Resolvigen 4

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Table of Contents

List of Figures

List of Tables

Chapter 1. Introduction

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5. Updates. If the Software is an update of a previous version, the license is transferred from the old version to the update. Only the update can be used, unless the update is destroyed.

6. Separation of components. The Software is licensed as a single product. Components cannot be separated.

7. Limitations. The User cannot convert, decode, decompile or disassemble the Software, except for what is explicitly requested by applicable laws.

2. How to get support

Resolvigen 4 is distributed by Ortho-Clinical Diagnostics:

Table 1.1. Ortho-Clinical Diagnostics

Australia	Ortho-Clinical Diagnostics Australia Pty Ltd 8 Nexus Court, Nexus Corporate Park, Mulgrave VIC 3170 Australia
Benelux	Ortho Clinical Diagnostics Parklaan 22, bus 10 2300 Turnhout, Belgium Email: orders.be@orthoclinicaldiagnostics.com Phone Flanders: 014 600 301 Phone Wallonia: 014 600 303
France	Ortho Clinical Diagnostics

	8, rue Rouget de Lisle CS60066 92442 Issy les Moulineaux cedex France
Germany	Ortho-Clinical Diagnostics GmbH Bahnhofstrasse 54 D-69151 Neckargemünd Germany
Italy	Italy Ortho Clinical Diagnostics Viale Fulvio Testi, 280 20126 Milano, Italy Phone 0284220300 Fax 0284220392
Korea	Ortho-Clinical Diagnostics Singapore Pte. Ltd. Korea Branch Office 3rd Floor, Hangangdaero 366, Yongsangu, Seoul, South Korea (Dongjadong, Twincitiy Namsan)
Philippines	Ortho-Clinical Diagnostics Philippines Inc. 4th Floor, Five E-Com Center, Unit 404-P, Pacific Drive, Pasay City, Manila Philippines
Portugal	Ortho Clinical Diagnostics Portugal Unipessoal, Lda. Lagoas Park - Edificio 5, Torre B, Piso 2 2740-245 Porto Salvo PORTUGAL Phone: +351 210961108
Singapore	Ortho-Clinical Diagnostics Singapore Pte Ltd The Synergy, 1 International Business Park, Units #01 11/12, Singapore 609917
Spain	Ortho Clinical Diagnostics Avenida Partenón 10, 3# planta. Campo de las Naciones 28042 Madrid Fax:+34 918312005 Phone: +34 912992418
Thailand	Ortho-Clinical Diagnostics (Thailand) Lrd Interlink Tower, 1858/149, 1858/11, Bangna-Trad Rd, Bangna, Bangkok 10260 Thailand
United-Kingdom	Ortho Clinical Diagnostics Jubilee House Third Avenue Globe Park Marlow Buckinghamshire SL7 1YW Phone: +44 (0) 1628 485122 Fax: +44 (0) 1628 487493 Email: ocduk@orthoclinicaldiagnostics.com

Trained product specialists are ready to answer your questions

Table 1.2. Ortho-Clinical Diagnostics: Technical support

Austria	0 810 001189	ocdtechsupport-de@orthoclinicaldiagnostic-s.com

BeNeLux (Belgium French speaking)	0800 17 528	
BeNeLux (Belgium Dutch speaking)	0 800 17 963	bnlhotline@orthoclinicaldiagnostics.com
BeNeLux (The Netherlands)	0 800 02 23 579	bnlhotline@orthoclinicaldiagnostics.com
BeNeLux (Luxembourg)	800 222 738	bnlhotline@orthoclinicaldiagnostics.com
France	03 88 65 47 33	hotlinefrance@orthoclinicaldiagnostics.com
Germany	0 800 181 48 97	ocdtechsupport-de@orthoclinicaldiagnostic-s.com
Irish Republic	00 800 08372560	ukhotline@orthoclinicaldiagnostics.com
Italy	800 870 655	italianhl@orthoclinicaldiagnostics.com
Nordic	00 800 08372560	nordichotline@orthoclinicaldiagnostics.com
Poland (support by Diasorin Pologne)	+48 22 223 62 65	service_pl@pl.diasorin.com
Portugal	800 83 31 43	port_ocdhotline@orthoclinicaldiagnostics.com
Spain	900 973 325	spanishhotline@orthoclinicaldiagnostics.com
Switzerland	0 800 820120	SwissHotline@orthoclinicaldiagnostics.com
UK	0 800 895 963	ukhotline@orthoclinicaldiagnostics.com

Resolvigen 4 is a product of Tecnosoft srl. You can get support from the Resolvigen Internet site:

www.resolvigen.com

Or by mail at:

<software@resolvigen.com> (for software related questions)

<diagnostics@resolvigen.com> (for immunohematology related questions)

3. Colophon

The core functionality of Resolvigen 4 is the identification of antibodies directed against RBC antigens. The design of this function builds on years of experience gained with Resolvigen 2 and Resolvigen 3, and further extends both sensitivity and number of antibodies examined.

Resolvigen 3 extended the analysis of scores to identify antibodies in complex mixes and included procedures to aid the identification of antibodies directed against high frequency antigens.

Resolvigen 4 improves on both these areas and procedures for identification of antibodies against public antigens have been updated capitalizing on the wealth of information that has recently become available. The on-line documentation has been extended accordingly and now includes about 300 antibodies; the documentation is linked to the program so that a complete description for any antibody is just a click away.

The support functions of Resolvigen have also been improved:

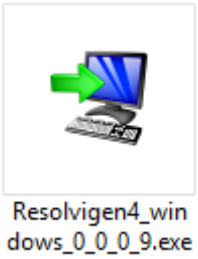
- It is now possible to share data among different copies of Resolvigen 4 running on different computers using a client-server database system.
- A standard format for the diagnosis allows exporting results to LIS (Laboratory Information System).
- Backup and restore functions have been integrated in Resolvigen: there is no need for an external tool.
- Reports can be customized
- A graphical explanation of the results can be displayed on panels.

Chapter 2. Installation

1. Software installation

To install Resolvigen 4 insert the CD in the drive; if the installation does not start automatically, open the CD folder on your Windows desktop and double click on the installation icon.

Figure 2.1. The installation icon

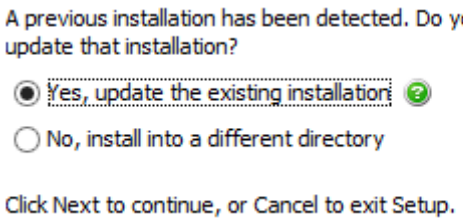


The four numbers in the filename are the version number of the Resolvigen 4 program; after the first installation you will be able to upgrade to the latest available version selecting the +**Help** → **Update** menu item.

The installation program will start and ask you to select the installation language; this is the language used for the installation: Resolvigen 4 will always install all the available languages.

If a previous version of Resolvigen 4 is already installed on the computer, the installation procedure will ask if you wish to upgrade the existing installation or install a new copy of Resolvigen 4 in a different directory.

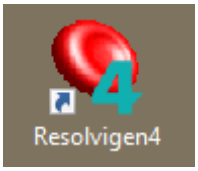
Figure 2.2. Upgrade or install in a different folder



The first option is the default as there is usually no reason to keep two different versions of Resolvigen 4 on the same computer.

At the end of the installation program a new icon will be available on your desktop.

Figure 2.3. The Resolvigen 4 icon



Insert the hardware protection key in any free USB port, wait a few seconds for the key to install and double click on this icon to run Resolvigen 4.

2. The hardware protection key

Resolvigen 4 comes with an hardware protection key; this key does not need installation: just plug it into a free USB port of your PC and wait a few seconds for Windows to recognize it.

The key is used to store:

- The master password: this is the password of the user **root**; this user has the possibility to configure Resolvigen 4 and to manage other users.
- The scramble key: this key is used to encrypt user passwords.

All keys come with both master password and scramble key set to "RESOLVIGEN". You may decide to change them:

1. Select +**Access** → **Change user** to login as **root**; the default password is "RESOLVIGEN". The status bar at the bottom of the Resolvigen 4 window should become orange.
2. Select +**Access** → **Change security setup** to change security settings; Resolvigen 4 will display a page in which you may enter the new password and data protection scramble key; you will have to enter the old password in the **Access** block and then enter the new password in the **Access data** block or the new scramble key in the **Data protection** block. In both cases you will need to enter data twice before confirming it by clicking the **Change** button in the same block.

In a networked installation, it is essential that all PCs connected to the same database share the same scramble key, otherwise the passwords entered on one PC will not be recognized by other PCs.

3. Configuring the data store

Resolvigen 4 may be configured to store data either in the local file system or in a client-server database; the latter option requires that a client-server database is configured by the system administrator and is useful in an environment in which different users need to use Resolvigen 4 on different computers sharing the same database.

When storing data in your local file system, you must consider if it will always be used with the same login, that is the same Windows user, or with different logins.

Windows may store user data in different locations:

- A user directory, that is a subdirectory of `C:\USERS`; this directory is different for any Windows user, that is: if there are two users, say SALLY and JOE, the first will store her data in `C:\USERS\SALLY` and the second in `C:\USERS\JOE`; as a consequence each one will only see her or his data and will be unable to see the data entered when the other user is logged in the computer. This only applies to the case in which each user logs in with a different Windows account: if everyone logs in with the same account, say GUEST, everyone will be able to access user data in `C:\USERS\GUEST`.
- A directory different from any system or program directory: a directory used for this on most system is `C:\PROGRAMDATA`; this is probably the ideal solution unless your system administrator has decided to disable such directories.

When using a local database, it is preferable to use it for indexing, while storing data in dedicated subdirectories: a local database tends to be more brittle than a client server database, and a simple power failure may cause a disaster.

Normally Resolvigen 4 stores data in five different subdirectories of a base RESOLVIGEN directory which may be located either in the user directory or in the `C:\PROGRAMDATA` directory.

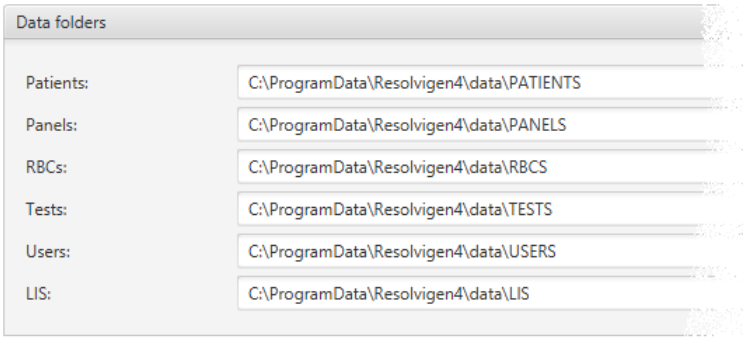
- RESOLVIGEN\PATIENTS: for storing data files for patients.

- RESOLVIGEN\PANELS: for storing data files for diagnostic panels.
- RESOLVIGEN\RBCS: for storing data files for rare RBCs.
- RESOLVIGEN\TESTS: for storing data files for tests.
- RESOLVIGEN\USERS: for storing data files for users' access credentials.

The database used for indexing data is normally stored in the RESOLVIGEN directory.

To configure Resolvigen 4 storage select the +**File** → **Configure** menu option; in the **File** page configure the **Data folders** entries:

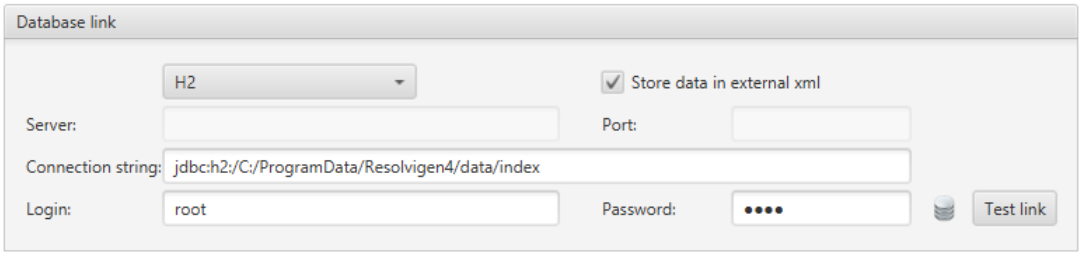
Figure 2.4. Data folders configuration



The last folder in this group (namely the LIS folder) is the folder used to export results to the Laboratory Information System.

Then select H2 as the database engine (MySQL is the engine used for the client-server configuration).

Figure 2.5. Database configuration



Resolvigen 4 will try to select a folder for storing the database tables automatically, but if you prefer you may enter a different folder in the **Server** field.

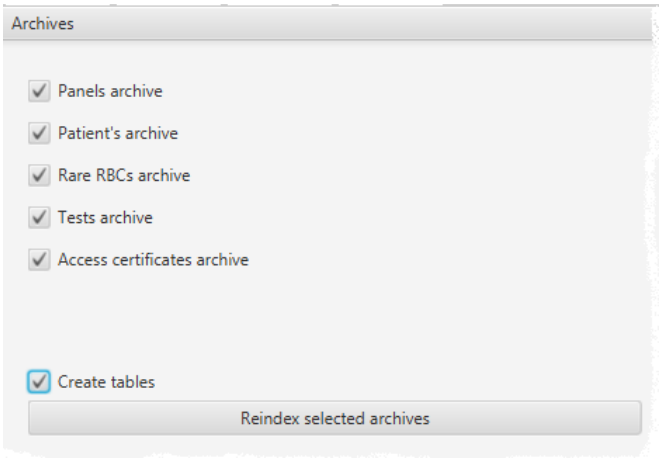
Make sure that the **Store data in external xml** checkbox is checked; in a local database you may wish to leave the **Login** and **Password** fields blank: this is absolutely not recommended with a client server database.

To test the database operation, click the **Test link** button: the icon at its left should become green.

4. Updating indexes

To update the indexes after changing the storage configuration, select the +**File** → **Reindex files** item.

Figure 2.6. Reindexing the archives



Select the checkmarks as in the above image, make sure that the **Create tables** checkmark is selected, then click the **Reindex selected archives** button.

When the operation is completed you may close this page clicking the **Close** button.

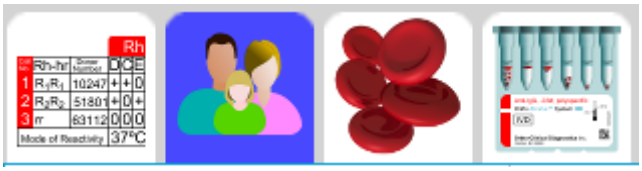
Chapter 3. Getting started

Resolvigen 4 is a very advanced software package and as such it offers several different functions; this chapter focuses on the more basic and commonly used features.

1. The main window

When Resolvigen 4 is started, the main window displays the content of the archives; four different archives are used to store Panels, patients, RBCs and tests. Several icons are located in a bar just under the top menu; the first four icons select the archive displayed in the main window, while the remaining icons are a shortcut for the most commonly used operations.

Figure 3.1. The archive buttons



The active archive may be selected by clicking one of the four archive icons in the toolbar; the following archives are used by Resolvigen 4:

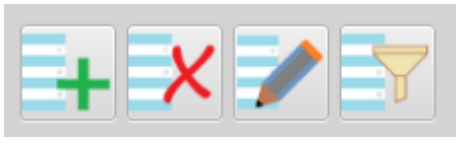
- Panels archive: this archive contains the diagnostic panels used in Resolvigen 4; the Panels are normally downloaded from the Internet to be imported in Resolvigen 4; when performing a test, some panels will normally be added to test data and reactions of patient's serum with each RBCs sample on panel will be marked.
- Patients' archive: this archive contains the personal data for each patient and the immunohematological characteristics of his or her RBCs; self RBCs are essential in solving some tough antibody identification problems.
- RBCs archive: this archive contains data for different RBCs samples that may be used after Panels for antibody identification. If data for frozen RBCs are stored in this archive, Resolvigen 4 will support in the search for the correct RBCs sample to add to Panels or to use for an adsorption and elution process.
- Tests archive: this archive will contain data for all tests entered in Resolvigen 4; data may be entered manually or imported directly from the Innova

A fifth archive containing data for users registered for using Resolvigen 4 is available; this archive is available through the Access menu.

The active archive may also be selected through the corresponding items of the **File** menu.

When an archive is displayed in the main window, four buttons are available in the toolbar for editing the content of the selected archive.

Figure 3.2. The editing buttons



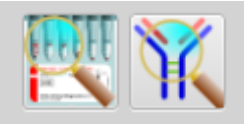
These buttons allow you to:

- Add a new item to the archive: the type of item added, a Panel, a patient or an RBCs sample, depends on the currently selected archive. For a new patient or a new RBCs sample, Resolvigen 4 will open a blank form; for Panels it will open a form to select which Panels to import.

