RBC navigation
2. Collapse/Expand
3. Main view

WBC/RBC Navigation

Switch between **WBC** and **RBC** (1) verification using the tabs. When a slide has no RBC only the **WBC** tab is shown and vice versa.

Collapse/Expand

Click on the arrow to collapse/expand (2) the side panel.

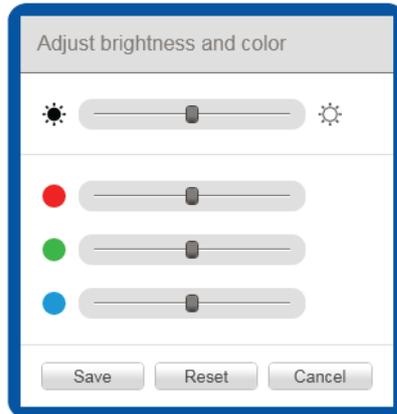
Main View

The main view (3) shows either the WBC images of the currently selected classes or the RBC image.

2.3.4.3 Adjust Image Brightness and Color

1. Click .
2. Adjust the sliders.
3. Click **Save**.

Clicking **Reset** will restore the default settings.



2.3.4.4 White Blood Cell Classification

General Workflow

1. Click on the **WBC** tab.
2. Click on a WBC class in the side panel to show a gallery of all cells classified to that class in the main view. When using the two-class layout, left-click on a class to open it in the left gallery and right-click on a class to open it in the right gallery. Use the drop-down menu in an open WBC class gallery to switch between classes.
3. If necessary, re-classify cells by dragging and dropping them from one open class gallery to another or from an open class gallery to a class in the side panel. Select multiple cells at once by pressing CTRL or SHIFT.

Note:

It is not possible to re-classify cells from slides that are locked.

Note:

It is possible to add user-defined WBC classes. See also 2.5.3 Managing User-defined Classes for more information.

Customize the Layout

	<p>Switch between a one-class, two-class or all-classes layout using the Layout Toggle buttons.</p>
	<p>Increase or decrease the size of the cell images using the Zoom Slider.</p>

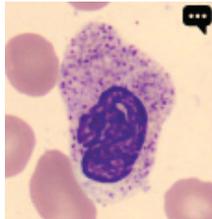
Magnify Individual WBC

1. Double-click on a cell.
2. Use the mouse-wheel to change the zoom level.
3. Use the arrow keys on the keyboard to show the next cell in the gallery.
4. Click **Close** to close the magnified view.

Add or Edit Individual Cell Comments

1. Double-click on a cell.
2. Click in the comment box underneath the magnified cell and write a comment.
3. Click **Save** to save the comment.
4. Click **Close** to close the magnified view.

Cells with comments are marked by a comment icon in the top right corner.



Cell Marker

The cell marker is a square marking the cell for identification. Click  to show/hide the square.

Split WBC

1. Right-click on a cell and choose **Split cell** from the menu.
2. Click on the center of all individual cells to mark them.
3. Click **OK** to split the cell. The new cells are added to the same class as the original cell.

Delete WBC

Delete cells by dragging them to the Trash class in the side panel or by choosing **Trash** from the right-click menu. Deleted cells are not visible for Participants.

Retrieve deleted cells by opening the Trash class and dragging cells from the Trash class to another cell class.

Create WBC Reference Libraries

1. Right-click on the cell that should be used as a reference for that class.
2. Select **Add as reference cell** from the right-click menu.

To view reference libraries:

1. Switch to either the one-class or two-class layout.
2. Open the cell class of interest.
3. Click **Reference cells**. The reference cell gallery for that class will open as a separate gallery.

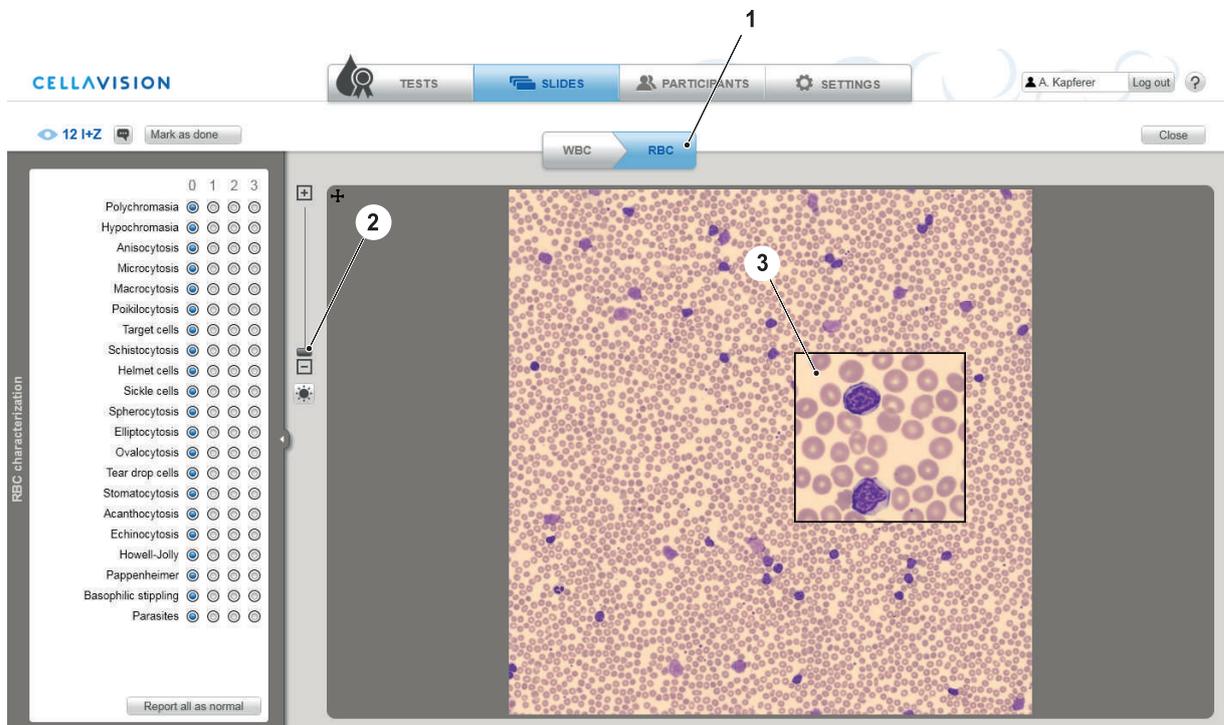
To delete cells from reference libraries:

1. Right-click on a cell.
2. Select **Delete** from the menu.

Note:

Reference libraries will be available to Participants if specified during test creation. Only reference cells created before the test is created will be shown to Participants. See 2.2.2.2 Test Settings for more information.

2.3.4.5 Red Blood Cell Characterization



1. RBC tab
2. Zoom slider
3. Magnified area

General Workflow

1. Click on the **RBC** (1) tab.
2. Zoom in to the RBC image using either the mouse wheel or the zoom slider (2). The RBC image corresponds to the area of 8 microscopic high power fields (HPF) (100x objective and a 22mm ocular).

Note:

Be aware that RBC images captured using a CellaVision® Image Capture System can be of different magnifications.

3. Move around the image by clicking and dragging it.
4. Double-click anywhere on the RBC image to magnify that area. Move the mouse around the RBC image to move the position of the magnified area (3). Click again to close it.
5. Grade the RBC morphology using the radio buttons in the side panel. If required, reset all morphologies grades to a normal level by clicking **Report all as normal**.

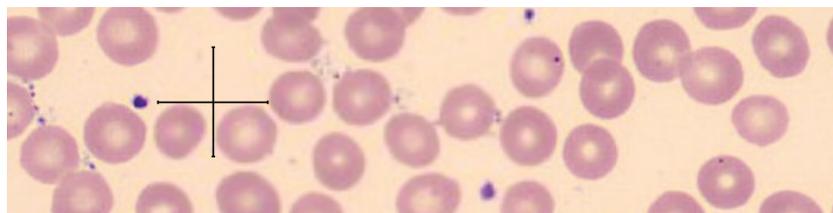
RBC Characterization Grades

0	Normal level
1	Morphology is present at a low level
2	Morphology is present at a moderate level
3	Morphology is present at a high level

Using the Ruler

In the top left-hand corner of the RBC image there is a cross-shaped ruler that represents 14 µm across.

Click on the ruler and drag it to the desired area in the RBC image. The ruler automatically scales up or down according to the zoom level of the RBC image.



2.3.5 Adding or Editing Slide Comments

1. In the **SLIDES** tab double-click on a slide to open the verification view.
2. Click  (Comment) next to the slide identifier.
3. Add or edit the comment and click **Save**.

2.3.6 Marking Slides as Done

To remember which slides are ready to be used in tests they can be marked with a check mark by clicking in the verification view.

Note:

This can only be done if there are no unidentified cells.

2.3.7 Deleting Slides

1. In the **SLIDES** tab click on any slide to bring up the slide information in the detailed view.

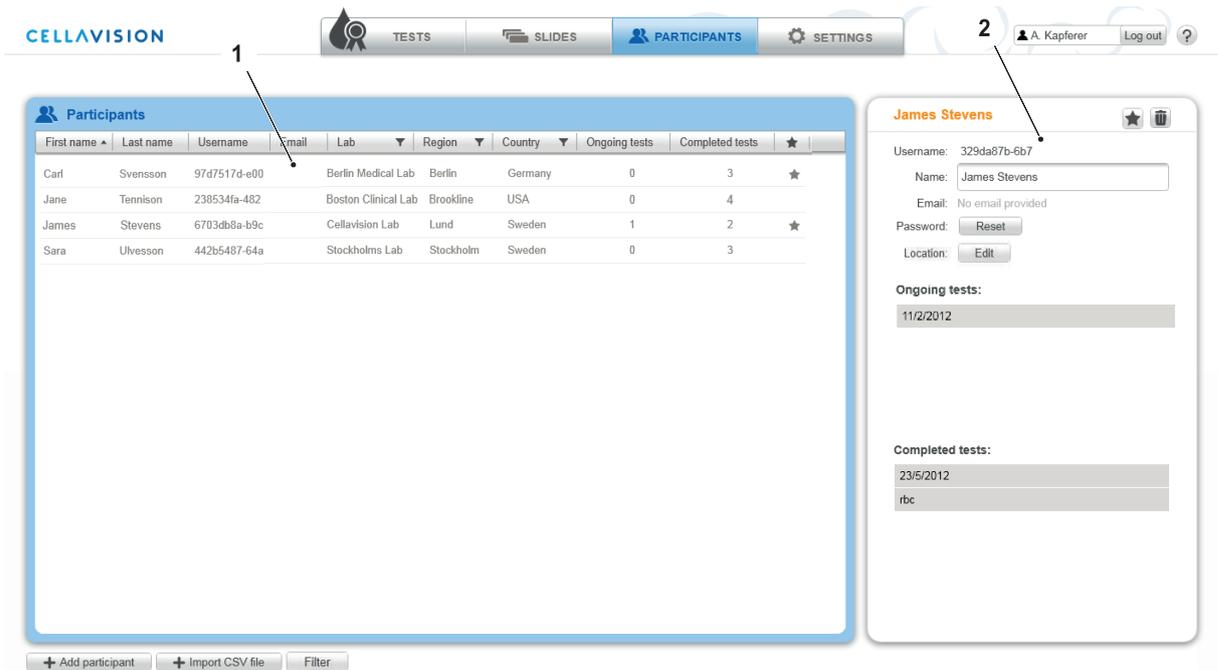
2. Click  (Delete) to delete the slide.