- Delete the currently selected item or items.
- Edit the currently selected item.
- Select which items to display based on some search criteria, that depends on the types of the items listed,

When a patient is selected in the patients archive, two additional buttons are available, for managing patient's tests.

Figure 3.3. The new test and browse tests buttons



These buttons allow you to:

- Browse tests performed for the selected patient in the past.
- Enter data for a new test.

Finally four buttons are available to access the online manual.

Figure 3.4. The help system buttons

These buttons will open:

- The user manual.
- The antibody documentation: identification hints, serological characteristics, clinical significance and bibliographic information is available for over 300 antibodies.
- Step by step instructions for 47 procedure are available.
- Context sensitive help for the current operation.

The name of the currently logged user is displayed at the right bottom corner of the main window.

Figure 3.5. The currently logged user

The user is initially set as **guest**; depending on your security settings this user may or may not be enabled to perform various operations; double click on this label to login as a different user.

2. Importing Panels: step 1, download panels from Internet.

Diagnostic panels are required for antibody identification; you may download panels from the **www.eantigram.com** site.

After accessing the site with a browser (for example Microsoft Explorer):

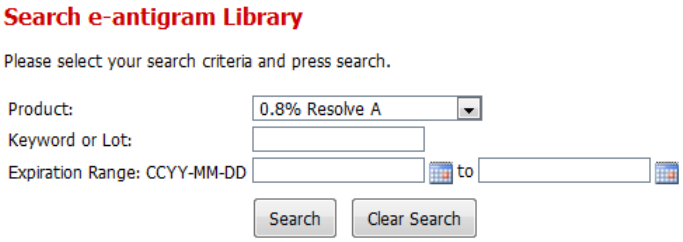
1. Select your country and language.

2. Login with the credentials that you have received from OCD

3. In the **ORTHO PLUSSM Applications** menu at the top select **e-Antigram**

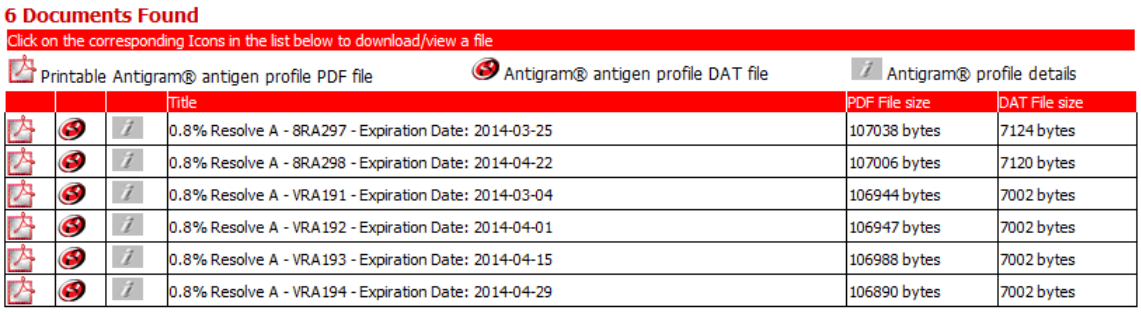
The browser will display a page for selecting the Panels you need:

Figure 3.6. The Antigram selection page



After entering your search criteria, click **Search**; the browser will display a list of the Panels matching your request.

Figure 3.7. A list of Panels



You may download an Acrobat PDF printable file if you wish, for your reference; Resolvigen 4 needs the Antigram® antigen profile DAT file, which may be downloaded by clicking the eAntigram icon in the row of the desired Panel.

Figure 3.8. The eAntigram icon

You will then be requested to confirm that the selected Antigram is the desired one; click **OK** and save the file in the desired location.

Antigrams for expired panels are removed from this site; so you should download antigrams before the expiration date.

3. Importing Panels: step 2, import .DAT files.

Make sure that the Panels archive is selected in the main window; then click the **Add** icon; Resolvigen 4 will display the Panel import window.

in the topmost part of this window select the type of files you wish to import:

- Resolvigen 2: this is the type of distribution file used by Resolvigen 2
- Resolvigen XML: this is the XML compliant file format used by Resolvigen 3
- OCD files: this is the type of distribution file used by OCD, that can be downloaded directly from the eAntigram.com site.

The next box shows the folder currently used for importing files; to change this folder click on the **Change** button. Resolvigen 4 will display a folder selection window: select the desired folder and click **Open**. You may conveniently set the default for the import folder to match the folder in which you usually store files downloaded from the Internet, so that files downloaded from eAntigram.com as described above are immediately available. The default import folder may be set in the configuration page.

Just below a list of the panels of the selected type available in the selected folder is shown; by default all the listed panels are selected. To select a single panel, click on it; to select a range of panels, click on the first one, then press the shift key and click on the last; to select a different set of panels click on the first one, then press the Control key and click on as many additional panels as desired. Click **OK** to import the selected Panels.

Click the Reload button if you have added files to the folder or for any reason the files in the selected folder have changed.

Panels in OCD format are digitally signed; Resolvigen 4 stores certificates used for validating the digital signature; these certificates are periodically replaced with new ones; if the certificates stored in Resolvigen 4 are not up to date, it will be impossible to import new panels; in this case you will need to update the certificates as described in Chapter 12, Section 4: Managing digital signature certificates.

4. Adding a patient

Select the patients' table, then click on the **Add** button in the toolbar or select +**Patients** → **Add patient** to add a new patient.

Resolvigen 4 will display a Patient data page which allows editing both the personal and the clinical data for a new patient.

In the uppermost part of the window Personal data for the patient can be edited, including:

- Family name
- First name
- Middle name
- Birth date
- Birthplace
- Hospital code (PID)

In the top right part of the window the user can enter notes about the patient. Try to put as much information as possible in the other fields and only use this free form field for data that does not fit anywhere else.

Close to the bottom of the window, in the group box named **Clinical data** the user can enter:

- ABO group: click on the drop-down list-box to display a list of the available groups and select the relevant one; available groups include unknown (blank), O, A, A1, A2, B, AB, A1B, A2B and Oh (Bombay).

- Race: click on the drop-down list-box to display the available races and select the relevant one; available races include unknown (blank), Caucasian, Black and Asiatic; race is relevant for the different incidence of certain antibodies for individuals of different races.

- Antigenic profile for patient's RBCs: refer to Chapter 9, *Editing antigenic profile and reactivities* for details.

When you are finished editing patient's data, click **OK** to add the new patient to archives or **Cancel** to dismiss the dialog without saving any data.

5. Performing a test

Antibody identification tests are obviously the main focus of Resolvigen 4; several procedures are available within the test framework, like identification of antibodies against public antigens, for example. The normal routine operation anyway, will be entering data on a screening and an identification panel and asking Resolvigen 4 to provide the most reasonable explanation for the observer reactions. The more advanced features are explained in Chapter 8, *Antibody identification tests*.

Select a patient in the patients' page, then select +**Patients** → **New antibody identification test** or click the antibody identification icon to open the page for a new test.

Figure 3.9. The antibody identification icon

The Antibody identification test window contains four group of items: **Patient's data**, **Test data**, **List of tests** and **Select new test**.

The **Patient's data** group contains data identifying the patient whose sample is being tested.

The **Test data** group contains additional data to identify the test; these data may be used to distinguish different tests performed for the same patient:

- **Sample date**: this field may be used to mark the date in which the sample was sampled.

- **Test date**: this is the date in which the test was created; this date can not be edited by the user.

- **Test code**: this code may be used to identify the test; it is normally different from the patient's code: the test code should vary from test to test, while the patient's code should remain constant for a long time, possibly for the lifetime of the patient.

The **Select new test** group items are used to select new items to be added into the **List of tests**. Different types of items may be selected. Depending on the type of item selected further data may be required to identify the specific object to use.

Select the item type in the **Type** list-box.

The more commonly used types are:

- Screening panels: SurgiScreen, BioVue Screen and Selectogen

- Identification panels: Panel A, Panel B, Panel C, BioVue Top, CNRGS France and EFS France

Since this is an identification procedure, you would probably have results from an identification panel by now, but you would also have the results of the screening panels that was performed first; entering data also for the screening panel, will supply Resolvigen 4 with more information useful for identifying the antibodies in mix.

In the **Select new test** group select the screening panel type in the **Type** field, then select the specific panel in the list below. Click the **Add** button: the panel will be added in the **List of tests** on the left.

By default expired panels will not be listed; in case you need to enter data for an expired panel, mark the **List expired panels** check box.

In the same way you may add an identification panel to the **List of tests**.

You need now to add reaction scores to the panels; double click on a panel in the **List of tests** to display the antigram; the look of the antigram closely resembles the printed version. On the right you may enter the scores: identify the phase for the reaction on the top of the **Test results** area and enter results in the cells in that column for each RBCs sample.

You may enter results using either the keyboard or the mouse:

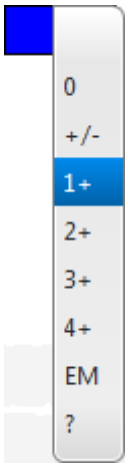
- Using the keyboard: move to the cell in which you need to enter the score, using the arrow key (also the **Home**,**End**,**PgUp**and **PgDn** keys work as expected) and type the key for the score:

Table 3.1. Reaction scores

Score	Key
0	**0**
+/-	**-**
1+	**+** or **1**
2+	**2**
3+	**3**
4+	**4**
Hemolized	**H** or **E**
Unknown	**?**
Undefined	**SPACE**

- Using the mouse: double click with the left mouse button on the cell in which you need to enter the score and select the score from the popup list.

Figure 3.10. Selecting scores from a list

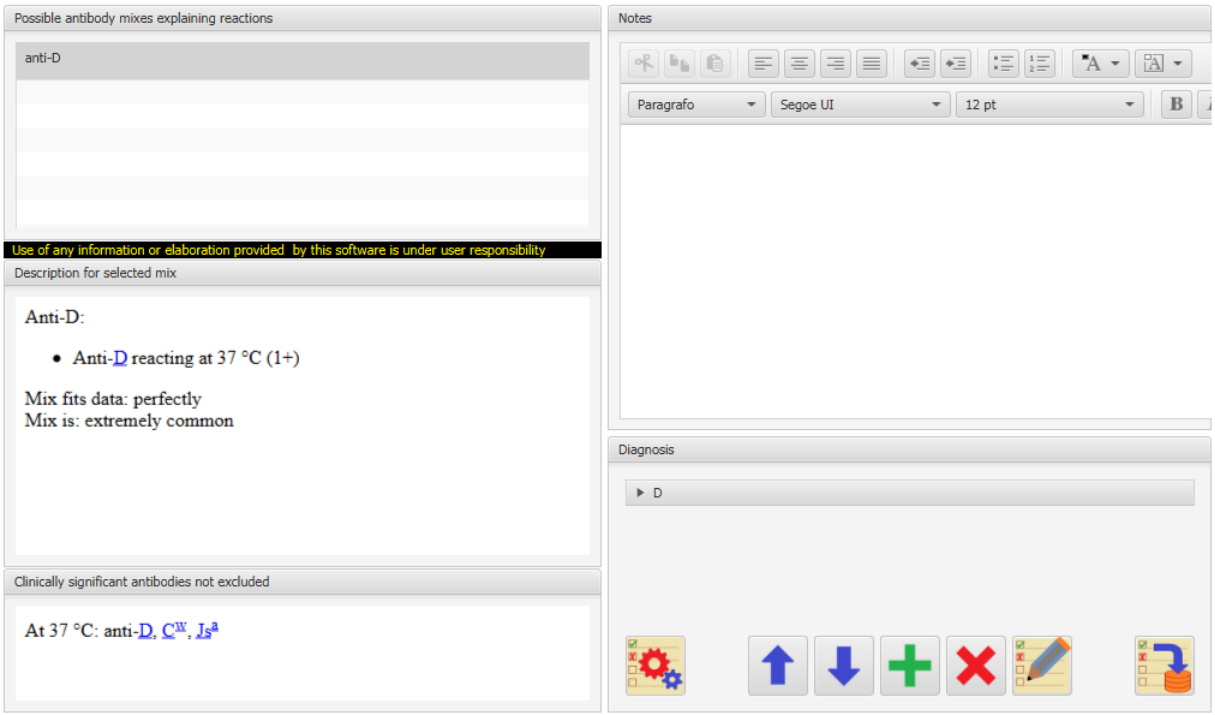


When you are finished entering the scores click the **OK** button.

You should enter results for all the panels, for all the test phases you have performed: Resolvigen 4 can cope with missing data, but the more data are available, the better.

When you are finished, click the **Diagnosis** button; after a few seconds Resolvigen 4 will display a new page.

Figure 3.11. The results page



In a list at the top left corned of the page, Resolvigen 4 lists all the possible mixes of antibodies that can justify the observed reactions. Below appears a detailed description of the selected mix.

Depending on the data available, more mixes can be displayed; click on a mix to display a detailed description for it.

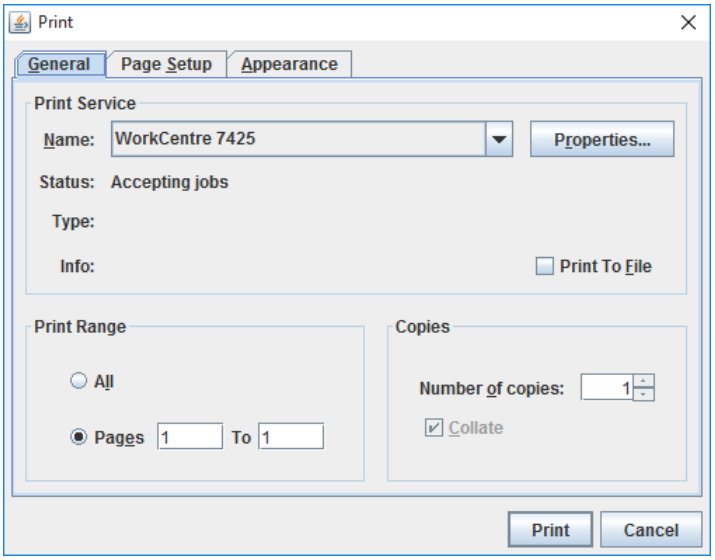
It is responsibility of the user to determine if a mix is the correct answer for the problem: Resolvigen 4 just suggests the more reasonable possibilities.

6. Printing

Two commands are available in the **File** menu to support printing: +**File** → **Print list** and +**File** → **Print list preview**. These commands are used to obtain printouts of the currently displayed list: Panels, Patients, Rare RBCs or Tests.

The **Print list** command will display a window for selecting a printer and configuring the printout parameters.

Figure 3.12. The printer selection window



Clicking the **Print** button will generate a printout on the selected printer.

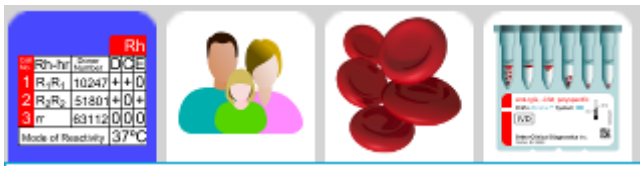
The **Print list preview** commands will generate a preview for the requested report.

Detailed printout

Two commands, **Print details** and **Print details preview**, are available in the menu for the currently displayed items (**Patients**, **Panels**, **Rare RBCs** and **Tests**); these commands are used to print and preview reports for each item that is currently selected in the main window; the exact form of the report depends on the customizable report format.

Chapter 4. Panels

Click on the **Panels** tab at the top of the window (or select **Panels** in the **File** menu).



The data area of Resolvigen 4 window will show a table view of the currently available panels with code, type of panel and expiry date.

Figure 4.1. The Panels page

Code	Type	Expiry
8RA301	Panel A	15-Jul-2014
8RB301	Panel B	15-Jul-2014
8RC278	Panel C	12-Aug-2014
8S865	SelectoGen	15-Jul-2014
BVS283	BiovueScreen	12-Aug-2014

When the panels archive is selected, the **Panels** menu is displayed; this menu has items to perform various operations on panels; note that some operations require that some panel is selected in the table, so, if no item is selected, they will be disabled. To make these menu items active, select one or more panels in the table by clicking on the corresponding row.

The table will be empty if no panel has been loaded yet or if all loaded Panels have expired. Note that, by default, Resolvigen 4 only displays valid panels. To show expired panels as well, uncheck the **Valid Panels only** checkmark at the bottom of the page.

To order the list of panels according to a specific column, click on the title of the column; clicking a second time reverses the order in which panels are listed.

1. Importing Panels

Click on the **Add** button in the toolbar or select +**Panels** → **Import** to show the Import Panels page; in the topmost part of this page select the type of files you wish to import:

- Resolvigen 2: this is the type of distribution file used by Resolvigen 2
- Resolvigen XML: this is the XML file format natively used by Resolvigen 3 and Resolvigen 4.
- OCD files: this is the type of distribution file used by OCD USA. Panels in this format may be downloaded from the eAntigram.com Internet site.