Note:

Slides that are currently included in tests are locked and cannot be deleted.

2.4 ADDING AND MANAGING PARTICIPANTS

2.4.1 The PARTICIPANTS Tab



1. Participant list
2. Detailed view

Participant List

The participant list (1) shows all Participants in the account. It also shows the number of ongoing and completed tests for each Participant.

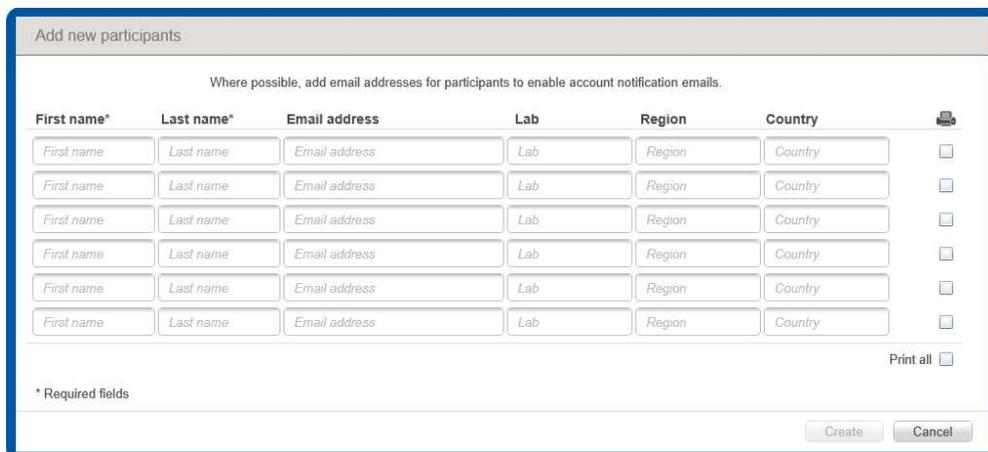
Detailed View

Click on a Participant in the participant list to view the detailed view (2).

2.4.2 Adding Participants

2.4.2.1 Add Participants Manually

1. Click on **Add participants**.



2. Enter First name and Last name of the Participant. If available, enter the Participant's Email address to enable account notification and test status emails to be sent. Enter Lab, Region and Country.*
3. Select the print checkbox if the account information of the newly created Participants should be printed.
4. Click **Create**. An email listing all newly created Participants will be sent to the Examiner. Participants where an email address was provided will also receive an email containing their account information.

*Only available in the Enterprise version.

Note:

The number of available Participants that can be added is determined by the license type. See 2.5.2.1 Upgrading the License on how to increase Participant seats.

2.4.2.2 Add Participants Via CSV File Upload

CSV File Guidelines

1. Arrange the column as shown in the table.

	A	B	C	D	E	F
1	First name	Last name	Email address	Lab	Region	Country
2	John	Smith	john.smith@company.com	John's Lab	Neverwood	Neverland
3						

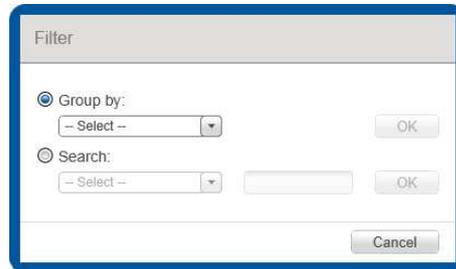
Note:

The fields Lab, Region and Country are only available in the Enterprise version.

2. Ensure that the maximum number of free Participant seats is not exceeded.
3. Save the file as a .csv file.

2.4.3 Filtering the Participant List*

1. Click **Filter**.



2. Choose **Group by** or **Search** and then select a category.
3. Click **OK**.

**Only available in the Enterprise version.*

2.4.4 Managing Participants

Click on a Participant in the participant list to focus the detailed view to that Participant.

2.4.4.1 Edit Participant Location*

1. Click **Edit** next to Location.
2. Enter Lab, Region and Country and click **OK**.

**Only available in the Enterprise version.*

2.4.4.2 Reset Participant Password

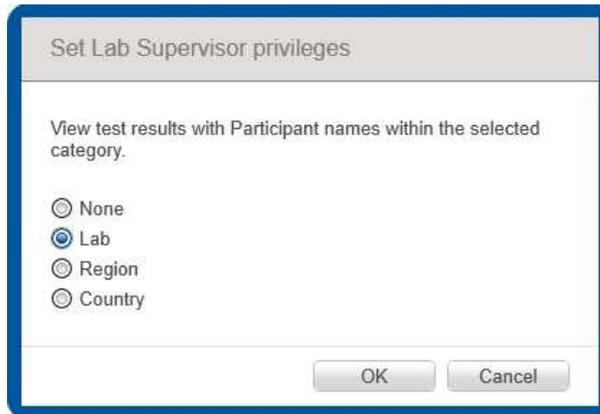
1. Click **Reset** next to Password.
2. A new password is automatically generated and emailed to the Examiner.

Note:

Passwords can only be reset for Participants that have no email address associated with their account. Participants with email addresses can reset their password from within their own account.

2.4.5 Setting Lab Supervisor Privileges*

1. In the **PARTICIPANTS** tab click on any Participant to focus the detailed view to that Participant.
2. Click  (Set Lab Supervisor Privileges).
3. Choose **Lab**, **Region** or **Country** to allow the Lab Supervisor to view test results with Participant names within the selected category.



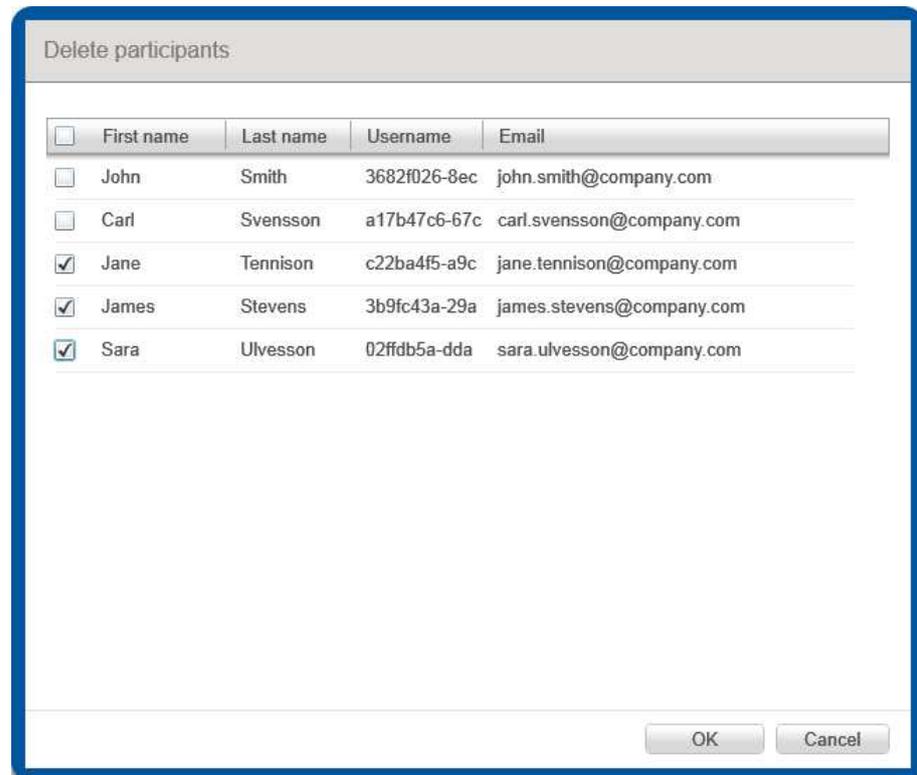
**Only available in the Enterprise version.*

2.4.6 Deleting Participants

1. In the **PARTICIPANTS** tab click on any Participant to focus the detailed view to that Participant.
2. Click  (Delete) to delete the Participant.

2.4.6.1 Deleting Multiple Participants

1. In the **PARTICIPANTS** tab click .
2. Select the checkbox next to the participants you want to delete.
3. Click **OK**.

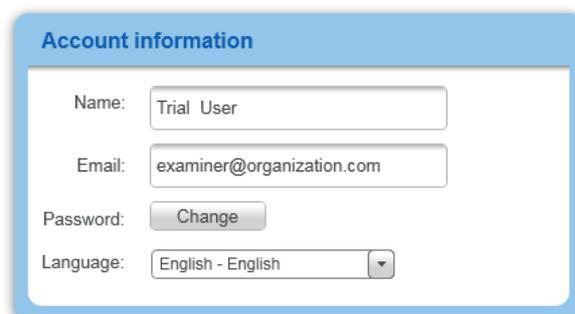


2.5 SETTINGS

Click on the **SETTINGS** tab to manage your account and customize the workspace.

2.5.1 Editing Account Information

1. In the **Account information** box click on the current name or email address.
2. Edit the information and click **Save**.
3. Customize the password by clicking **Change** and entering a new password.
4. Customize the language using the drop-down menu.