The **Import from folder** area shows the folder currently used for importing files; to change this folder click on the **Change** button.

Just below a list of the panels available in the selected folder is shown; by default all the listed panels are selected. To select a single panel, click on it; to select a range of panels, click on the first one, then press the shift key and click on the last; to select a different set of panels click on the first one, the press the **Control** key and click on as many additional panels as desired. Click the **Reload** button if for any reason the files in the selected folder have changed. In order to import OCD files, you must first load OCD digital signature certificates (see Change Security Setup (Root Only) paragraph.

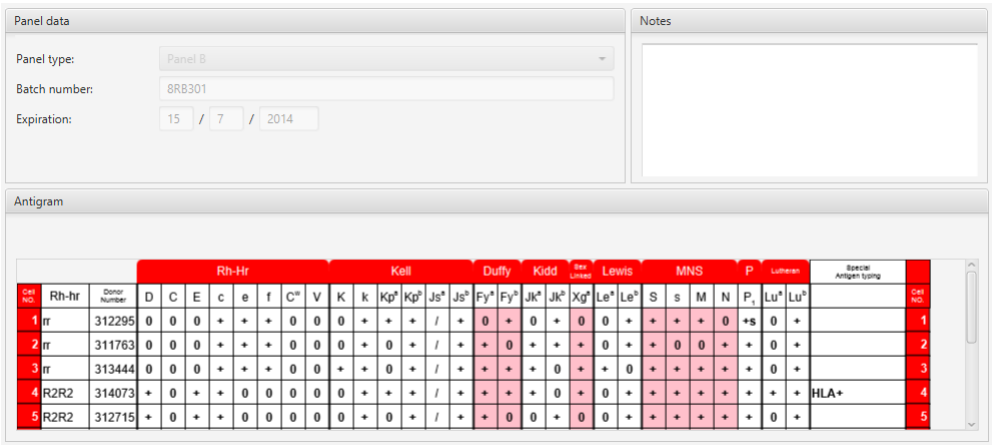
Panels in OCD format are digitally signed; Resolvigen 4 stores certificates used for validating the digital signature; these certificates are periodically replaced with new ones; if the certificates stored in Resolvigen 4 are not up to date, it will be impossible to import new panels; in this case you will need to update the certificates as described in Access and security settings.

2. Viewing a panel

In order to view details about a given panel, double click in the list or select it and then select +**Panels** → **Show panel**.

Resolvigen 4 will display the Panel in the main page: at the top the panel type (SELECTOGEN®, SURGISCREEN®, BioVue® Screen, Panel A, Panel B or Panel C), lot number, expiration date and notes; below the antigram for the panel is displayed.

Figure 4.2. The Panel View page



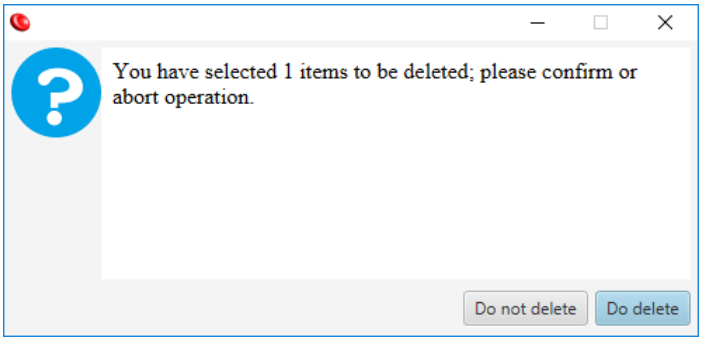
Some BioVue® Screen panels distributed in Europe list antigenic expressions for MNS system antigens in the MNSs order; for consistency, Resolvigen 4 always displays these antigens in the same SsMN order used by all other OCD panels.

Click **Close** to dismiss this page.

3. Deleting a Panel

To remove one or more panels select the related rows in the main window, then select +**Panels** → **Delete**.

Figure 4.3. The delete Panels confirmation window



Resolvigen 4 will show a window asking you to confirm the requested operation; click **Do delete** to remove the selected panels or **Do not delete** to abort the operation.

a complete copy of all panels used for a given test are stored with that test, so even if a panel is removed from the archives, it is still possible to browse the antigenic profile and reactivities for that panel within the same test; anyway, it will not be possible to add that panel to a new or existing test.

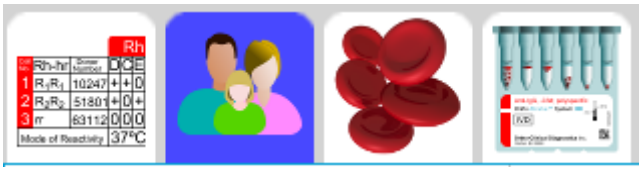
4. Printing a panel

Select one or more panels in the main window, then click +**Panels** → **Print item** to print all the selected items. Resolvigen 4 will display a standard print setup window: select the printer you wish to use and click **OK**. One page will be printed for each selected item, including both the identification information and the Antigram.

If you wish to see a preview of the printout before printing, click +**Panels** → **Print item preview**.

Chapter 5. Patients

Click on the **Patients** icon or select **Patients** in **File** menu.



The data area of Resolvigen 4 window will show a table view of patients with Name, date of Birth, Birthplace and Nosographic.

Figure 5.1. The patients page

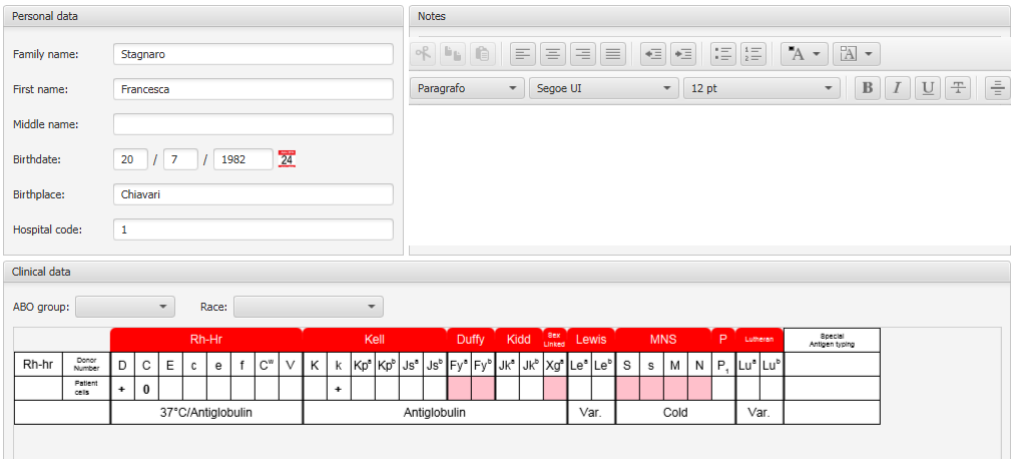
Name	Birthdate	Birthplace	Nosographic
Magnaghi Carlo	15-May-1961		35517
Stagnaro Francesca	20-Jul-1982	Chiavari	1

When the Patients archive is selected, the **Patients** menu is displayed; this menu has items to perform various operations on patients; note that some operations require that some patient is selected in the table, so, if no item is selected, they will be disabled. To make these menu items active, select one or more patients in the table by clicking on the corresponding row.

1. Adding a new patient

Click on the **Add** button in the toolbar or select +**Patients** → **Add** to add a new patient.

Figure 5.2. The patient's edit page



In the uppermost part of the page Personal data for the patient can be edited, including:

- Family name
- First name
- Middle name
- Birth date

- Birthplace
- Hospital code (PID)

In the top right part of the window the user can enter notes about the patient. Try to put as much information as possible in the other fields and only use this free form field for data that does not fit anywhere else.

Close to the bottom of the page, in the group box named **Clinical data** the user can enter:

- ABO group: click on the drop-down list-box to display a list of the available groups and select the relevant one; available groups include unknown (blank), O, A, A1, A2, B, AB, A1B, A2B and Oh (Bombay).
- Race: click on the drop-down list-box to display the available races and select the relevant one; available races include unknown (blank), Caucasian, Black and Asiatic; race is relevant for the different incidence of certain antibodies for individuals of different races.
- Antigenic profile for patient's RBCs: refer to Chapter 9, *Editing antigenic profile and reactivities*.

When you are finished editing patient's data, click **OK** to add the new patient to archives or **Cancel** to dismiss the page without saving any data.

2. Edit Patient

In order to edit data for a patient, select the patient's row in the main window, then select +**Patients** → **Edit patient** , or just double click on patient's row.

Resolvigen 4 will display the same Patient data page described in the Section 1, “Adding a new patient” paragraph, only all fields will be preset with data stored for the selected patient. When you are finished editing a patient's data, click **OK** to save changes or **Cancel** to dismiss the dialog without recording changes.

3. Delete Patient

To remove one or more patients from the archives select the related rows in the main window, then select +**Patients** → **Delete Patient**.

Resolvigen 4 will show a window asking you to confirm the requested operation. Click **Do Delete** to remove the selected patients or **Do Not Delete** to abort the operation.

a complete copy of a patient's data is stored with test data when a test for a patient is performed; so, even if a patient is removed from the archives, patient data is still stored with each stored test. When opening an existing test for browsing, Resolvigen 4 will check for a matching patient:

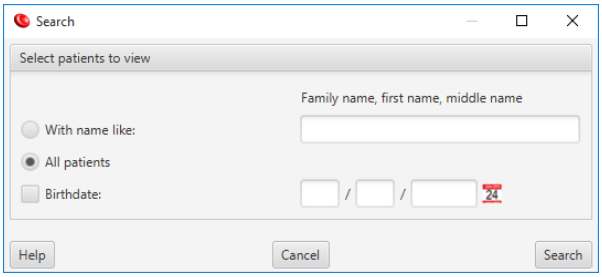
- If a matching patient is found, Resolvigen 4 will compare and warn about any difference, offering to copy test patient data to stored patient data or vice versa or to ignore differences.
- If no matching patient is found, Resolvigen 4 will offer to save the test patient data as a new patient.

Therefore, when exchanging data with other Resolvigen users, sending just the test XML file is enough.

4. Select Patient View

Select +**Patients** → **Select patient view** or click the **View** button in the toolbar: Resolvigen 4 will display the **Select patients to view** window.

Figure 5.3. The Patients select view



In this window you can select to either display all patients or just patients with a given pattern of family name, first name and middle name or birthdate.

For example, select **With name like** button and type “Brown”: Brown John, Brown Philip as well as Browning Henry, will match. After selecting the display criteria for patients click **Search** to confirm or **Cancel** to revert to the previous settings.

Once set, display criteria remain fixed until you decide to change them again; if a new patient is added that does not match these criteria, it will not appear in the list in the main window, although it will be added in the archives.

5. Antibody Identification

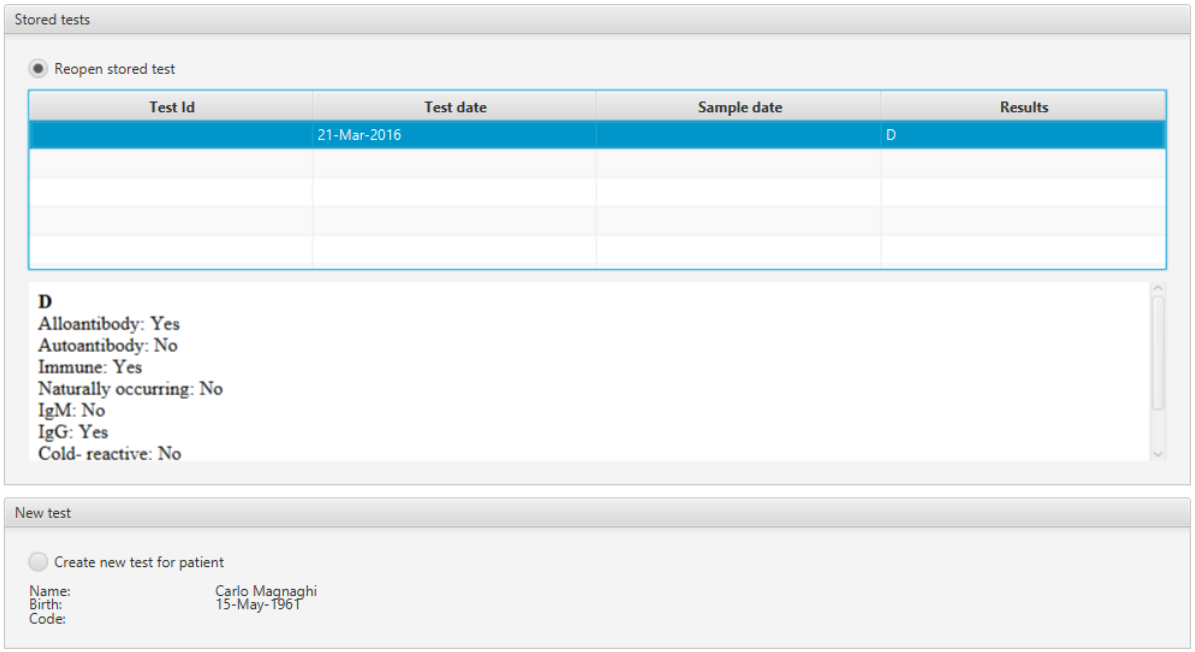
In order to perform a new antibody identification test for a patient, select patient's row in the main window, then click the menu item +**Patients** → **Antibody identification**. Resolvigen 4 will display the **Antibody identification test** window; the use of this window is described in detail in Chapter 8, *Antibody identification tests*.

6. Browse Tests for Patient

To browse tests performed on a given patient, select the patient's row in the main window, then click +**Patients** → **Browse tests for patient**.

Resolvigen 4 will display a window for selecting an existing test to browse or performing a new test.

Figure 5.4. The test selection window



The uppermost part of the window displays a list of tests performed in the past for this patient. To browse one of these tests select the **Reopen stored test** radio button, then select the specific test in the list; when a test is selected a more detailed diagnosis is displayed below the list of tests; click the **OK** button to open the test.

To perform a new test, select the **Create new test** radio button and click **OK**.

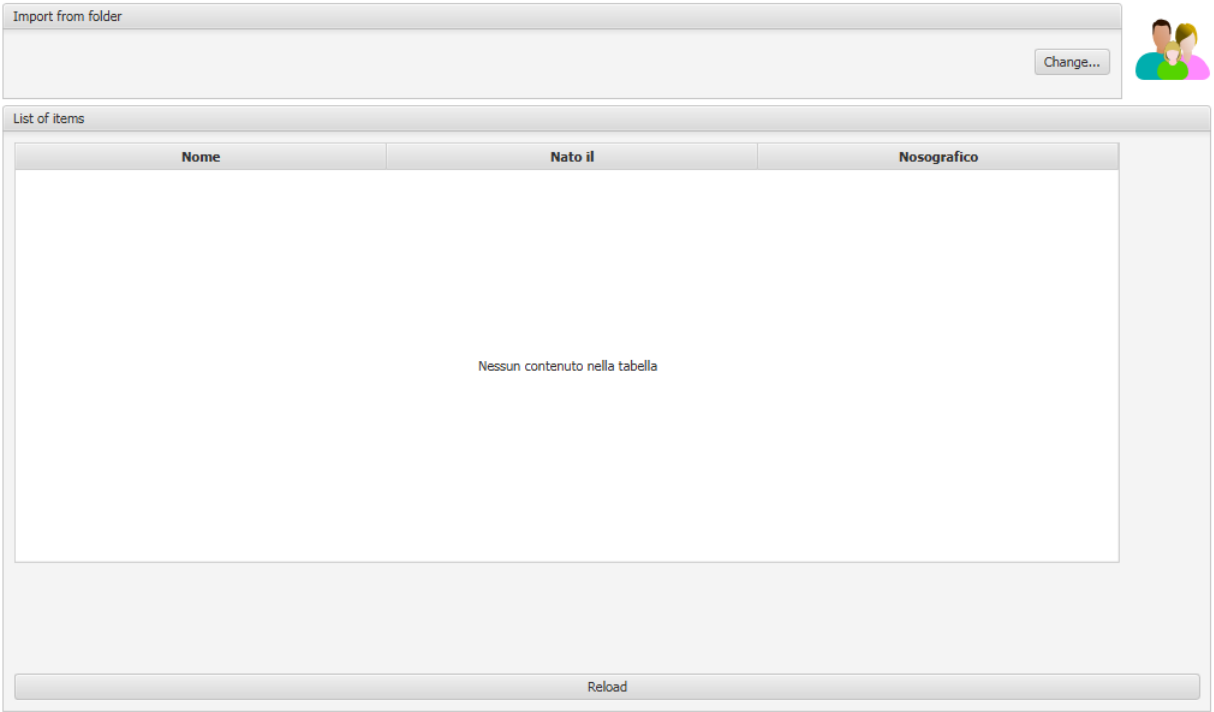
After clicking **OK**, the **Antibody identification test** page will be displayed; the use of this page is described in detail in Chapter 8, *Antibody identification tests*.