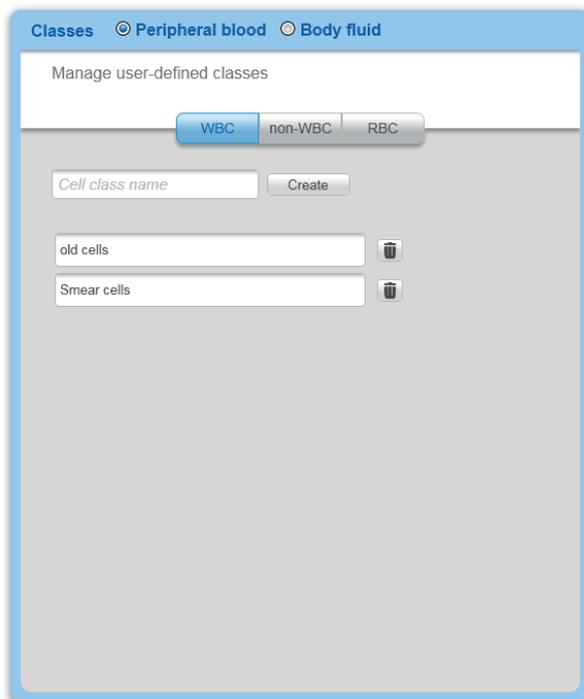
2.5.2 License

The License box contains information about license type, number, renewal date and the organization name.

2.5.2.1 Upgrading the License

Click the **Read more about how to upgrade licenses** link for more information.

2.5.3 Managing User-defined Classes



1. In the Classes box select either **Peripheral blood** or **Body fluid** samples.
2. Under Manage user-defined classes click on either the **WBC**, **non-WBC** or **RBC** tab.
3. Enter the name of the new class and click **Create**.

Editing User-defined Classes

1. Click on the class.
2. Edit the class name.
3. Click **Save**.

Deleting User-defined Classes

Click  (Delete) next to the class to delete it.

All cells of a deleted class are automatically moved to the Unidentified class and need to be re-classified. Affected slides will be marked with  in the **SLIDES** tab.

Note:

User-defined cell classes that is used in a test cannot be deleted.

2.6 TROUBLESHOOTING

2.6.1 No Slides Shown in Wizard Step 1

1. Navigate to the **SLIDES** tab.
2. Upload slides to your CellaVision® Proficiency Software (see also 2.3.1 *Uploading Slides*).
3. Return to the **TESTS** tab and double-click on the respective under construction test to continue setup.

2.6.2 Missing Slides in Wizard Step 1

Slides containing un-classified cells cannot be included in tests and are marked with  in the **SLIDES** tab. To make these slides available for tests:

1. Navigate to the **SLIDES** tab.
2. Double-click on the slide in question.
3. Classify all WBC in the **Unidentified** class.

See also 3.2.3 *Verifying Slides* for more information.

2.6.3 No Participants Shown in Wizard Step 2

1. Navigate to the **PARTICIPANTS** tab.
2. Click **Add participants** or **Import CSV file** and add Participants.
3. Return to the **TESTS** tab and double-click on the respective under construction test to continue setup (see also 2.4 *ADDING AND MANAGING PARTICIPANTS*).

2.6.4 No Results Available in Test Results View

The following scenarios can cause no results to be shown:

- The test was completed early and no Participant completed the selected slide (s).
- Nobody completed the test.

If possible, select a different slide or a different Participant to see results.

If no results are available for any of the slides it is likely that an ongoing test was manually stopped before any slides could be completed. See 2.2.3.2 *Stop an Ongoing Test* for more information.

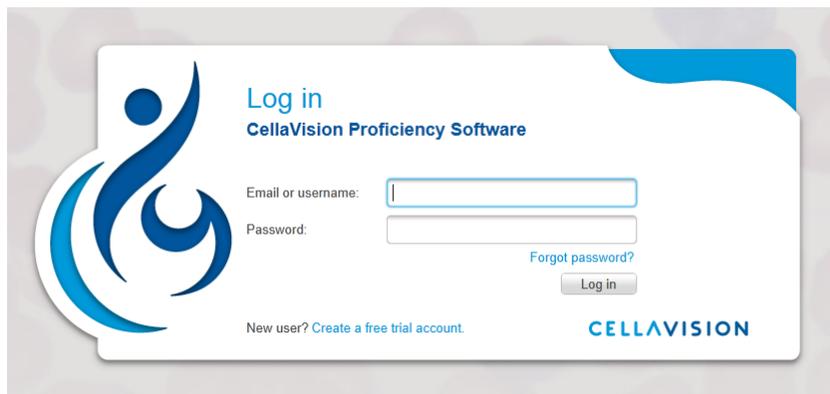
3 PARTICIPANT

The following chapters are intended for the Participant. An Examiner cannot access these parts of the program.

3.1 GETTING STARTED

3.1.1 Logging in

1. Open an internet browser window and go to <https://www.cellavision-proficiency-software.com>.



2. Enter your email/username and password.
3. Click **Log in**.

3.1.2 Retrieving the Password

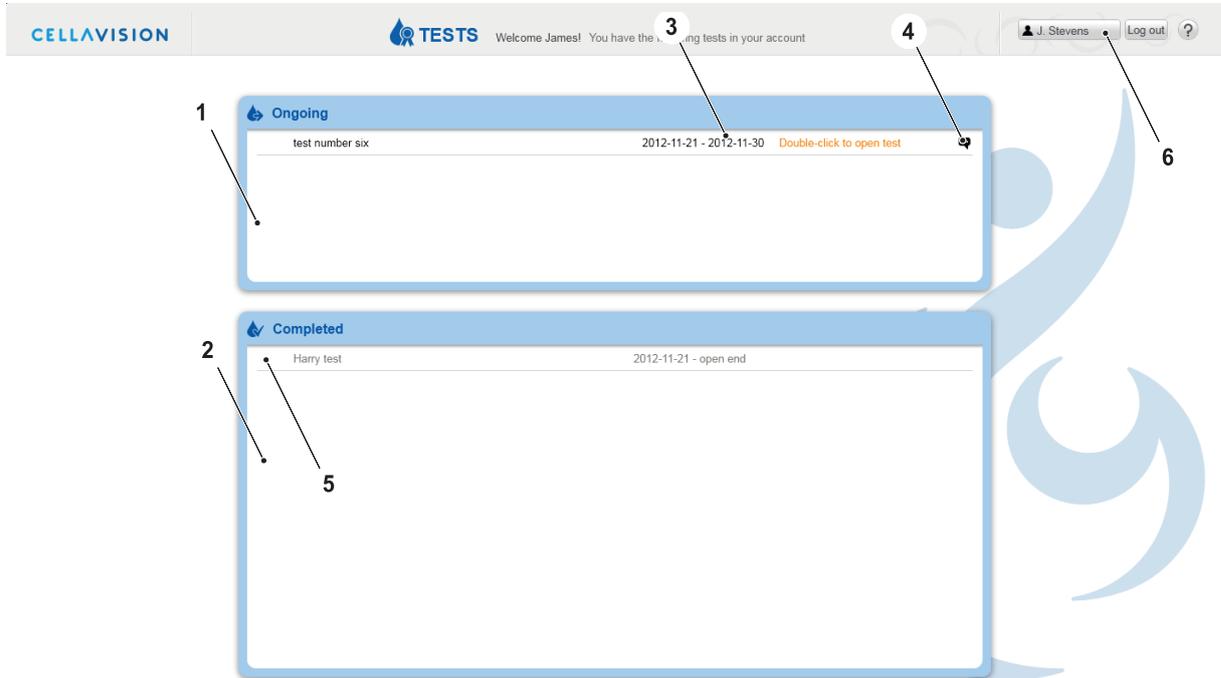
1. In the login screen click the **Forgot password?** link.
2. Enter your email address and click **Reset password**.
3. A new password will be sent to this email address.

Note:

If no email address is associated with your account, please contact your Examiner.

3.2 TAKING A TEST

3.2.1 The TESTS Tab



1. Ongoing
2. Completed
3. Test completion dates
4. Test comments
5. Test results
6. Account settings

The **TESTS** tab lists all Ongoing (1) and Completed (2) tests set by the examiner.

3.2.1.1 Test Completion Dates

Test completion dates (3) are shown as the second date next to the test name. If a completion date is given a test must be completed before that date.

3.2.1.2 Test Comments

Test comments (4) are indicated by the  (comment icon) next to a test. Move the mouse over the test comment icon to see the comment.

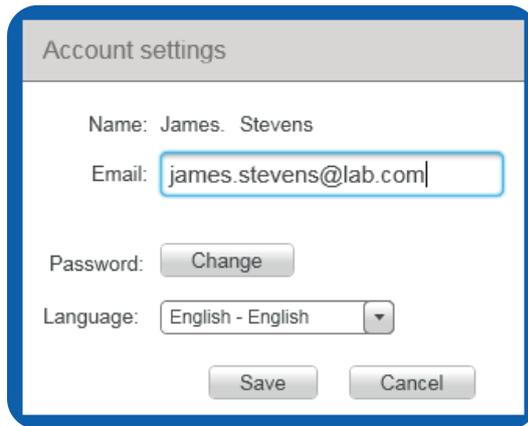
3.2.1.3 Results Status

 (Hourglass Icon) before a completed test indicates that the test results (5) are not yet available.

E (Early access icon) before a completed test indicates that results are available but not all Participants in the test group have yet completed the test. Incomplete test results from fellow Participants will not be shown.

3.2.1.4 Account Settings

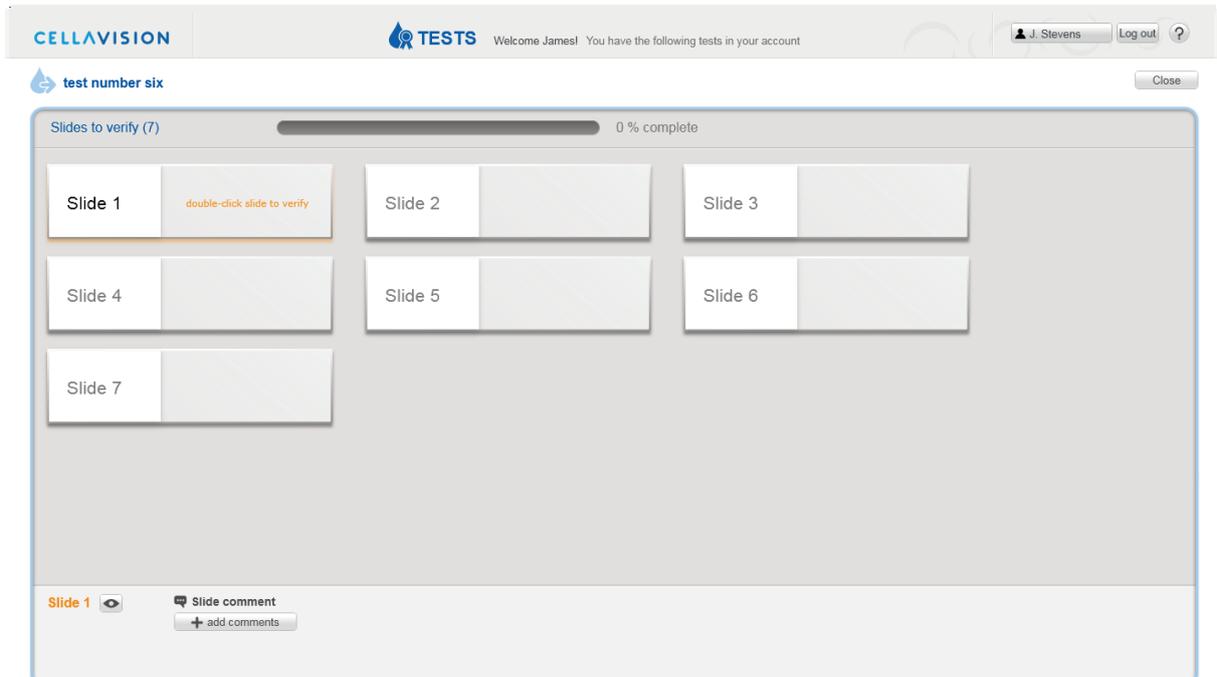
1. Click on the user name in the top right corner. The Account settings (6) window opens.
2. Click on the text box next to Email: to edit your email address.
3. Click on **Change** next to Password: to customize your password.
4. Select the language for the user interface using the drop down menus.
5. Click **Save** to save your changes.



3.2.2 Viewing a Test

3.2.2.1 Opening a Test

Double-click on an ongoing test.



Each test contains one or more slides that need to be verified and signed in order to complete the test.

3.2.2.2 Slide States

	<p>Unsigned slide. The verification of this slide is not yet complete and the slide has not yet been signed.</p>
	<p>Signed slide. Verification of this slide is complete and the slide has been signed.</p>

Note:

To complete a test all slides must be signed.

3.2.2.3 Slide Information

Click on a slide to obtain more information about that slide at the bottom of the page.

Slide Comment

1. Click **Add comment**.
2. Add or edit the comment.
3. Click **Save** to save the change or **Cancel** to return the comment to its previous state.

Note:

Slide comments are visible to the Examiner.

Additional Slide Data

Additional slide data is sometimes provided and gives information to help correctly classify and characterize the cells.

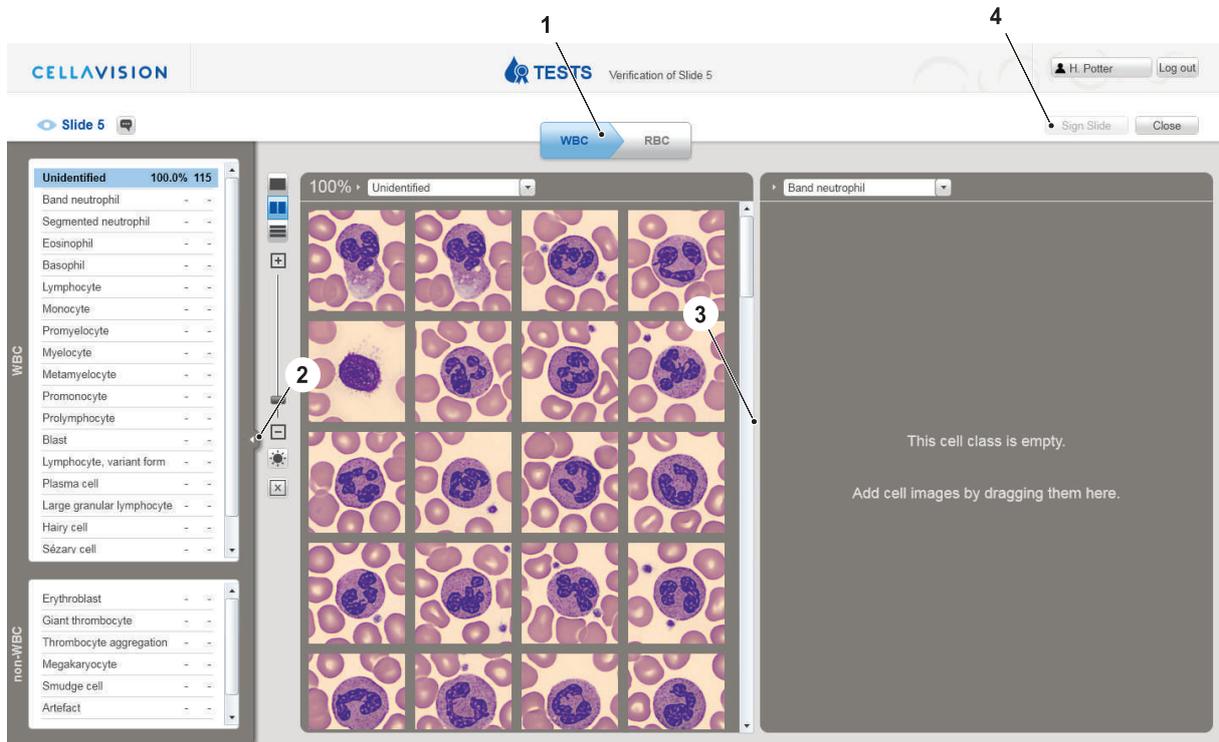
Click on the link to open the file. It will open in a program suitable for that file type.

3.2.3 Verifying Slides

3.2.3.1 Opening a Slide for Verification

In the test overview page double-click on a slide to verify it.

3.2.3.2 The Verification View



1. WBC/RBC navigation
2. Collapse/Expand
3. Main view
4. Sign slide

WBC/RBC Navigation

Switch between WBC and RBC (1) verification using the tabs. When a slide has no RBCs only the WBC tab is shown and vice versa.

Collapse/Expand

Click on the arrow to collapse/expand (2) the side panel.

Main View

The main view (3) shows either the WBC images of the currently selected classes or the RBC image.

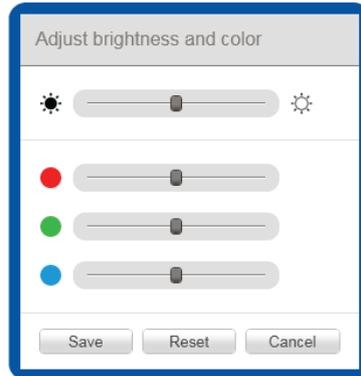
Sign Slide Button

Click **Sign Slide** (4) to sign the slide when verification is complete.

3.2.3.3 Adjust Image Brightness and Color

1. Click 
2. Adjust the sliders.
3. Click **Save**.

Clicking **Reset** will restore the default settings.



3.2.3.4 White Blood Cell Classification

General Workflow

1. Click on the **WBC** tab. When starting WBC classification all cells will be listed in the **Unidentified** class.
2. Click on a WBC class in the side panel to show a gallery of all cells classified to that class in the main view. When using the two-class layout, left-click on a class to open it in the left gallery and right-click on a class to open it in the right gallery. Use the drop-down menu in an open WBC class gallery to switch between classes.
3. Classify cells by dragging and dropping them from one open class gallery to another or from an open class gallery to a class in the side panel or by right-clicking on a cell and selecting a class from the menu. Select multiple cells at once by pressing CTRL or SHIFT.
4. Continue until all cells are classified.

Customize the Layout

	<p>Switch between a one-class, two-class or all-classes layout using the layout toggle buttons.</p>
	<p>Increase or decrease the size of the cell images using the zoom slider.</p>

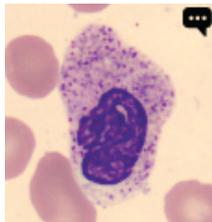
Magnify Individual WBC

1. Double-click on a cell. A magnified version of that cell will open.
2. Use the mouse-wheel to change the zoom level.
3. Use the arrow keys on the keyboard to show the next cell in the gallery.
4. Click **Close** to close the magnified view.

Add or Edit Individual Cell Comments

1. Double-click on a cell. A magnified version of that cell will open.
2. Click in the Comment box underneath the magnified cell and write a comment.
3. Click **Save** to save the comment.
4. Click **Close** to close the magnified view.

Cells with comments are marked by a comment icon in the top right corner.

**Cell Marker**

The cell marker is a square that surrounds the cell for identification. Click  to show/hide the square.