7. Importing patient's data

The **Import** and **Export** menu items are used together to exchange patients between different computers or users.

Select +**Patients** → **Import** to import patients from external XML files (e.g. from an USB key) into Resolvigen 4; Resolvigen 4 will display the Import from XML files page.

Figure 5.5. The patients import page



At the top of this window the current import folder is displayed; to change it, click the **Change** button and select a new folder in the window that will be displayed.

In the central part of the window a list shows all the XML patient files available in the current folder: select one or more files and click the **OK** button. Click the **Cancel** button to dismiss this page without importing any file.

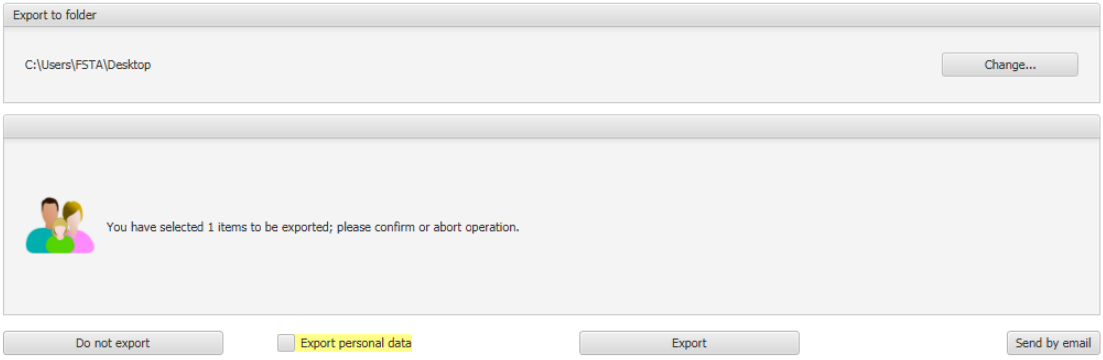
Resolvigen 4 will check the content of the files before displaying them in the Import From XML files window: even if a file has .XML extension and is a valid XML file, it will not be listed if it does not actually contain valid data for a patient.

8. Export patient's data

The Import and Export menu items are used together to exchange patients between different Resolvigen or users.

Select in the main window the patients you wish to export (one or more patients), then select +**Patients** → **Export**; Resolvigen 4 will display the **Confirm XML export** page.

Figure 5.6. The export patients page



At the top of this window the current export folder is displayed; to change it click the **Change** button and select a new folder in the window that will be displayed. Click **Export** to export XML files for selected items or **Do not export** to abort operation.

Make sure that the **Export personal data** option at the bottom of the window is not checked if you do not wish to export personal data.

You may send the data by email by clicking **Send by email**; Resolvigen 4 will ask for the recipient email address.

The email server must be set before sending email: enter the configuration page, selecting +**File** → **Configure** and set parameters as described in Chapter 10, Section 7: Email configuration.

9. Printing patients reports

Select +**Patients** → **Print** in the Patients menu to print all the selected patients.

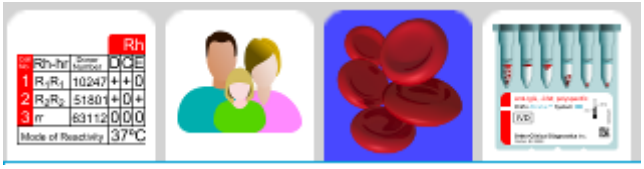
The printout will include both personal and clinical data for the patient.

Resolvigen 4 will display a print setup window analogous to the print setup window described in the section File – Print . One or more pages will be printed for each selected patient, depending on the configured print layout, including both personal and clinical data.

Select a patient in the main window, then click the +**Patients** → **Print preview** item to display a preview for a printout for the selected patient.

Chapter 6. RBCs

Click on the RBCs icon at the top of the window (or select +**File** → **Rare RBCs**).



The data area of Resolvigen 4 window will show a table view of RBCs with donor's Code, Name, date of Birth and list of stored Samples.

Figure 6.1. The RBCs page

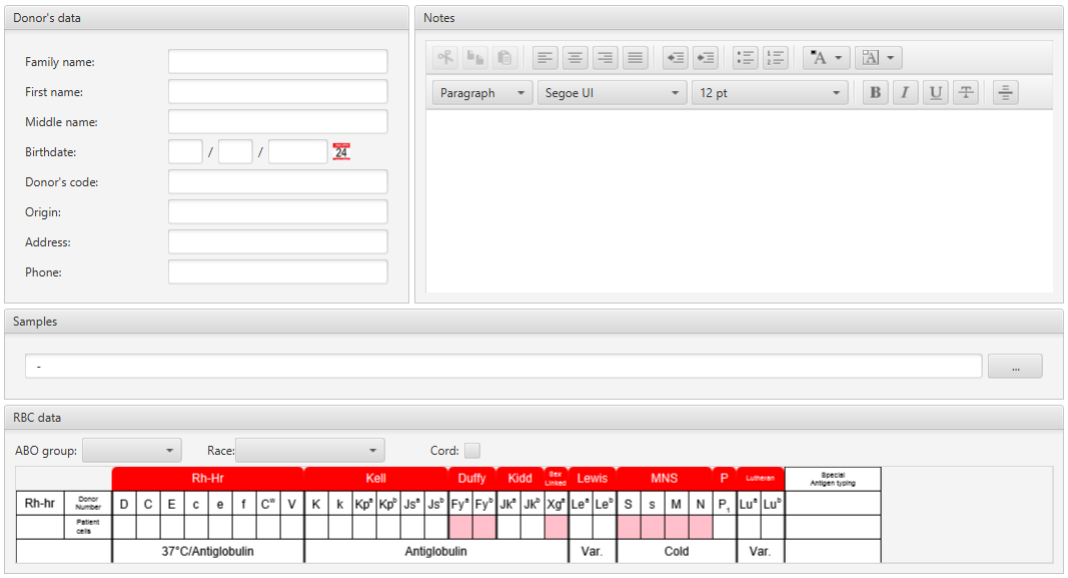
Code	Donor	Birthdate	Samples
123	Brown John	21-Jun-1977	A1

When the RBCs archive is selected, the **Rare RBCs** menu is displayed; this menu has items to perform various operations on RBCs; note that some operations require that some RBC is selected in the table, so, if no item is selected, they will be disabled. To make these menu items active, select one or more RBCs in the table by clicking on the corresponding row.

1. Adding a new RBCs

Click on the Add button in the toolbar or select +**Rare RBCs** → **Add RBC** to add a new RBC donor; Resolvigen 4 will display a RBC page which allows editing both personal data for the new donor and RBC immunohematological characteristics.

Figure 6.2. The RBCs edit page



In the group-box in the top left part of the window, you can edit donor's personal data, including:

- Family name
- First name

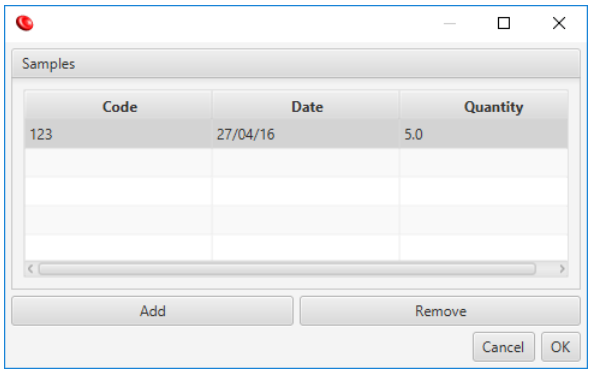
- Middle name
- Birth date
- Donor's code
- Origin: should identify where donor's RBCs can be obtained, like a blood bank or reference laboratory.
- Address
- Phone

In the top right part of the window a notes field can be used to record user notes that do not fit in other fields in this window.

Just below, the **Samples** box displays a list of the available samples; a single dash is displayed if no sample is available.

To edit the list of samples click on the **'...'** button on the right of the sample list; Resolvigen 4 will display the **List of RBC samples** dialog.

Figure 6.3. The sample list window



This dialog shows a list of currently available samples in the **Samples** box: this list will be empty for a new donor.

To add a new sample to this list click the **Add** button, then:

- Click the left mouse button in the **Code** column field and type the sample code: this is normally different from the donor's code.
- Click the left mouse button in the **Date** column field; Resolvigen 4 will preset this field with the current date; edit it if you need to enter a different date.
- Click the left mouse button in the **Quantity** field and type the quantity of available samples: generally this should be the number of available frozen test tubes.

To remove an existing sample, e.g. when a sample has been completely used, select it in the list and click the **Remove** button.

When you are done with editing the samples list, click **OK** to confirm changes; a list of sample codes will be displayed in the **Samples** box in RBC data window. Click **Cancel** instead to drop changes.

In the bottom part of the RBC page, a **RBC data** group-box contains immunohematological data for the RBC; the following data can be inserted:

- ABO group: click on the drop-down list-box to display a list of the available groups and select the relevant one; available groups include unknown (blank) O, A, A1, A2, B, AB, A1B, A2B and 0h (Bombay).

- Race: click on the drop-down list-box to display the available races and select the relevant one; available races include unknown (blank), Caucasian, Black and Asiatic.
- Cord: check this box if the RBC sample is a cord sample.
- Antigenic profile for donor's RBCs: refer to Chapter 9, *Editing antigenic profile and reactivities*.

When you are finished editing the RBC donor data, click **OK** to add the new donor to archives or **Cancel** to dismiss the dialog without saving any data.

2. Editing an RBC sample

In order to edit data for an RBC donor, select donor's row in the main window, then click +**Rare RBCs** → **Edit RBCs**, or just double click on donor's row. Resolvigen 4 will display the same RBC data window described in Section 1, "Adding a new RBCs", only all fields will be preset with the data stored for the selected RBC donor.

When you are finished editing the donor's data, click **OK** to save changes or **Cancel** to dismiss the dialog without saving changes.

3. Deleting an RBC sample

To remove one or more RBCs from archives select the relevant rows in the main window, then select +**Rare RBCs** → **Delete RBC**.

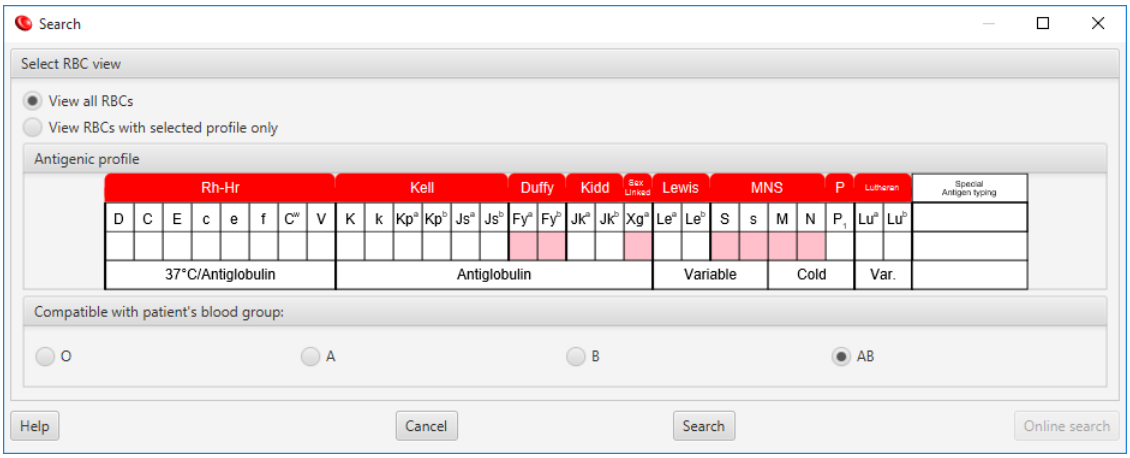
Resolvigen 4 will show a window asking you to confirm the requested operation; click **Do Delete** to remove the selected RBCs or **Do Not Delete** to abort the operation.

Complete copies of all RBCs used for a given test are stored with that test; so, even if an RBC is removed from archives, it is still possible to browse antigenic profile and reactivities for that RBC within the same test. In any case, it will not be possible to add that RBC to a new or existing test.

4. Selecting RBCs to list

Select +**Rare RBCs** → **RBC view** or click the View/Order button in the toolbar; Resolvigen 4 will display the **Select RBC view** window.

Figure 6.4. The RBC filter window



You can choose to display all donors or just donors with a specific antigenic profile; in the latter case you should also specify as much of the profile as needed: double click on any antigram cell and select the desired antigenic expression for the antigen; set any antigenic expression to blank if you don't care about it: donors with any antigenic expression for an antigen left blank will be accepted.

You can also select the required ABO compatibility (most likely this should be set to the ABO group of the patient being examined):

- O: only O donors will be accepted
- A: only O and A (both A1 and A2) donors will be accepted
- B: only O and B donors will be accepted
- AB: all donors will be accepted

After selecting the display criteria for donors click **Search** to confirm or **Cancel** to revert to the previous settings.

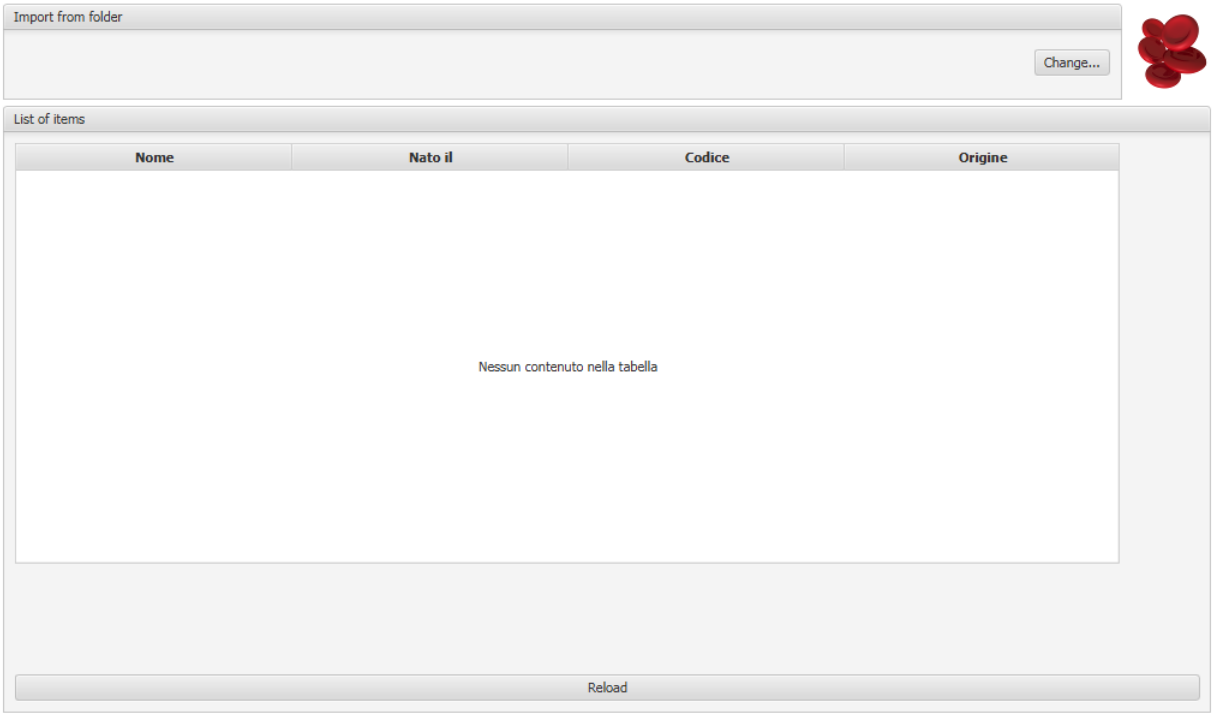
Once set, display criteria remain fixed until you decide to change them again. If a new donor is added that does not match these criteria, it will not appear in the list in the main window, although it will be added in the archive.

5. Importing RBCs data

The **Import** and **Export** menu items are used together to exchange RBCs between different computers or users.

Select +**Rare RBCs** → **Import** to import RBCs from external XML files (e.g. from an USB key) into Resolvigen 4; Resolvigen 4 will display the Import from XML files page.

Figure 6.5. The Import RBCs page



At the top of this page the current import folder is displayed; to change it click the **Change** button and select a new folder in the window that will be displayed.