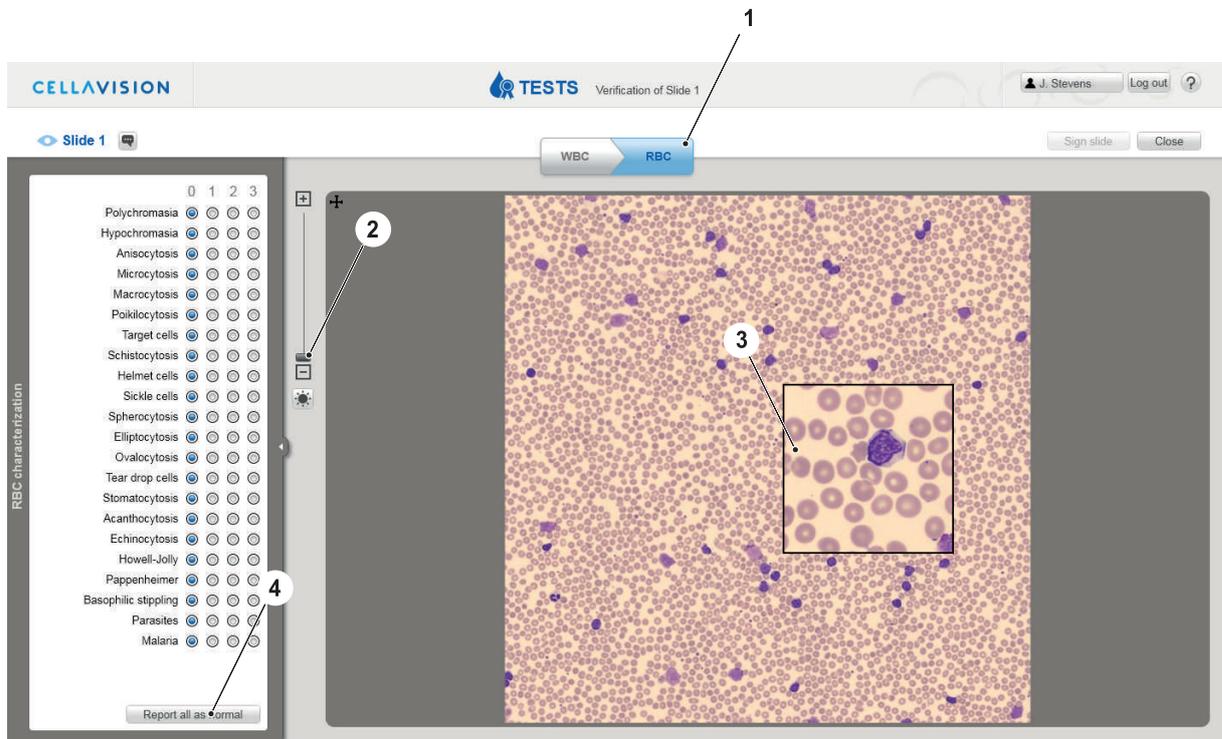
WBC Reference Libraries

1. Switch to either the one-class or two-class layout.
2. Open the cell class of interest.
3. Click **Reference cells**. The reference cell gallery for that class will open as a separate gallery.

Note:

Reference libraries are only available if specified so by the Examiner.

3.2.3.5 Red Blood Cell Characterization



1. RBC tab
2. Zoom slider
3. Magnified area
4. Report all as normal

General Workflow

1. Click on the **RBC** (1) tab.
2. Zoom in to the RBC image using either the mouse wheel or the zoom slider (2). The RBC image corresponds to the area of 8 microscopic high power fields (HPF) (100x objective and a 22mm ocular).

Note:

Be aware that RBC images captured using a CellaVision® Image Capture System can be of different magnifications.

3. Move around the image by clicking and dragging it.
4. Double-click anywhere on the RBC image to magnify that area. Move the mouse around the RBC image to move the position of the magnified area (3). Click again to close it.
5. Grade the RBC morphology using the radio buttons in the side panel. If required, reset all morphologies grades to a normal level by clicking **Report all as normal** (4).

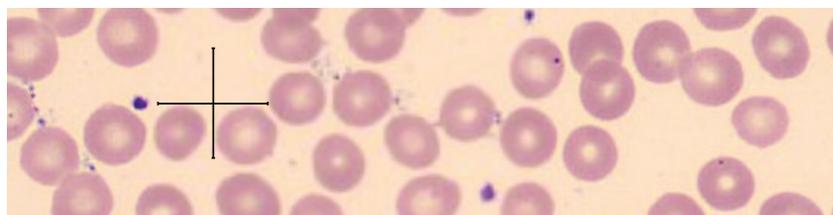
RBC Characterization Grades

0	Normal level
1	Morphology is present at a low level
2	Morphology is present at a moderate level
3	Morphology is present at a high level

Using the Ruler

In the top left-hand corner of the RBC image there is a cross-shaped ruler that represents 14 µm across.

Click on the ruler and drag it to the desired area in the RBC image. The ruler automatically scales up or down according to the zoom level of the RBC image.



3.2.4 Signing Slides

Signing a slide indicates that the verification of that slide is completed.

1. Double-click on a slide to open it for verification.
2. Classify all WBC's until there are no cells left in the unidentified class and characterize the RBC image. The **Sign slide** button activates.



3. Click **Sign slide**.

Signed slides are indicated in the test overview page by a check mark. See also [3.2.2.2 Slide States](#) for more information.

Note:

Once a slide has been signed it is no longer possible to change verification.

3.3 VIEWING TEST RESULTS

3.3.1 Definitions

3.3.1.1 Examiner result

The Examiner result is the WBC classification and/or RBC characterization performed by the Examiner.

3.3.1.2 Majority result

For WBC, it is the cell class assigned to a particular cell by the majority of Participants.

For RBC, it is the characterization grade chosen by the majority of Participants.

If the majority cannot be decided unanimously one of the cell classes/characterizations is at random used as majority.

3.3.1.3 Reference

The reference is either the Examiner result or Majority result depending on the selection made by the viewer.

3.3.1.4 WBC Agreement

WBC Agreement shows how well the Participant's classification agrees (percentage) with the reference.

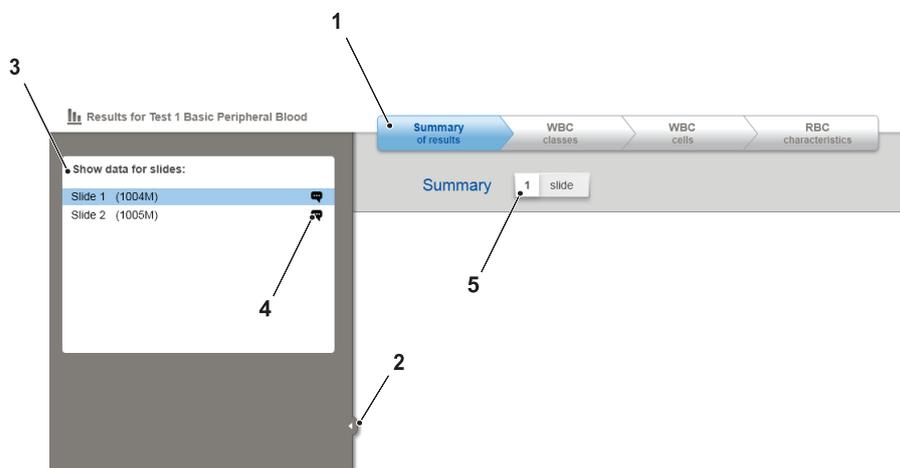
3.3.1.5 RBC Agreement

The RBC Agreement shows how well the Participant's characterization agrees (percentage) with the reference.

3.3.2 Opening a Completed Test

In the TESTS tab double-click on a completed test to open the results view.

3.3.3 The Results View



1. Results view navigation
2. Collapse/Expand
3. Slide list
4. Slide comments
5. Slide counter

3.3.3.1 Results View Navigation

Click the results view navigation (1) tabs to browse the results.

Test results are automatically compiled to show:

- A summary of results.
- WBC classification statistics on a class level.
- WBC classification statistics on a cell level.
- RBC characterization statistics.

3.3.3.2 Collapse/Expand

Click on the arrow to collapse/expand (2) the side panel.

3.3.3.3 Slide list

The slides list (3) shows all slides included in the test. Include and exclude slides from the results by clicking on the slide. Hold down CTRL or SHIFT whilst clicking to select multiple slides. Only results from selected slides (*i.e.* highlighted in blue) are presented.

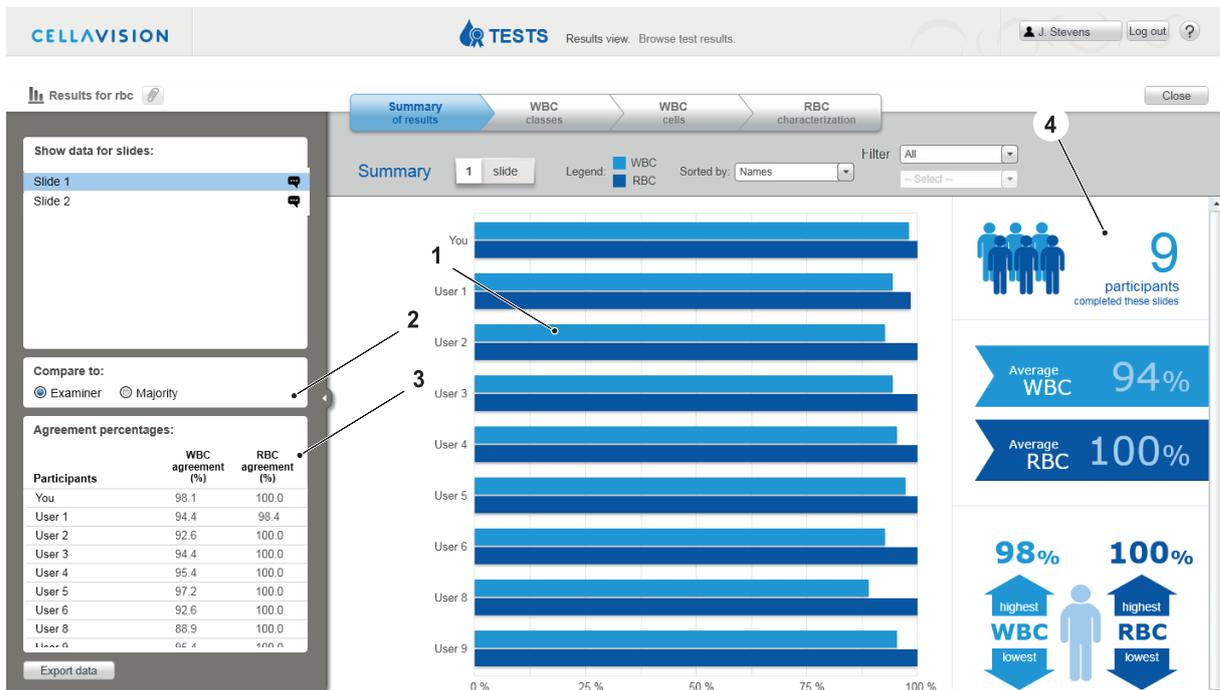
3.3.3.4 Slide comments

If one or more slide comments (4) exist for a slide the comment icon  will be shown next to the slide in the slide list. Click on the comment icon to open a window with all comments.

3.3.3.5 Slide counter

The slide counter (5) shows how many slides are currently selected and contributing to the shown results.

3.3.4 Test Summary



1. Bar chart
2. Compare to
3. Agreement percentages
4. Infographics

Click the **Summary of results** tab to see an overview of how Participants performed in the test. Participant names are anonymized, but your results are indicated by You.

3.3.4.1 Bar Chart

The bar chart (1) shows the average WBC and RBC agreement for each Participant displayed as percentage values. The higher the agreement the better a Participant is considered to have performed in the test.