In the central part of the window a list shows all the XML RBCs files available in the current folder: select one or more files and click the **OK** button. Click the **Cancel** button to dismiss this page without importing any file.

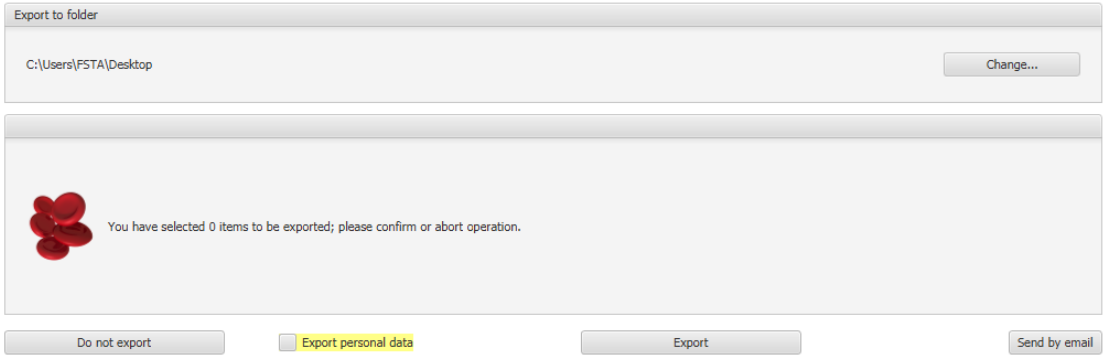
Resolvigen 4 will check the content of the files before displaying them in the Import From XML files window: even if a file has .XML extension and is a valid XML file, it will not be listed if it does not actually contain valid data for an RBC sample.

6. Exporting RBCs data

The **Import** and **Export** menu items are used together to exchange RBCs between different computers or users.

Select in the main window the RBCs you wish to export (one or more RBCs), then select +**Rare RBCs** → **Export**; Resolvigen 4 will display the **Confirm XML export** window.

Figure 6.6. The export RBCs page



At the top of this page the current export folder is displayed; to change it click the **Change** button and select a new folder in the window that will be displayed. Click **Export** to export XML files for selected items or **Do not export** to abort operation.

Make sure that the **Export personal data** option at the bottom of the window is not checked if you do not wish to export personal data.

You may sent the data by email by clicking **Send by email**; Resolvigen 4 will ask for the recipient email address.

The email server must be set before sending email: enter the configuration page, selecting +**File** → **Configure** and setting parameters as described in Chapter 10, Section 7: Email configuration.

7. Printing RBC reports

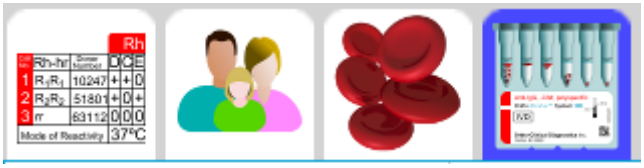
Select one or more RBCs in the main window, then SELECT +**Rare RBCs** → **Print** to print all the selected RBCs.

Resolvigen 4 will display a print setup window analogous to the print setup window described in the section File – Print. One or more pages will be printed for each selected RBC sample, depending on the configured print layout, including both donor's and clinical data.

Select an RBCs sample in the main window, then select +**Rare RBCs** → **Print preview** to display a preview for a printout of the selected sample.

Chapter 7. Tests

Click on the Tests icon at the top of the window (or select +**File** → **Tests**).



The data area of Resolvigen 4 window will show a table view of tests with patient's Name, date of Birth, PID and Date of Test.

Figure 7.1. The Tests page

Name	Birthdate	Patient code	Test date
ROSSI CARLO	01-Jan-1942	2910111580	21-Jun-2014
Magnaghi Carlo	15-May-1961		18-Jun-2014

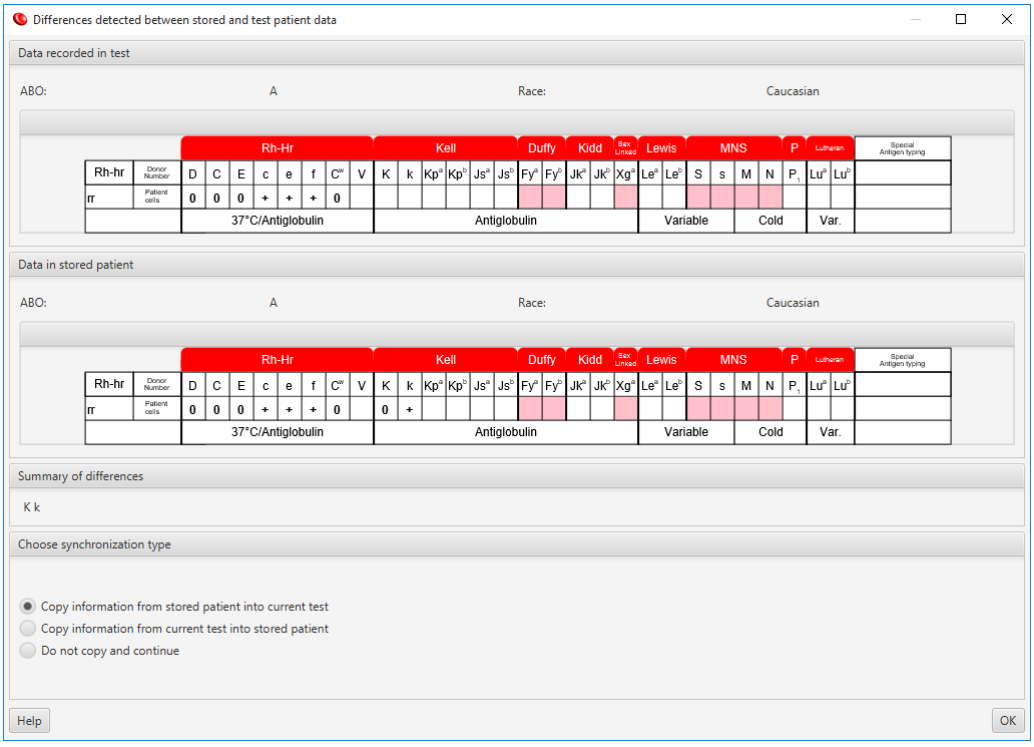
When the test archive is selected, the **Tests** menu is displayed; this menu has items to perform various operations on tests; note that some operations require that some test is selected in the table, so, if no item is selected, they will be disabled. To make these menu items active, select one or more tests in the table by clicking on the corresponding row.

1. Editing a Test

In order to browse or edit data for a test performed in the past, select test row in the main window, then select +**Tests** → **Edit test**, or just double click the test row.

When opening an existing test Resolvigen 4 compares the data for the patient stored in test with the same patient in patients' archive and it will show a window if any difference is found.

Figure 7.2. Discrepancies between test and patient



You may choose:

- Copy information from patient in archive into the test being opened.
- Copy information from test being opened to current patient.
- Ignore the differences and continue opening the test

This window is only shown if there are discrepancies between test and patient.

At this point Resolvigen 4 will display the Antibody identification test window; the use of this window is described in detail in Chapter 8, *Antibody identification tests*.

To perform a new test switch to patients' archive, select a patient, then select +**Patients** → **Antibody identification**.

2. Deleting a test

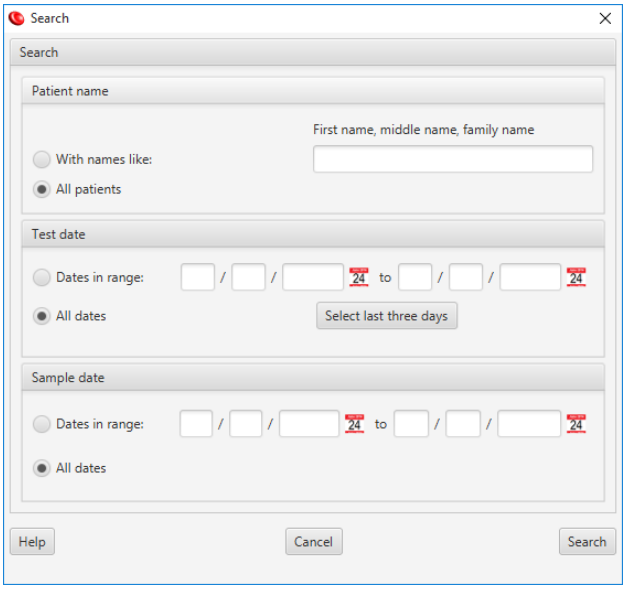
To remove one or more tests from archives select the related rows in the main window, then select +**Tests** → **Delete Test**.

Resolvigen 4 will show a window asking you to confirm the requested operation; click **Do Delete** to remove the selected tests or **Do Not Delete** to abort the operation.

3. Selecting tests to list

Select +**Tests** → **Select test view** or click the **View/Order** button in the toolbar; Resolvigen 4 will display the **Select tests to view** window.

Figure 7.3. The Select tests to view window



Tests can be filtered on different conditions; more that one condition can be set at the same time: Resolvigen 4 will only show tests matching all conditions set.

The uppermost group-box, **Patient name**, can be used to filter patient's name: you can choose either to display tests for all patients or just for patients with a given pattern of family name, first name and middle name. For example, check With name like button and enter 'Brown': Brown John, Brown Philip as well as Browning Henry, will match.

The next group-box, **Test date**, can be used to filter only tests performed during a given range of dates: check Dates in range button and enter both dates for start and end of period; date format depends on country.

The next group-box, Sample date, can be used to filter only tests performed on samples taken in a given range of dates: check Dates in range button and enter both dates for start and end of period.

After selecting the display criteria for tests click **OK** to confirm or **Cancel** to revert to previous settings.

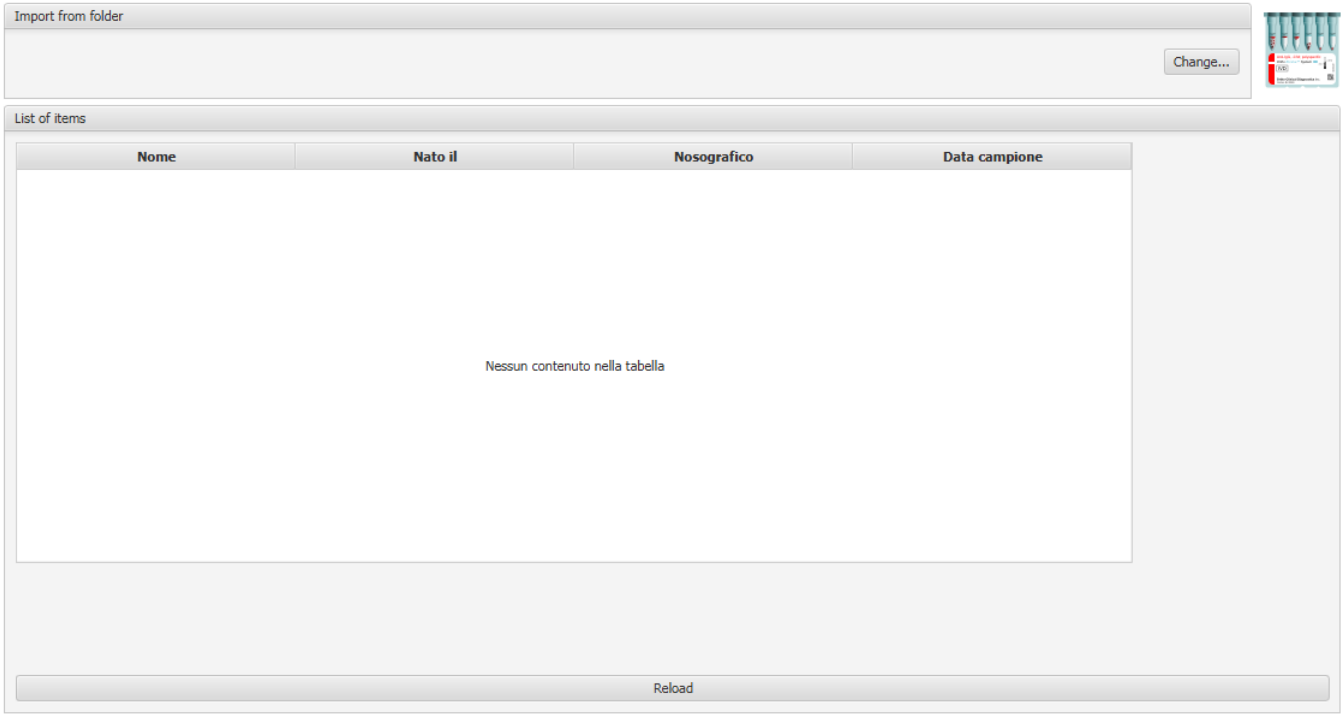
Once set, display criteria remain fixed until you decide to change them again; if a new test is added that does not match these criteria, it will not appear in the list in the main window, although it will be added in the archive.

4. Importing tests

The **Import** and **Export** menu items are used together to exchange tests between different computers or users.

Select +**Tests** → **Import** to import tests from external XML files (e.g. from a USB memory) into Resolvigen 4; Resolvigen 4 will display the Import from XML files page.

Figure 7.4. The import tests page



At the top of this page the current import folder is displayed; to change it click the **Change** button and select a new folder in the window that will be displayed.

In the central part of the window a list shows all the XML test files available in the current folder: select one or more files and click the **OK** button. Click the **Cancel** button to dismiss this dialog without importing any file.

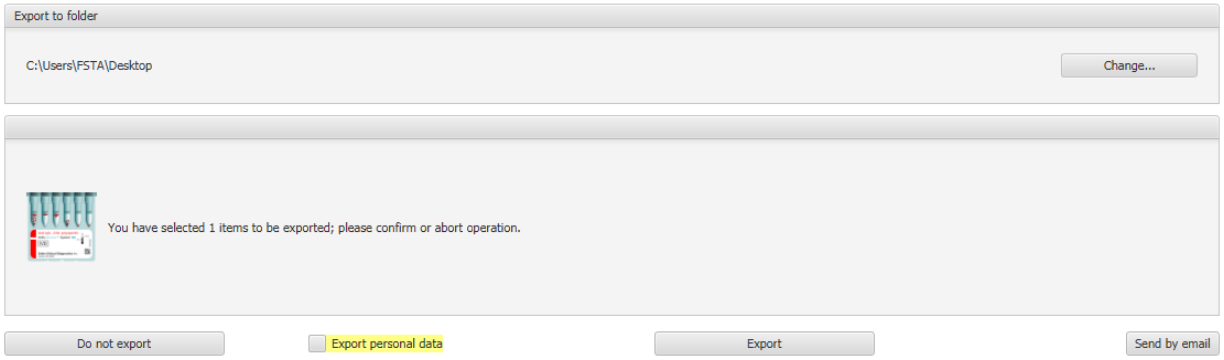
Resolvigen 4 will check the content of the files before displaying them in the Import from XML files window: even if a file has .XML extension and is a valid XML file, it will not be listed if it does not actually contain valid data for a test.

5. Exporting tests

The **Import** and **Export** menu items are used together to exchange tests between different computers or users.

Select in main window the tests you wish to export (one or more tests), then click +**Tests** → **Export**; Resolvigen 4 will display the **Confirm XML export** window.

Figure 7.5. The export test page



At the top of this window the current export folder is displayed; to change it click the **Change** button and select a new folder in the window that will be displayed.

Click **Export** to export XML files for selected items or **Do not export** to abort operation.

Make sure that the **Export personal data** option at the bottom of the window is not checked if you do not wish to export personal data.

You may send the data by email by clicking **Send by email**; Resolvigen 4 will ask for the recipient email address

The email server must be set before sending email: enter the configuration page, selecting +**File** → **Configure** and setting parameters as described in Chapter 10, Section 7: Email configuration.

6. Printing test reports

Select one or more tests in main window, then select +**Tests** → **Print** to print all the selected tests.

Resolvigen 4 will display a print setup window; select the desired printer, then press the **OK** button; one or more pages will be printed for each selected test, depending on the configured print layout, including all data entered for the test: patient's data, panel data, reactivities and notes entered by user.

Select a test sample in the main window, then +**Tests** → **Print preview** to display a preview for a printout of the selected test.

Chapter 8. Antibody identification tests

All antibody identification related tasks are reached through the **Antibody identification test** page and sub-windows opened by this page.

Antibody identification page may be opened:

- by selecting **Antibody identification** in the **Patients** menu
- by selecting **Edit test** in the **Tests** menu
- by double clicking on row in the main window when tests are displayed

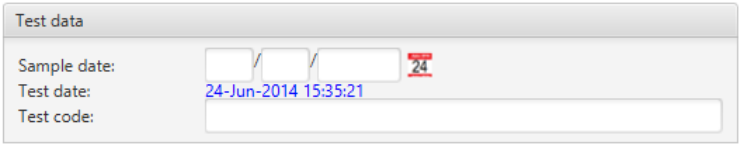
1. Antibody Identification Test Window

The Antibody identification test window contains four group of items: **Patient's data**, **Test data**, **List of tests** and **Select new test**.