Switch between using either the Examiner or Majority result as a reference for the agreement using the radio buttons in the Compare to (2) box.

The Agreement percentages (3) box shows the values used for drawing the bars in the bar chart.

Sort the bar chart using the drop-down menu.

Filter the bar chart using the drop-down menus.*

* Only available in the Enterprise version.

3.3.4.2 Infographics

The infographics (4) display the following key metrics of the test:

- Total Participant number.
- Average WBC and RBC agreement for all Participants compared to the reference selected in the compare to box (Examiner or Majority result).
- Highest and lowest WBC and RBC agreements compared to the reference selected in the Compare to box (Examiner or Majority result).

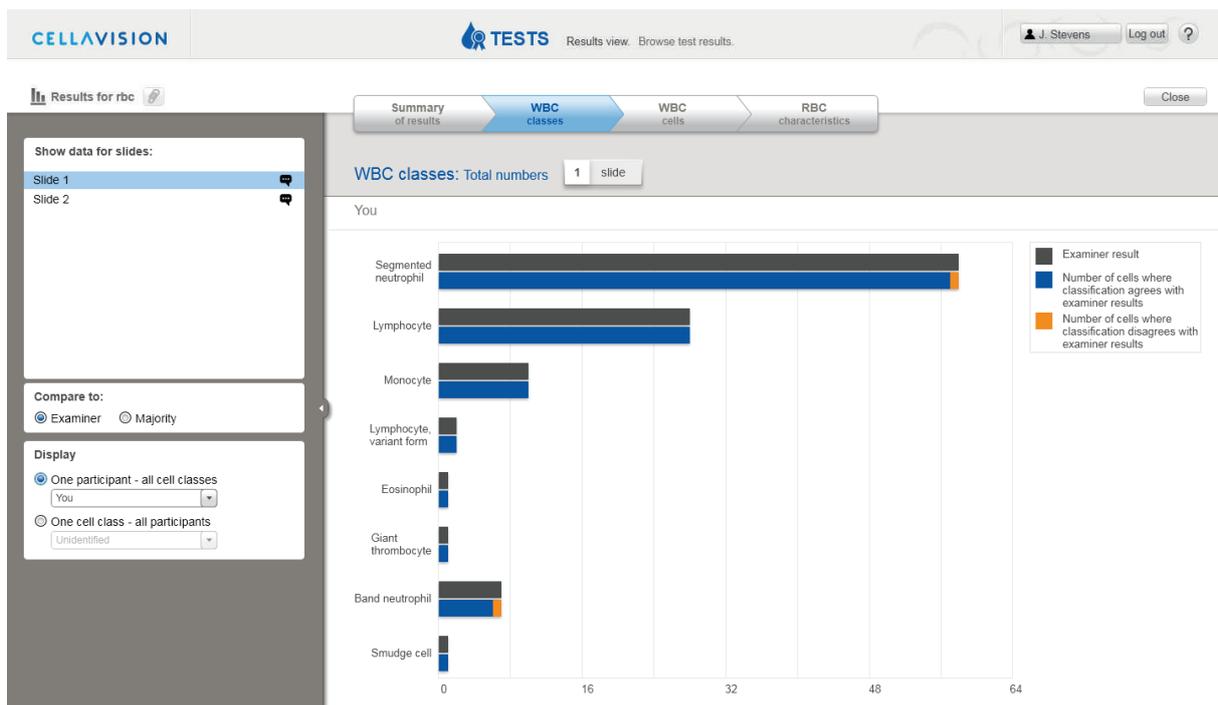
3.3.5 WBC Classes

Click the **WBC classes** tab to see the results of WBC classification on a class level.

Switch between **Examiner** and **Majority** in the compare to box to change the reference classifications.

Switch between showing **One participant - all cell classes** and **One cell class - all participants** in the Display box to show different views of the data.

3.3.5.1 One participant - all cell classes

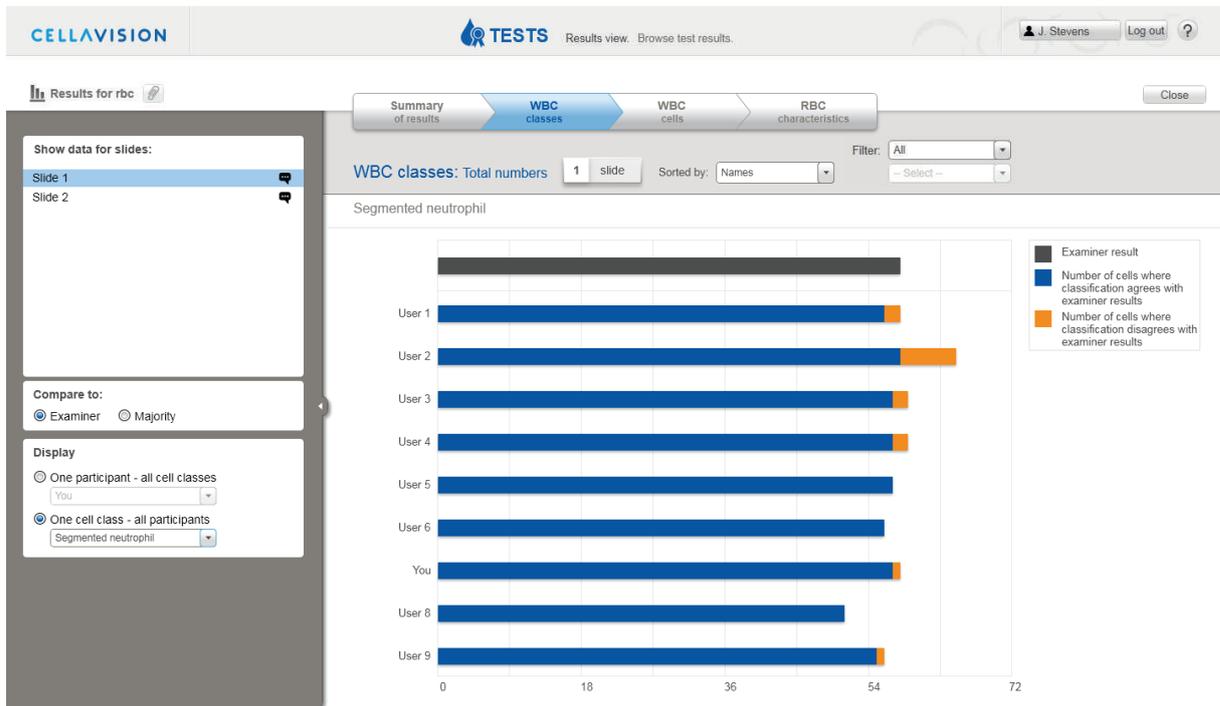


When selecting **One participant - all cell classes** your classification results are shown as a total number of cells per cell class compared to the reference classification.

Each cell class is shown with a top and bottom bar. The top bar (dark grey) shows the total number of cells classified to this class by the reference.

The bottom bar shows the total number of cells classified to this class by you. The blue part of the bar indicates the number of cells where you and reference agreed on the classification. The orange part indicates where you disagreed.

3.3.5.2 One cell class - all participants



When selecting **One cell class - all participants** the total number of cells classified to the selected cell class by all Participants as well as the reference is shown.

The top bar (dark grey) shows the reference result.

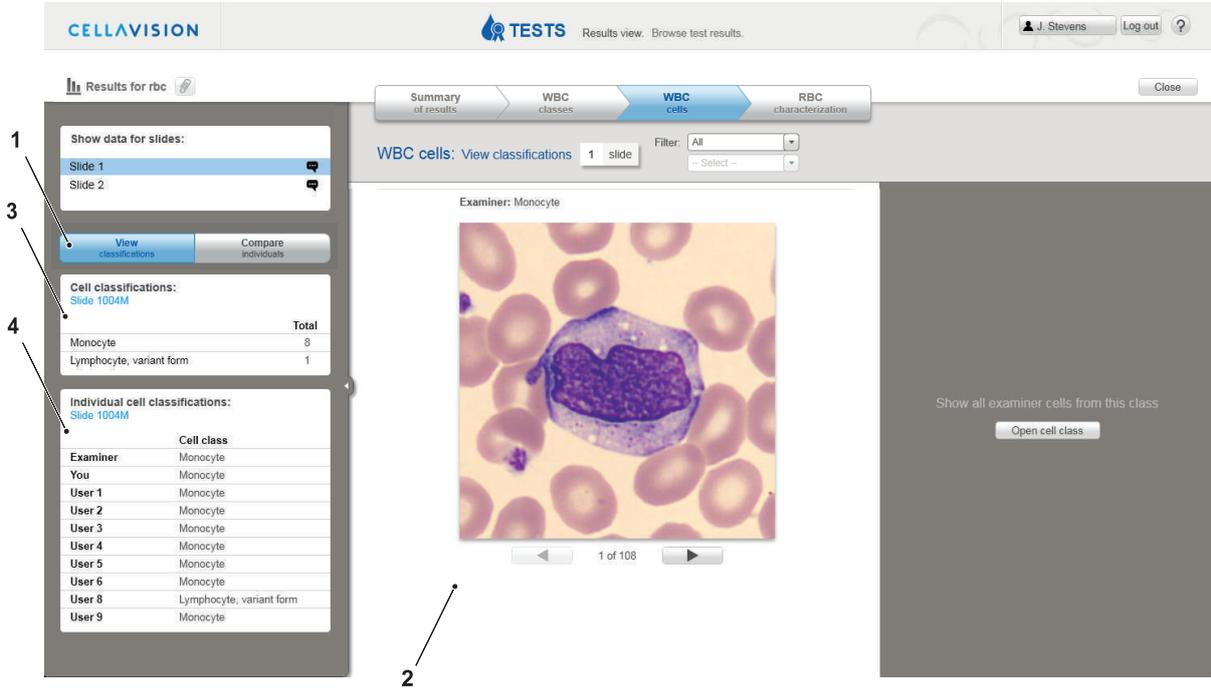
The following bars show the Participant results. The blue part of the bar indicates the number of cells where the Participant and reference agreed on the classification. The orange part indicates where they disagreed.

Change cell class using the drop down menu in the Display box.

3.3.6 WBC Cells

Click the **WBC cells** tab to see the results of WBC classification on a cell level.

3.3.6.1 View Classifications



1. View classifications
2. Main view
3. Cell classifications
4. Individual cell classifications

Click on the **View classifications** (1) tab in the side panel to see which WBCs caused the most classification disagreements.

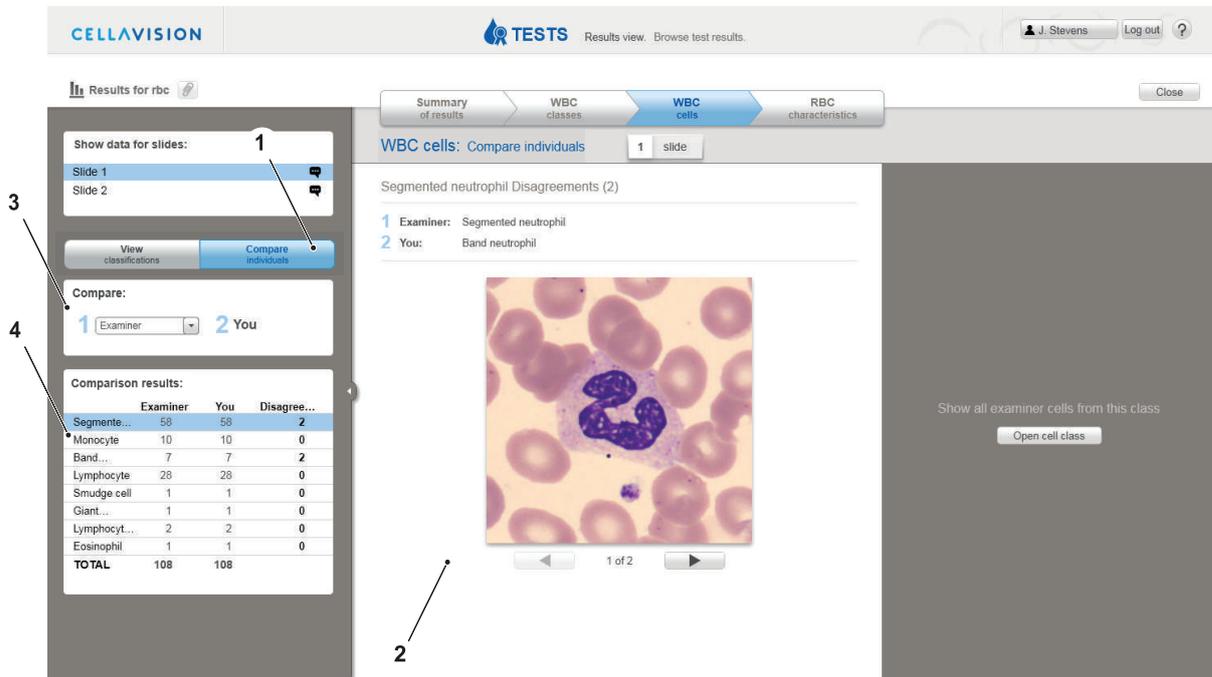
All cells from the currently selected slides are compiled and shown in the main view (2), starting with the cell that has the highest number of disagreements. The total number of cells in the current list is shown in brackets next to the heading All cells above the cell image.

The Cell classifications box (3) shows the cell classes and number of total classifications to each cell class for the currently shown cell. It also shows which slide the cell originates from.

The Individual cell classifications (4) box shows how the Examiner and each Participant classified the cell.

Use the arrow buttons underneath the cell to click through all cells. The cells are sorted so that the cells with highest number of different classifications are at the beginning of the list.

3.3.6.2 Compare Individuals



1. Compare individuals
2. Main view
3. Compare
4. Disagreement results

Click on the **Compare individuals** (1) tab in the side panel to see how the WBC classification results compare between you and a chosen reference.

Change the reference using the drop-down menu in the Compare (3) box.

The first two columns in the Disagreement results (4) table show the number of cells you and the reference classified to each class. The third column shows the number of cells where the classification differs.

Sort WBC classes with the most disagreements to the top of the list by clicking on the table headers in the Disagreement results (4) table.

Click on a cell class name to show cell images with disagreements in the main view (2). The two differing classifications are shown above the cell image. Use the arrow buttons underneath the cell image to click through all disagreements of that class.

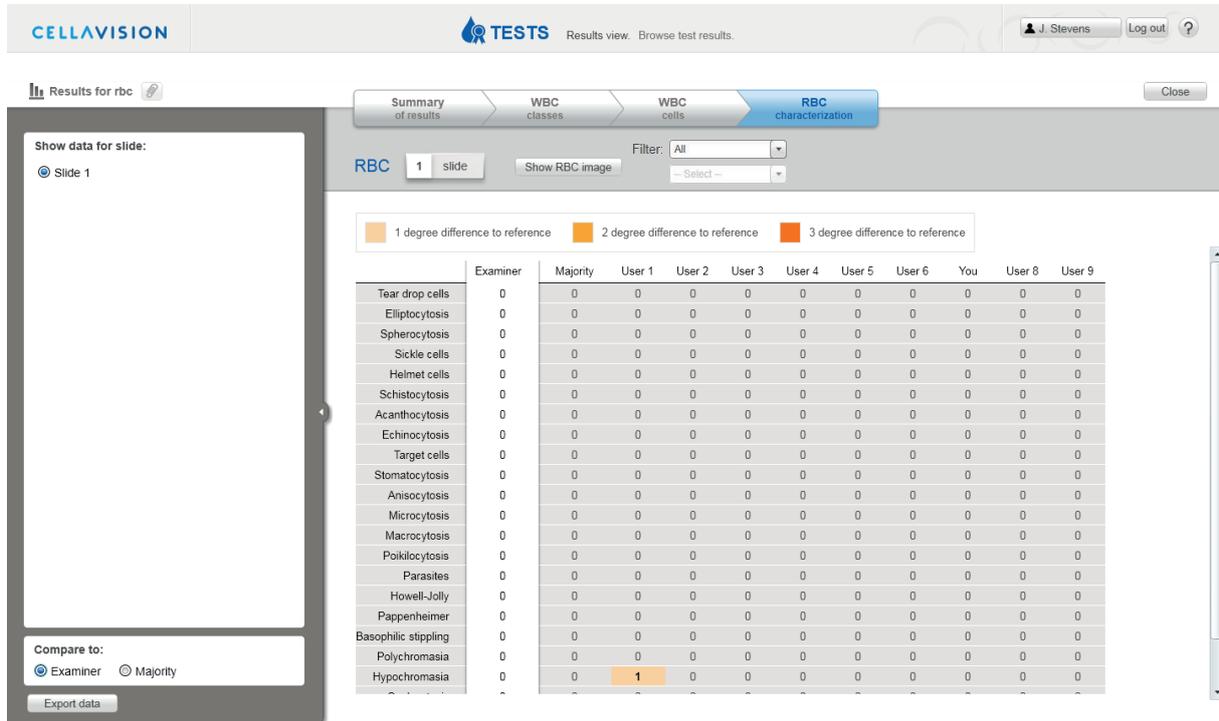
Cell comments (if available) are shown underneath the cell image.

3.3.6.3 Showing Cell Libraries

Click **Open cell class** to show all cells for that slide that were classified to this class by the Examiner.

Use the drop-down menu to change to a different class.

3.3.7 RBC Characteristics



	Examiner	Majority	User 1	User 2	User 3	User 4	User 5	User 6	You	User 8	User 9
Tear drop cells	0	0	0	0	0	0	0	0	0	0	0
Elliptocytosis	0	0	0	0	0	0	0	0	0	0	0
Spherocytosis	0	0	0	0	0	0	0	0	0	0	0
Sickle cells	0	0	0	0	0	0	0	0	0	0	0
Helmet cells	0	0	0	0	0	0	0	0	0	0	0
Schistocytosis	0	0	0	0	0	0	0	0	0	0	0
Acanthocytosis	0	0	0	0	0	0	0	0	0	0	0
Echinocytosis	0	0	0	0	0	0	0	0	0	0	0
Target cells	0	0	0	0	0	0	0	0	0	0	0
Stomatocytosis	0	0	0	0	0	0	0	0	0	0	0
Anisocytosis	0	0	0	0	0	0	0	0	0	0	0
Microcytosis	0	0	0	0	0	0	0	0	0	0	0
Macrocytosis	0	0	0	0	0	0	0	0	0	0	0
Poikilocytosis	0	0	0	0	0	0	0	0	0	0	0
Parasites	0	0	0	0	0	0	0	0	0	0	0
Howell-Jolly	0	0	0	0	0	0	0	0	0	0	0
Pappenheimer	0	0	0	0	0	0	0	0	0	0	0
Basophilic stippling	0	0	0	0	0	0	0	0	0	0	0
Polychromasia	0	0	0	0	0	0	0	0	0	0	0
Hypochromasia	0	0	1	0	0	0	0	0	0	0	0

Click the **RBC characteristics** tab to see the results of RBC characterization. Switch between **Examiner** and **Majority** in the compare to box to change the reference characterization.

The table shows the Examiner, Majority and Participant(s) characterization grades for the different morphologies. Cells with an orange background color indicate where the characterization differs from the reference. The stronger the orange color the greater the deviation.

Click **Show RBC image** to bring up the RBC image. Click outside of the image to close it.

Note:

RBC characterization results can only be viewed for one slide at a time.

3.3.8 Test Conclusions

Test conclusions are reports created externally by the Examiner and may be attached to the result of a test.

1. Double-click on a completed test in the **TESTS** tab to open the results.
2. A  button next to the test name indicates that a test conclusion is available.
3. Click on the button. The test conclusion will open in a program that supports that file type.

Appendix - A Buttons and Symbols

A.1 General

Place the mouse-pointer over any button or symbol to view a short explanation in a tooltip.