Figure 8.1. The patient's data

The **Patient's data** group contains data identifying the patient whose sample is being tested.

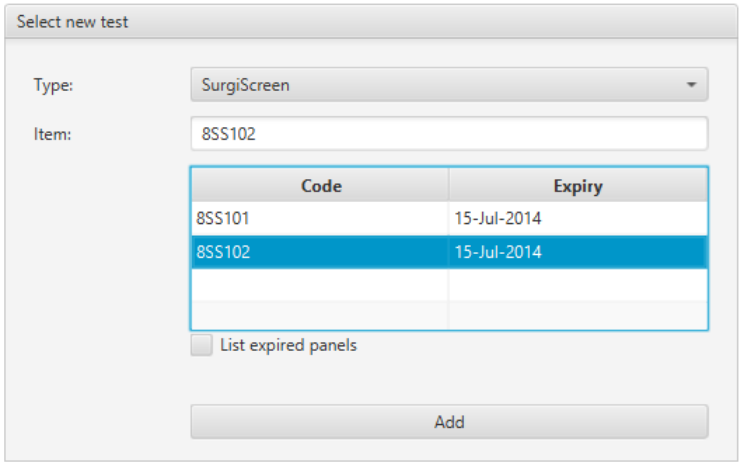
Figure 8.2. The test data



The **Test data** group contains additional data to identify the test; these data may be used to distinguish different tests performed for the same patient:

- **Sample date**: this field may be used to mark the date in which the sample was sampled.
- **Test date**: this is the date in which the test was created; this date can not be edited by the user.
- **Test code**: this code may be used to identify the test; it is normally different from the patient's code: the test code should vary from test to test, while the patient's code should remain constant for a long time, possibly for the lifetime of the patient.

Figure 8.3. The test selection group



Items in **Select new test** group are used to select new items to be added into the List of test list. Different types of items may be selected. Depending on the type of item selected further data may be required to identify the specific object to use. Select the item type in the Type list-box.

Selecting SURGISCREEN®, SELECTOGEN®, BioVue® Screen, Panel A, Panel B or Panel C or other panels

When one of these item types is selected, a list of available items is displayed. Normally only valid panels are displayed. To list expired panels, check the **List expired panels** check box. You can either select one of the listed items, or directly type the panel code in the Item field.

Selecting Self RBCs

No additional data is needed in this case.

Selecting Rare RBCs

When this item type is selected, a list of RBCs is displayed; this list normally contains the complete list of RBCs in archives; click the Select RBCs profile button to filter RBCs for a given profile; Resolvigen 4 will display the same dialog described in Chapter 6, Section 4: Selecting RBCs to list. You can either select one of the listed items, or directly type the RBC code in the **Item** field.

Selecting Rare Antibodies Test

No additional data is required; a test for the identification of antibodies against high frequency antigens will be added.

Selecting List of Excluded Antibodies

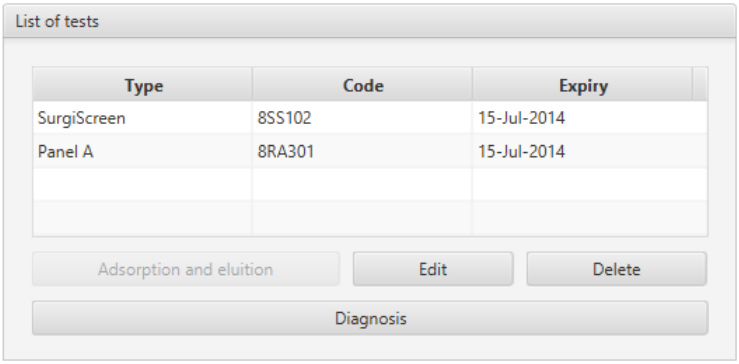
No additional data is required; this item is used to exclude some antibodies from the search, in case for some reason those antibodies are known not to be present in the patient's serum. Please note that the most obvious reason for excluding antibodies, namely the presence of the related antigen on non reacting patient's RBCs, is better expressed by adding the patient's RBCs to the test and marking the negative scores for reactions.

The presence of an antigen on patient's RBCs is not enough to exclude an antibody targeting the antigen: Resolvigen 4 will consider the possibility of an autoantibody.

Editing the List of Tests

When the desired item is selected click the **Add** button to add it to the **List of tests**.

Figure 8.4. The list of tests



To remove one item from the **List of tests**, select it in the list and click the **Delete** button. Deleting a test item also removes all data entered in it.

All items in the List of tests should be filled with data from tests. To edit one item, select it in the List of tests, and click the **Edit** button or just double click on the item.

Entering results in Antigrams

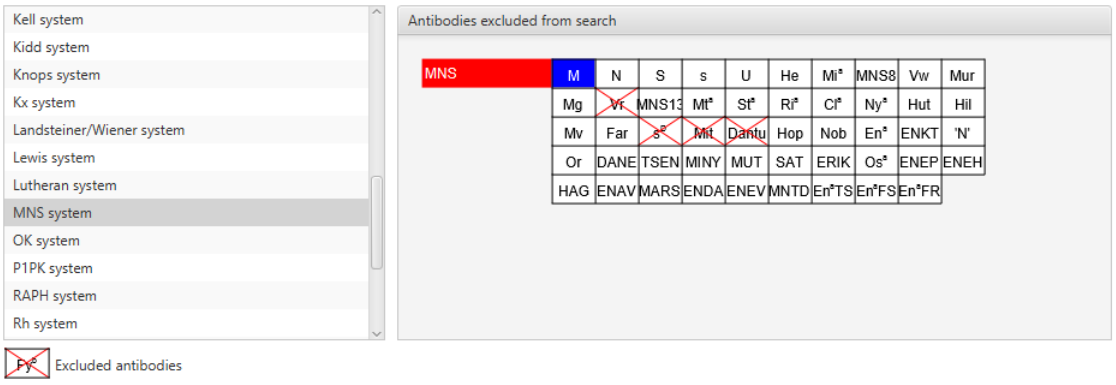
Data in screening and identification panels, as well as self RBCs and rare RBCs, are edited via an Antigram like interface; data can be entered here as described in Chapter 9, *Editing antigenic profile and reactivities*.

Only reactivities can be edited. When patient's RBCs have been added to the test, a row for them is appended at the bottom of each antigram. For this row, the antigenic profile may also be edited.

Editing list of Excluded Antibodies

In some circumstances you may wish to exclude some antibodies from search; the most common case is that of non-reacting patient's RBCs expressing an antigen targeted by the given antibody.

Figure 8.5. The antibody exclusion page



In this specific case, the best way of proceeding would be to add patient's RBCs, enter antigenic profile and mark scores.

In some rare cases this may not be enough; for example a D+ patient can still develop and anti-D alloantibody (patient with a D partial phenotype).

In some circumstances some antibodies may be excluded from search for different reasons. In these cases, you may wish to explicitly exclude antibodies; after adding an **Exclude antibodies** item, double click on the item in the **List of tests**.

Antibodies excluded from the search are crossed in this window. To tag or untag an antibody, double click on it. Click **OK** to update list of excluded antibodies or **Cancel** to dismiss this page without saving.

2. Editing Rare Antibodies Test

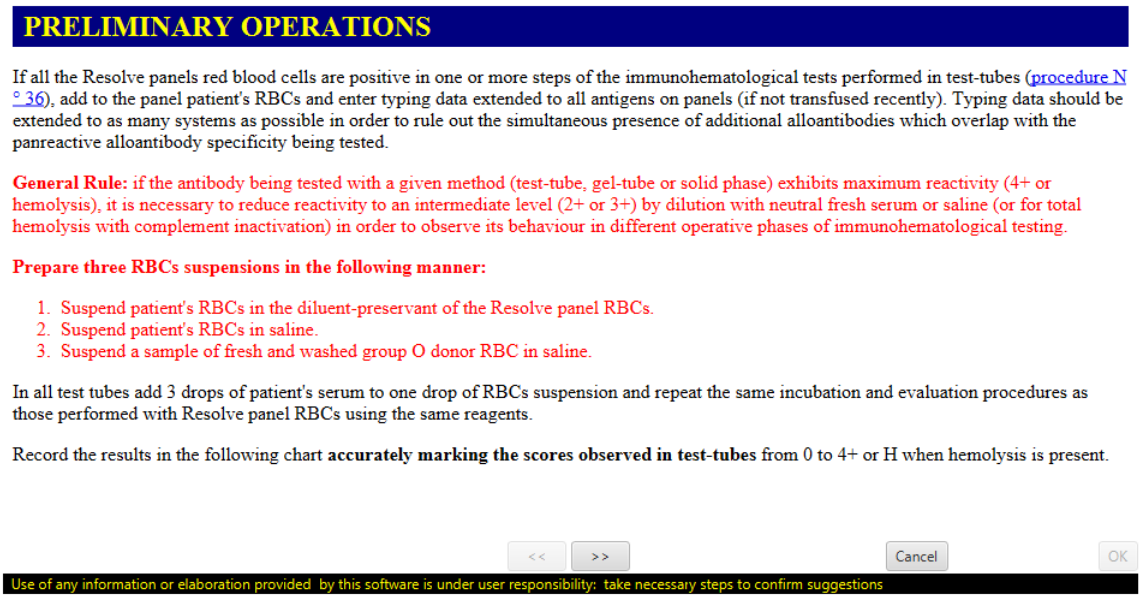
In some cases, all panels RBCs are reactive. This may be due to a complex mix of antibodies in serum or to the presence of a single antibody against a common antigen.

The first case can usually be detected by the strong difference of reactivities with different test RBCs. Resolvigen 4 will generally suggest different mixes that have the more strongly reacting antibodies in common and give hints on how to proceed to identify other antibodies in mix (e.g. by adsorption/elution).

In the second case, it is impossible to proceed further with panels: even high frequency reactive antibodies directed against high frequency antigens on panels (namely k, Kp^b, Js^b and Lu^b) are hard to detect (by dose effect or by typing of patient's RBCs), but for the vast majority of antibodies against high frequency antigens you get practically no hint at all from panels.

In these cases, you may wish to perform a rare antibodies test; after adding a **Rare antibodies test** item, double click on the item in the **List of tests**. The initial page for Antibodies against high frequency antigens search will be displayed. This page gives some initial directions about the tests to perform.

Figure 8.6. Rare antibodies: preliminary operations

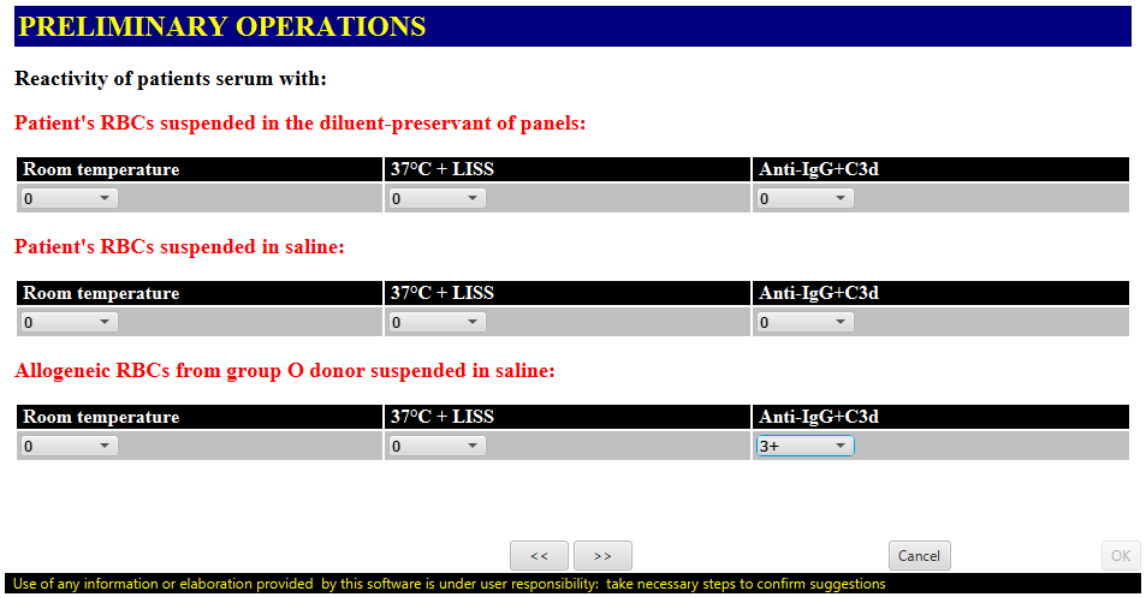


At the bottom of the window a few buttons are displayed:

- **Back (<<)**: click this button to move to previous step; this button is initially disabled.
- **Next (>>)**: click this button to move to next step after filling data eventually required in this step.
- **Cancel**: click this button to exit the rare antibodies identification procedure.
- **OK**: when procedure is complete, click this button to save data.

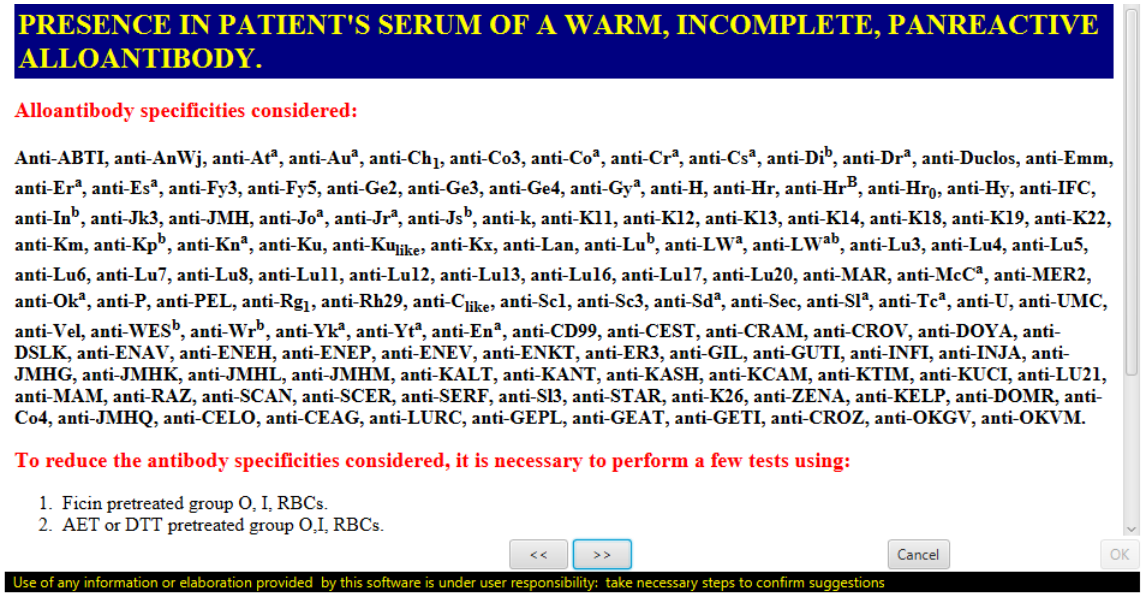
After preparing samples as described in this page, click the **Next** button; Resolvigen 4 will ask you to enter some data.

Figure 8.7. Rare antibodies: self and donor's RBCs



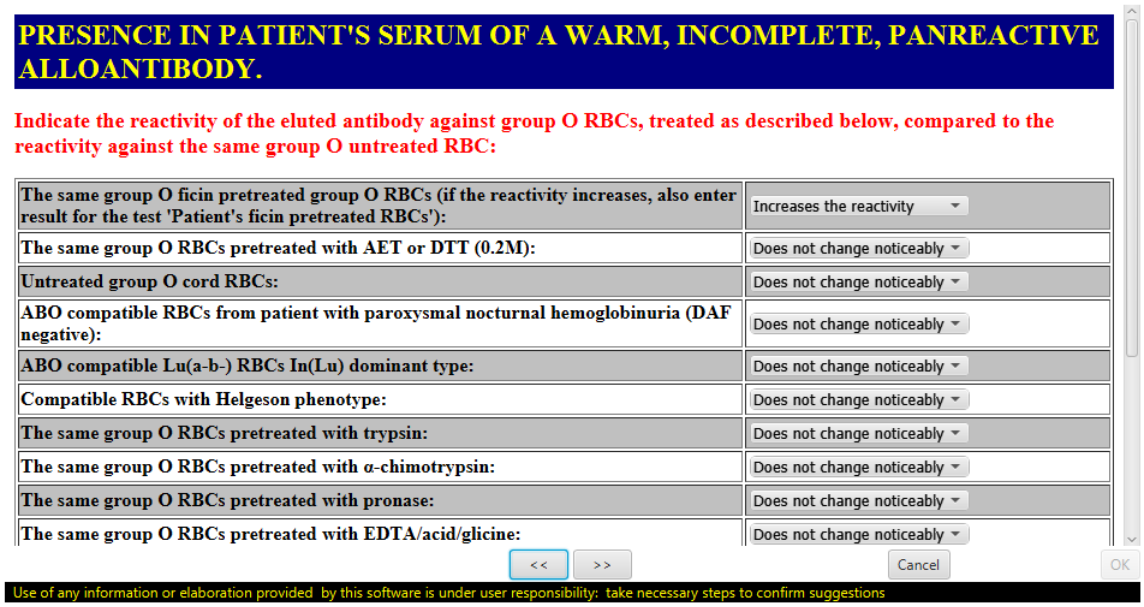
Fill in data and click the **Next** button. The path followed from now on depends on data entered step by step. A few pages are displayed, some giving instructions on how to proceed with tests and some asking for data input.

Figure 8.8. Rare antibodies: list of possible antibodies



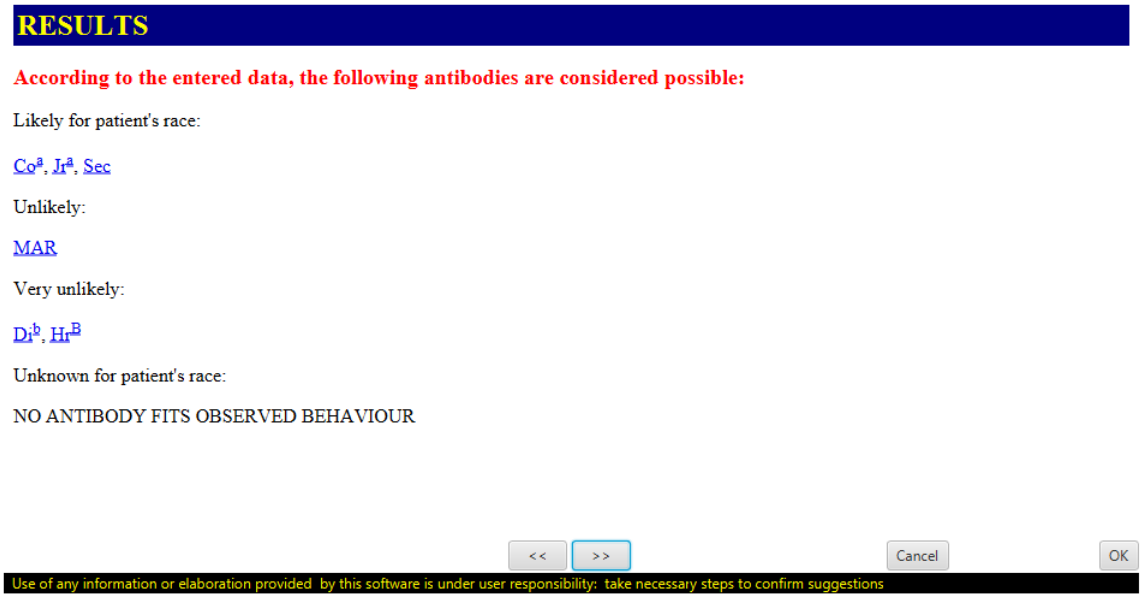
Depending on the observed characteristics of the antibody Resolvigen 4 asks to perform different tests.

Figure 8.9. Rare antibodies: antibody behaviour



Which help narrow the list of possible antibodies.

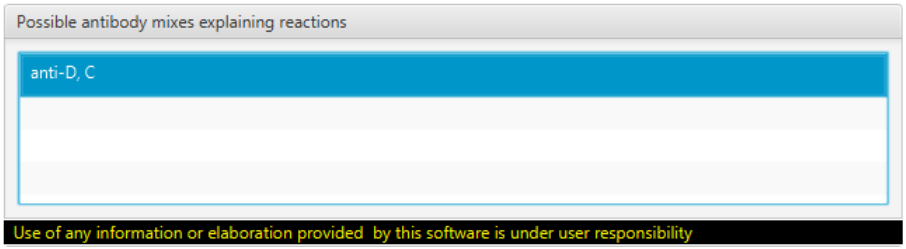
Figure 8.10. Rare antibodies: suspected specificities



3. Viewing Results

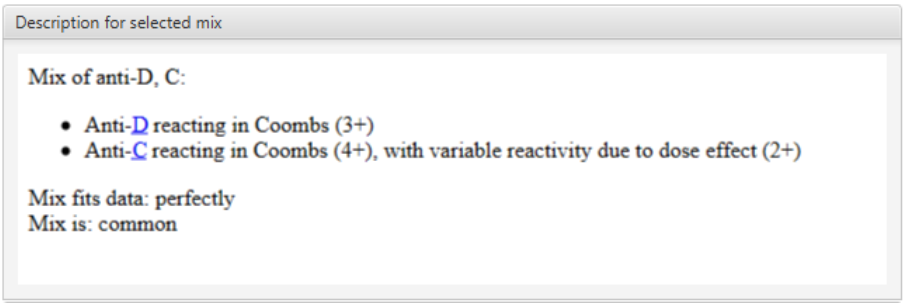
Click the **Diagnosis** button in order to view the interpretation that Resolvigen 4 gives for entered data. Depending on the complexity of the mix, the analysis may take some time; an hourglass cursor is displayed during analysis, and a progress bar signals the completion of the process. At the end the **Diagnosis** page is displayed.

Figure 8.11. List of possible mixes



At the top left of the window a list of possible mixes explaining the observed reactions is displayed; when selecting one of these mixes, a detailed description is reported in the text area below.

Figure 8.12. Detailed description of selected mix

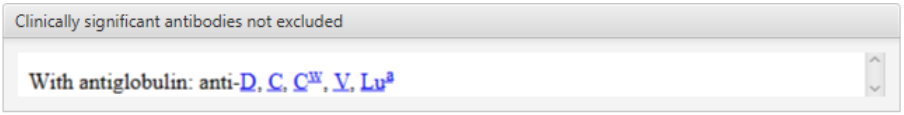


In "Mix fits data": not at all < badly < satisfactorily < well < perfectly;

In "Mix is": extremely rare < rare < not common < common < extremely common.

Still below, in Clinically significant antibodies not excluded, a list of the clinically significant antibodies whose normal reaction pattern would be covered by observed reactivity is reported.

Figure 8.13. Clinically significant antibodies not excluded



On the right it is possible to enter a free form note at the top and enter a detailed diagnosis at the bottom.

The diagnosis is entered in a structured way that allows exporting the results in an ASTM compatible format to a LIS.

Figure 8.14. Structured diagnosis

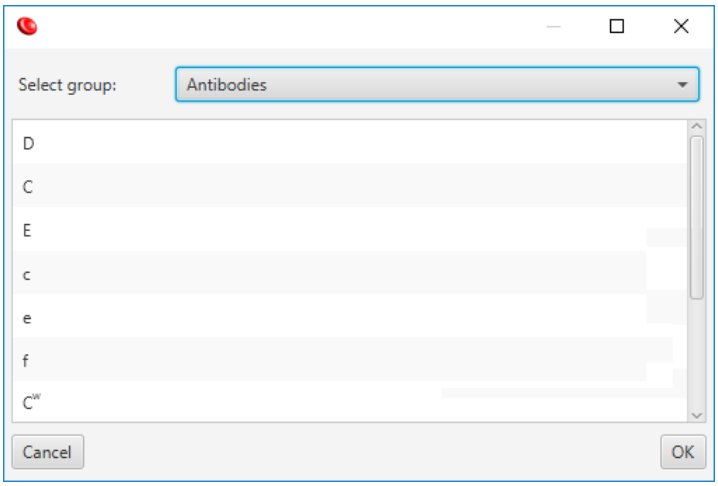
It is possible to fill the diagnosis from one of the possibilities suggested by Resolvigen 4: select the mix in the top left box and click the import button at the bottom left of the **Diagnosis** box.

You may edit the diagnosis using the buttons at the bottom of the **Diagnosis** box; these buttons are used in order to:

- Move the selected antibody up in the diagnosis list
- Move the selected antibody down in the diagnosis list
- Add a new antibody
- Remove the selected antibody
- Edit the selected antibody

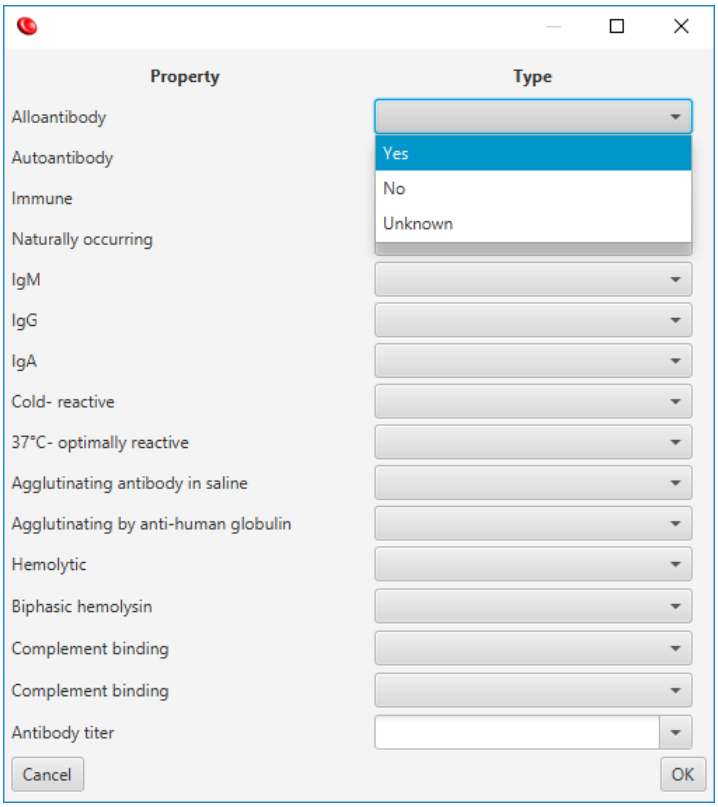
When adding a new antibody, Resolvigen 4 first asks to select the antibody; by default the antibodies normally on panels are listed; select a different item in **Select group** to list the antibodies for a given system.

Figure 8.15. Selecting an antibody for diagnosis



Click **OK** to display a window in which the characteristics of the identified antibody may be entered.

Figure 8.16. Entering antibody characteristics



The last button at the right of the **Diagnosis** box will export the diagnosis in ASTM format.

```
H|\^&|||Resolvigen4|||||||P|1|20160506165210
P|1||12345|||Smith^John||19980422|U|C|^^^^|||||||||||||||||||||||
O|1||876^\^|^^^ABID^^|N|20160504000000|||||||||^^||||||||||F|||||
R|1|D^AB_IGG\Yes^AB_37C\Yes|||||||F|||||  ❶
R|2|C^AB_IGM\Yes|||||||F|||||  ❷
R|99|^^^^^|D^C||^|||F||||  ❸
L|1|N
```

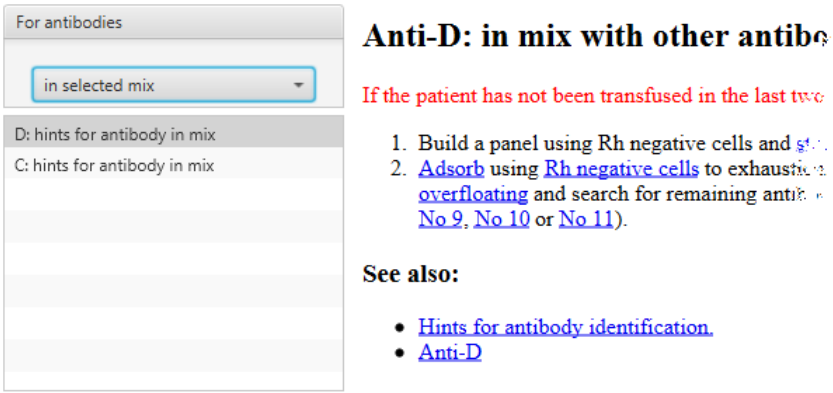
The file contains, after the usual ASTM fields identifying the sample and the patient:

❶ Detailed information for the first antibody
❷ Detailed information for the second antibody
❸ A summary of the antibodies in mix (D and C in the above example)

4. Hints for antibodies weak and in mix

You may get hints about the current situation for the most common cases of weak antibodies and antibodies in complex mixes by clicking the **Hints** button.

Figure 8.17. Hints for weak antibodies and mixes



In the listbox at the top left it is possible to select:

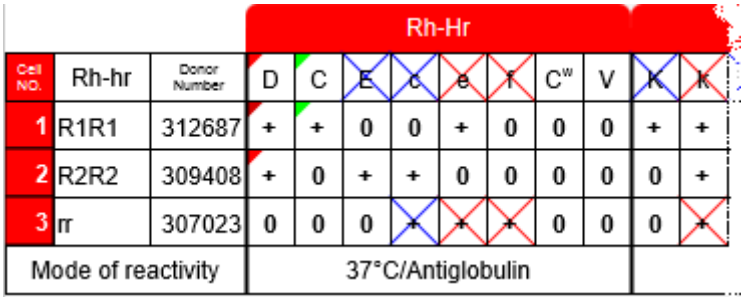
- Hints for antibodies in selected mix
- Hints for antibodies covered in Coombs
- Hints for antibodies covered at 37°C
- Hints for antibodies covered at room temperature

5. Getting an explanation for results

To obtain an explanation of the reasons why Resolvigen 4 suggested a given mix, select the mix in the list and click the **Explain** button.

Resolvigen 4 will show a list of the panels used for the test; in each panel annotations are added; in the parts with the antigenic profile the antigens targeted by the excluded antibodies are crossed out.

Figure 8.18. Explaining results: RBCs antigenic profiles

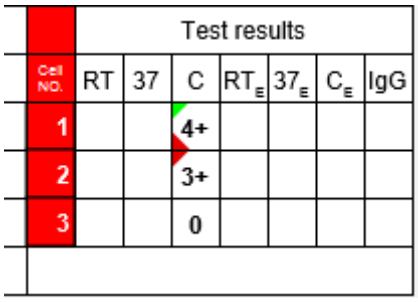


			Rh-Hr									
Cell NO.	Rh-hr	Donor Number	D	C	E	c	e	f	C^w	V	K	k
1	R1R1	312687	+	+	0	0	+	0	0	0	+	+
2	R2R2	309408	+	0	+	+	0	0	0	0	0	+
3	rr	307023	0	0	0	+	+	+	0	0	0	+
Mode of reactivity			37°C/Antiglobulin									

RBCs that have a weak expression of the antigens are crossed in blue, while RBCs that have a normal or strong expression are crossed red. The antigen itself is crossed red if at least one non reactive RBCs has a strong expression for the antigen, blue otherwise.

Antigens that are present in the mix are tagged with different colors; the antigenic expression on each RBC is tagged with the same color, which is rendered brighter for stronger expressions.

Figure 8.19. Explaining results: scores of reactivity



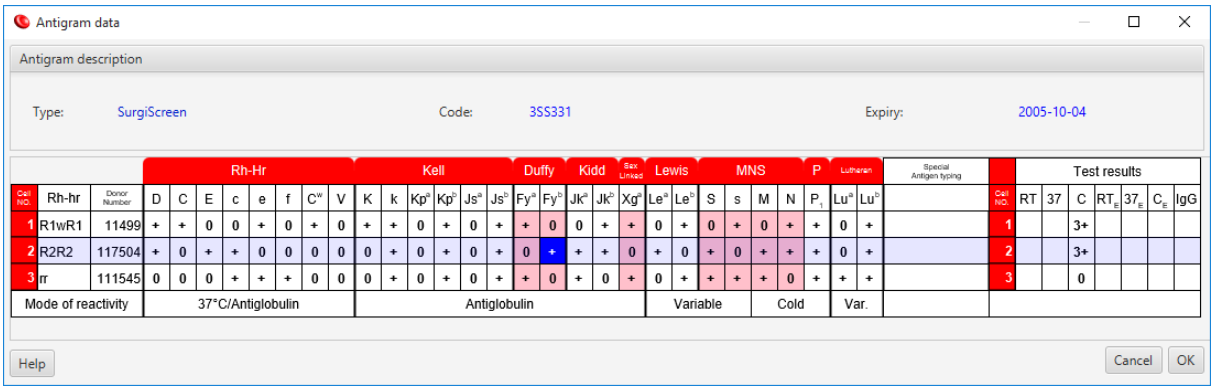
	Test results						
Cell NO.	RT	37	C	RT_E	37_E	C_E	IgG
1			4+				
2			3+				
3			0				

In the results part positive reactions which are expected to be due to an antibody are tagged with the color of the target antigen. Again, brighter colors are used for stronger reactions; the tag for a given antigen may be dark in a strongly reacting RBCs because the strong reaction may be due to antibodies targeting a different antigen.