A.2 Buttons

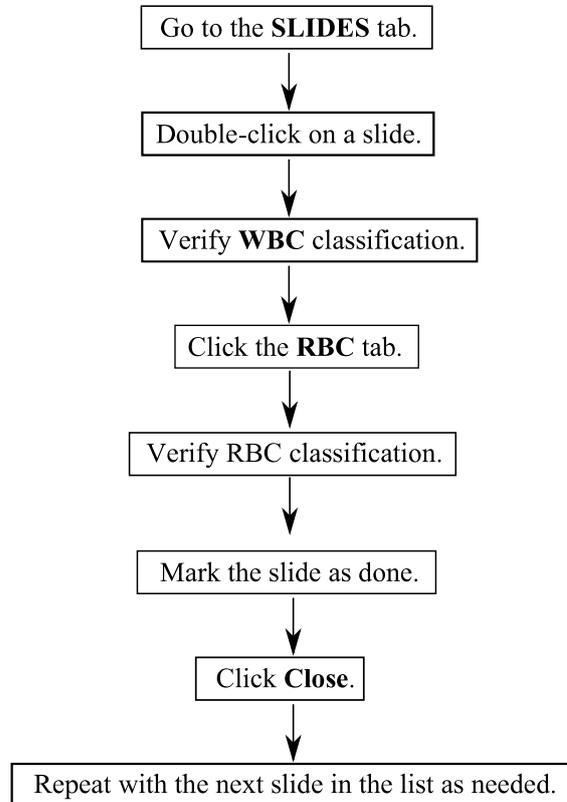
	Help.
	Delete.
	Add the selected items.
	Remove the selected items.
	Open slide verification.
	Add or edit a comment.
	Change the WBC gallery layout.
	Zoom in.
	Zoom out.
	Adjust image color and brightness.
	Show the cell markers.
	Open the attached test conclusion.
	Show next cell image.
	Show previous cell image.
	Set Lab Supervisor privileges.

A.3 Symbols

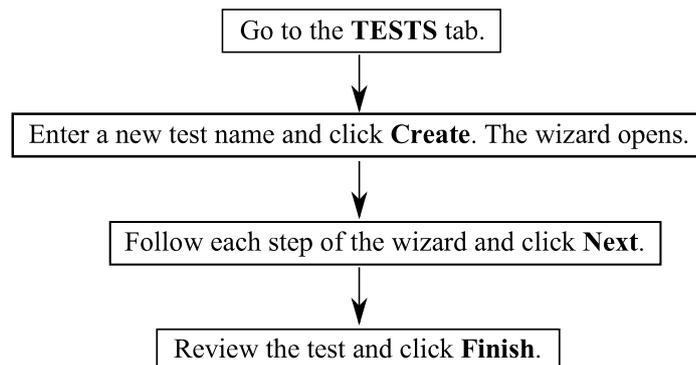
	Patient information.
	Additional slide data.
	Slide contains unclassified cells / general warning symbol.
	Slide is locked. Verification cannot be changed and the slide cannot be deleted.
	Examiner: Slide is marked as done. Participant: Slide is signed.
	Comment.
	Print.
	Trash.
	Cell ruler.
	Early access to results.
	Mark for Transfer Tool.
	Lab Supervisor.

Appendix - B Recommended Workflow

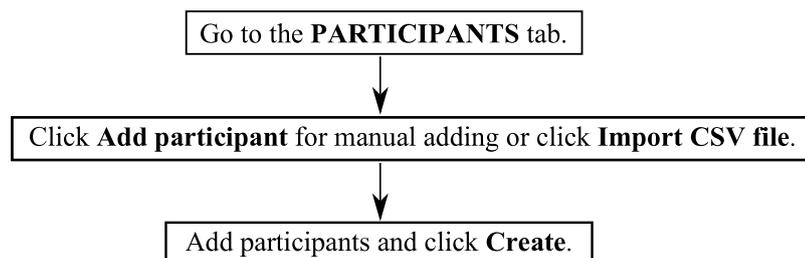
Confirm correct classification of slides (Examiner)



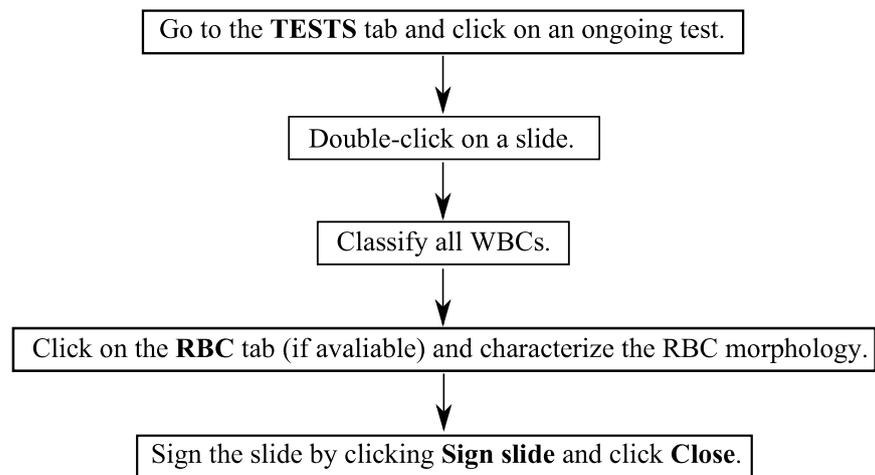
Create a New Test



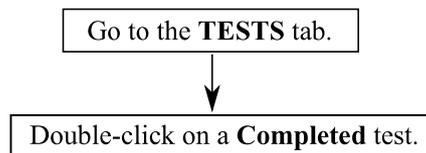
Create Participants (Examiner)



Take a test (Participant)



View Results



Appendix - C Calculations

WBC Agreement

The WBC Agreement in the **Summary of results** tab is the percentage of cells where the participant's classification agrees with the reference classification for the selected orders in the test case.

Example:

Assume that there are 200 cells in the selected orders and that the participant's classification agrees with the reference for 165 of the 200 cells. The WBC Agreement is now calculated as:

$$\frac{165}{200} \times 100\% = 82,5\%$$

Mean

The mean (average, arithmetic mean) is calculated by dividing the sum of the observations with the number of observations.

RBC Agreement

The RBC agreement measure for each Participant is calculated as follows. For all morphologies and all selected orders the maximum difference from the

reference is calculated as,
$$obs_{max} = \begin{cases} \max(3 - ref_x, ref_x - 0), & \text{if } ref_x > 0 \text{ or } ind_x > 0 \\ 0, & \text{otherwise} \end{cases}$$

where ref_x is the reference characterization and ind_x is the Participant's characterization of the morphology. Then the total maximum difference from the reference is the sum of all the differences, $diff_{max} = \sum obs_{max}$. For all slides and morphologies the absolute difference between the Participants and the reference is calculated as $ind_{diff} = |ind_x - ref_x|$.

The sum of these differences is calculated, $ind_{total} = \sum ind_{diff}$.

The RBC agreement is now calculated as:

$$RBC_{agr} = \begin{cases} 1 - \frac{ind_{total}}{diff_{max}} \times 100\%, & \text{if } diff_{max} > 0 \\ 100\%, & \text{otherwise} \end{cases}$$

Example:

The table below shows how the RBC agreement is calculated for one slide.

Morphology	Reference Characterization	Participant Characterization	<i>obs</i> _{max}	<i>ind</i> _{diff}
Polychromasia	3	3	3	0
Hypochromasia	3	2	3	1
Anisocytosis	3	1	3	2
Microcytosis	3	0	3	3
Marcocytosis	2	3	2	1
Poikilocytosis	2	2	2	0
Target cells	2	1	2	1
Schistocytosis	2	0	2	2
Helmet cells	1	3	2	2
Sickle cells	1	2	2	1
Spherocytosis	1	1	2	0
Elliptocytosis	1	0	2	1
Ovalocytosis	0	3	3	3
Tear drop cells	0	2	3	2
Stomatocytosis	0	1	3	1
Acanthocytosis	0	0	0	0
Echinocytosis	3	3	3	0
Howell-Jolly	2	2	2	0
Pappenheimer	1	1	2	0
Basophilic stippling	0	0	0	0
Parasites	1	1	2	0

$$diff_{max} = \frac{ind_{total}}{20} = \frac{20}{46}$$

The RBC skillfulness is: $1 - \frac{ind_{total}}{diff_{max}} \times 100\% = 1 - \frac{20}{46} \times 100\% = 56,5\%$

Appendix - D Glossary

Term	Description
Examiner	The person assessing proficiency.
Participant	The person taking the proficiency tests.
Lab Supervisor	A Participant given allowance by the Examiner to view the test results with Participant names within a specific category.
Examiner result	The WBC classification and/or RBC characterization performed by the Examiner.
Majority result	The result decided by the majority of the participants.
WBC	White blood cells, leukocytes.
RBC	Red blood cells, erythrocytes.
Non-WBC	Cells and objects identified as not being WBCs.
WBC Agreement	WBC Agreement shows how well the Participant's classification agrees (percentage) with the reference.
RBC Agreement	A measure that describes how close to the reference result a Participant has characterized the RBC.
Classification	The process of assigning WBCs to pre-defined classes.
Characterization	The process of assigning RBCs to pre-defined classes.
Verification	The process of verifying existing cell classifications and/or (re-)classifying WBCs.
Reference cells	Cells displaying typical characteristics for their class.
Reference results	The Examiner result or the majority result depending on the context which it appears in.
Signing	Finally confirming analysis results before locking and reporting them.
Unidentified	A cell class for cells and objects which are not yet classified.

A		P	
access to results.....	9	Participants.....	1
Available Participants	6	Password	3
Available slides	5	Patient Information	9, 23
		Progress Bar	10
		Progress Grid	10
C			
Cell Marker	42	R	
classification disagreements.....	17	RBC Agreement.....	12
collapse/expand.....	12	RBC Characteristics.....	19
Compare Individuals.....	18	reference.....	11
Completed.....	5	reference cell.....	27
CSV File.....	30	reference cells	9
		Reference Libraries.....	27
		ruler	28
D			
databases	20	S	
distribute the test.....	7	slide data	9
		Slide Data.....	9, 23
E		sort.....	5, 10
End test.....	10	Stop	5, 10, 35
Examiner	1		
Examiner result	11	T	
		Test Comment	10
F		Test Conclusions	20
Full Account.....	2	Test Duration.....	9
		Test End Date.....	9, 11
L		test preferences.....	6
Lab Supervisor	32	Test results	44
license	2	Transfer Tool.....	21
Logging in.....	3, 36	Trash.....	27
		Trash class.....	27
M		Trial Account	2
Majority result.....	11		
		U	
N		Under Construction.....	4
New Test	5, 8, 11	User-defined Classes.....	25, 34
notification email	7		
		W	
O		WBC Agreement.....	12
Ongoing.....	4	WBC Cells	17
		WBC Classes	14
		Workflow	55–56



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