Chapter 9. Editing antigenic profile and reactivities

Resolvigen 4 shows antigenic profiles and reactivities in the common format used when panels are printed on paper.

Figure 9.1. An antigram edit window



If the window displaying the panel is too small to fit the panel, horizontal and vertical scrollbars are displayed on the bottom and right border of the panel: use them to display the relevant part of the panel. Alternatively click on the panel to make sure it has the input focus (the cell of the antigram that has the focus is highlighted in blue) and use the arrow keys to move to the relevant field: the antigram will scroll as needed.

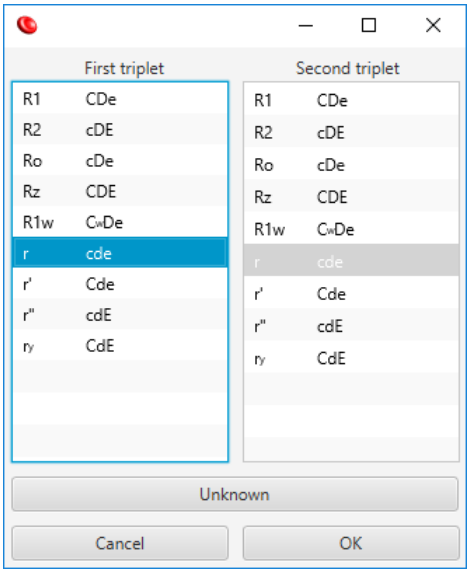
Editing works differently for different fields. Note that depending on the RBC being part of a panel, an archive RBC or patient's RBC, some part of the panel may be non editable.

If you PC screen has a resolution of 1024x768 or below, you may wish to display the panel so that the left part, with RBCs IDs and Rh, and the right part, with scores are fixed and the central part scrolls. In this case open the configuration page selecting +**File** → **Configure**, navigate to the **User options** tab and select the **Set for small monitor** option.

1. Editing the Rh-hr Field

To edit an Rh-hr field, move the focus to it using the arrow keys and press spacebar or double click on it with the left mouse button. Resolvigen 4 will display a dialog box with two lists for the first and second triplet of the Rh haplotype. Select one item in each list and click the **OK** button to confirm or the **Cancel** button to abort editing.

Figure 9.2. Editing the Rh haplotypes



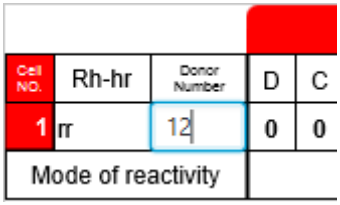
If you wish to delete the current haplotype without selecting a different one (e.g. the haplotype is unknown), click the **Unknown** button.

When an haplotype is selected, Resolvigen 4 sets the expression for the related antigens accordingly. The expression of the following antigens is set: D, C, E, c, e, f and C^w. Manually changing the expression for any of these antigens will clear the Rh-hr field.

2. Editing Donor Number

To edit the donor number field, move the focus to it using the arrow keys or click on it with the left mouse button, then type the new value.

Figure 9.3. Editing donor's number



While typing you can move the I-beam cursor using the left and right arrow keys; press **Enter** to confirm the new value or Escape (**Esc**) to abort editing. If you need to edit an old value, double click on the donor number cell: an I-beam cursor will be displayed within the field; you can then proceed editing as above.

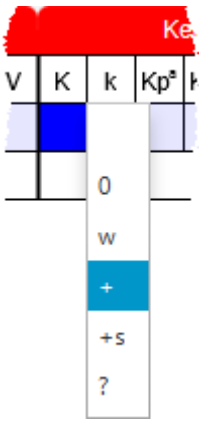
3. Editing Antigenic Profile

To change the expression for an antigen, move the focus to it using the arrow keys or click on it with the left mouse button, then type:

- Spacebar or '?' to clear the expression
- '0' (zero) to set the expression to 0
- 'W' to set expression to +w (weak)

- '+' to set the expression to +
- 'S' to set the expression to +s (strong)

Figure 9.4. Editing the antigenic profile



If you type any different character or double click with the left mouse button, Resolvigen 4 will display a list of possible values: press **Escape** or click somewhere else with the mouse to dismiss the list or select a new value by clicking on it with the left mouse button or by moving to it with the up and down arrow keys and pressing **Enter**.

Changing the antigenic expression for any Rh-hr haplotype related antigen (D, C, E, c, e, f and C^w) will clear the Rh-hr field.

4. Editing the Extended Antigenic Profile

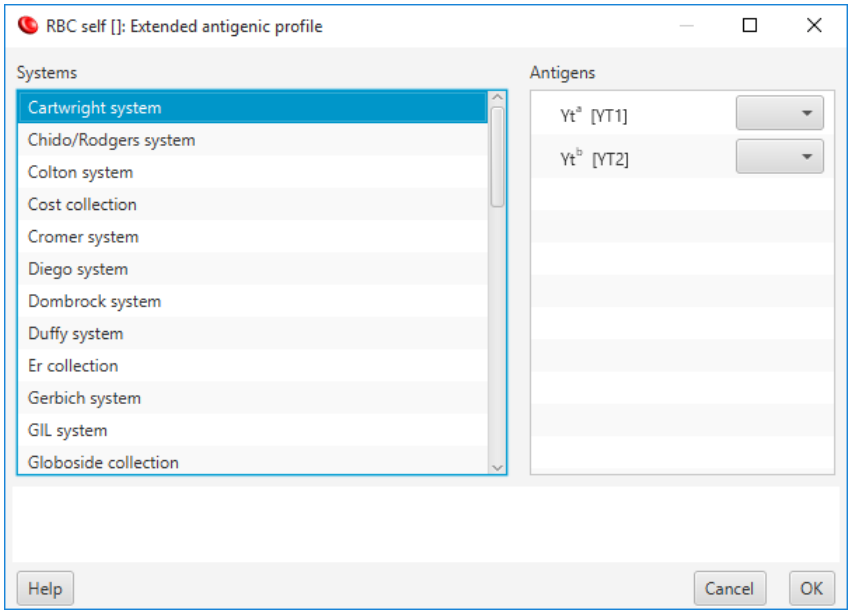
With few exceptions, antigens which have high or low frequency are not displayed in the antigenic profile cells directly.

To change the expression for one of these antigens move the focus to the **Special antigen typing** field at the right of antigenic profile fields using the arrow keys and press **space** or double click on it with the left mouse button.

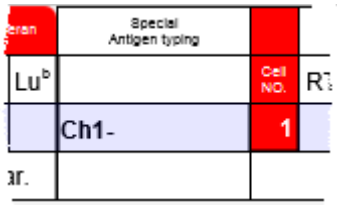
Resolvigen 4 will display a dialog box with a list of the antigenic systems on the left and a list of antigens for the selected system on the right. Both lists may be scrolled using the scrollbar on the right to display more items if available.

Select the antigenic system on the left, then select the expression for the antigens whose expression is known on the right. For each antigen a drop-down list is displayed: click on it and select the appropriate value.

Figure 9.5. Editing the extended antigenic profile



When you have finished editing click the **OK** button to confirm or the **Cancel** button to cancel editing.



The **Special antigen typing** field will display a summary of the extended antigenic profile:

- Missing high frequency antigens are shown; e.g. JMH-.
- '*' means that some extended antigen is set that does not deserve a better description; e.g. a high frequency antigen has been marked with '+'.
- '...' means that more information is available that does not fit the extended antigen typing field.

The Extended antigen typing dialog also allows editing expression for antigens that are displayed in the normal antigenic profile part; if a value is edited in the dialog, the value is updated in the normal antigenic profile part and vice versa.

Changing the antigenic expression for any Rh-hr haplotype related antigen (D, C, E, c, e, f and Cw) will clear the Rh-hr field.

5. Editing Reactivities

To enter results for test the reactivities of each RBC with patient's serum must be entered in different phases:

Table 9.1. The different test phases

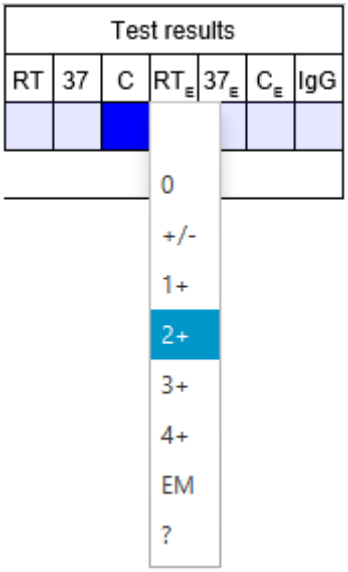
RT	The test has been performed at Room Temperature
37	The test has been performed at 37 ºC
C	The test has been performed with antiglobulin serum: anti-IgG + C3d
RT_E	The test has been performed at Room Temperature; RBCs have been pre-treated with enzymes

37_E	The test has been performed at 37 ºC; RBCs have been pre-treated with enzymes
C_E	The test has been performed with antiglobulin serum: anti-IgG + C3d; RBCs have been pre-treated with enzymes
IgG	The test has been performed with mono-specific anti-IgG (without C3d) antiglobulin serum

To change the expression for a reactivity, move the focus to it using the arrow keys or click on it with the left mouse button, then type:

- Spacebar or '?' to clear the reactivity score
- '0' (zero) to set reactivity score to 0
- '-' to set reactivity score to +/- (weak reactivity)
- '+' or '1' to set reactivity score to 1+
- 2 to set reactivity score to 2+
- 3 to set reactivity score to 3+
- 4 to set reactivity score to 4+
- 'E' or 'H' to mark hemolysis

Figure 9.6. Editing the reaction score



If you type any different character or double click with the left mouse button, Resolvigen 4 will display a list of possible values: press **Escape** or click somewhere else with the mouse to dismiss the list or select a new value by clicking on it with the left mouse button or by moving to it with the up and down arrow keys and pressing **Enter**.

Chapter 10. Program configuration

To view or edit the Resolvigen 4 configuration, select the **Configure** item in the **File** menu. Resolvigen 4 will display a page with several tabs at the top. Click on the tab related to the subject you wish to browse.

When you are finished browsing configuration parameters, click **OK** to save changes or **Cancel** to dismiss this page without saving changes.

1. The Storage tab

This page contains various settings for storing, indexing, importing and exporting data.

Resolvigen 4 may store data either in external XML files or in fields contained in a database; the checkmark **Store data in external XML files** described below is used to control this.

When storing data in external XML files, the database is only used to index files and can be erased and rebuilt anytime without loss of data; this option is recommended when Resolvigen 4 is used on a single machine with a local database; if the database gets corrupted, for example when a power failure occurs, the database can be rebuilt from the XML files.

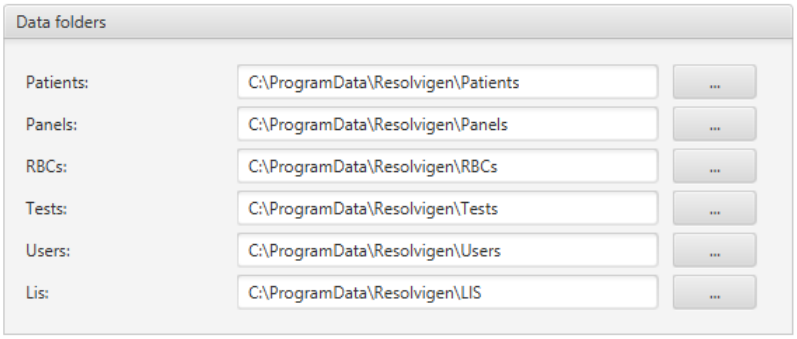
When storing data in the database, the folders for the XML files are not used; this option is needed when data must be shared among different machines using Resolvigen 4 and requires a client server database; in this case the database runs on a server, so data is not corrupted when a failure occurs on the local machine. The use of mySQL is recommende in this case.

In any case, it is recommended to perform periodic backup; it is easy to perform backups with Resolvigen 4, just select +**Utilities** → **Backup**; the backup format used by Resolvigen 4 allows restoring data on systems using different storage configurations (e.g. a backup from a system using a client server database, may be restored on a system using external XML files)

1.1. Data folders

When Resolvigen 4 data is stored in XML file: each item, be it patient, test, panel or anything that has a row displayed in Resolvigen 4 main window, has an associated XML file to hold it.

Figure 10.1. The Data folders group



Since all data files have .XML extension (they are all in XML conforming format), files for different object types must be stored in different folders; so different folders must be set up for:

- Patients
- Panels
- Rare RBCs
- Tests

- Users

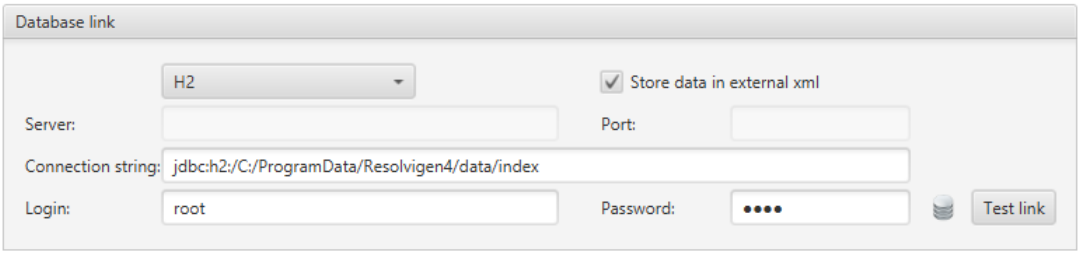
To change the folder set for each of these item types, you can either edit the related field or click the button at its right and select it in a folder selection window.

The **LIS** folder is used to export results to the Laboratory Information System; data is exported in ASTM format.

1.2. Database link

Resolvigen 4 needs a database for indexing XML files or for storing data depending on the program configuration.

Figure 10.2. The database link configuration



When **Store data in external XML** is selected, the first five items in **Data folders** are enabled and the folders set in those fields are used for storing data; the database is used only for indexing; in this case a local database is used and the driver used is **H2**.

Resolvigen 4 will try to figure out a reasonable directory for storing the database tables, but is is anyway possible to specify a directory in the **Server** field. If the directory in the **Server** field is valid, it will take precedence over the default set by Resolvigen 4 and the **Connection string** field will be updated accordingly.

When a local database is used, **Login** and **Password** are not normally needed and these fields may be left blank.

When **Store data in external XML** is **NOT** selected, the first five items in **Data folders** are disabled and the folders set in those fields are not used. In this case a client server database is used and the driver should be set to **MySQL**.

You should ask to your system administrator to create a **resolvigen** domain in the database, with a user with rights to create and destroy tables. The system administrator should provide you with the **Server** (usually a four numbers sequence like 192.168.0.1) and the **Port** (normally 3306 for MySQL).

Login and **Password** must be set as indicated by the system administrator.

1.3. Default import folder

When you ask Resolvigen 4 to import or export data (e.g. when importing panel antigrams), Resolvigen 4 prompts you for the folder to use.

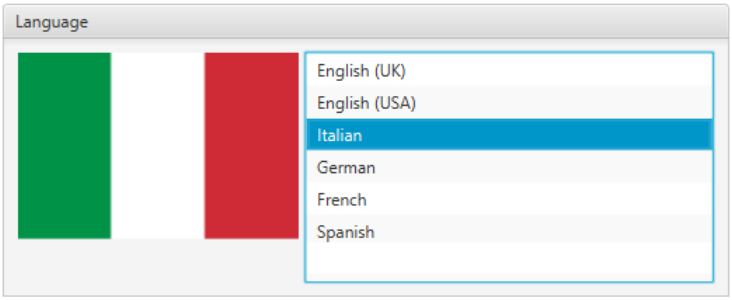
Figure 10.3. The default import folder

The value entered here is used as a default.

2. The user options tab

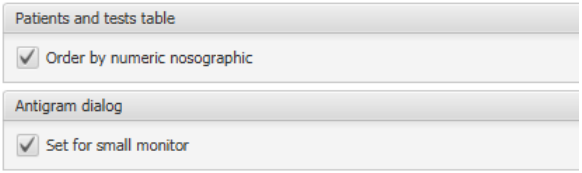
In this page you can select the Language and some other user related preferences.

Figure 10.4. Selecting the language



The list of available languages is displayed at the top. Select the language you prefer in the list: the flag on the left should be updated to reflect your settings. The date format will be DD/MM/YYYY for European countries and MM/DD/YYYY for the USA.

Figure 10.5. Other user options



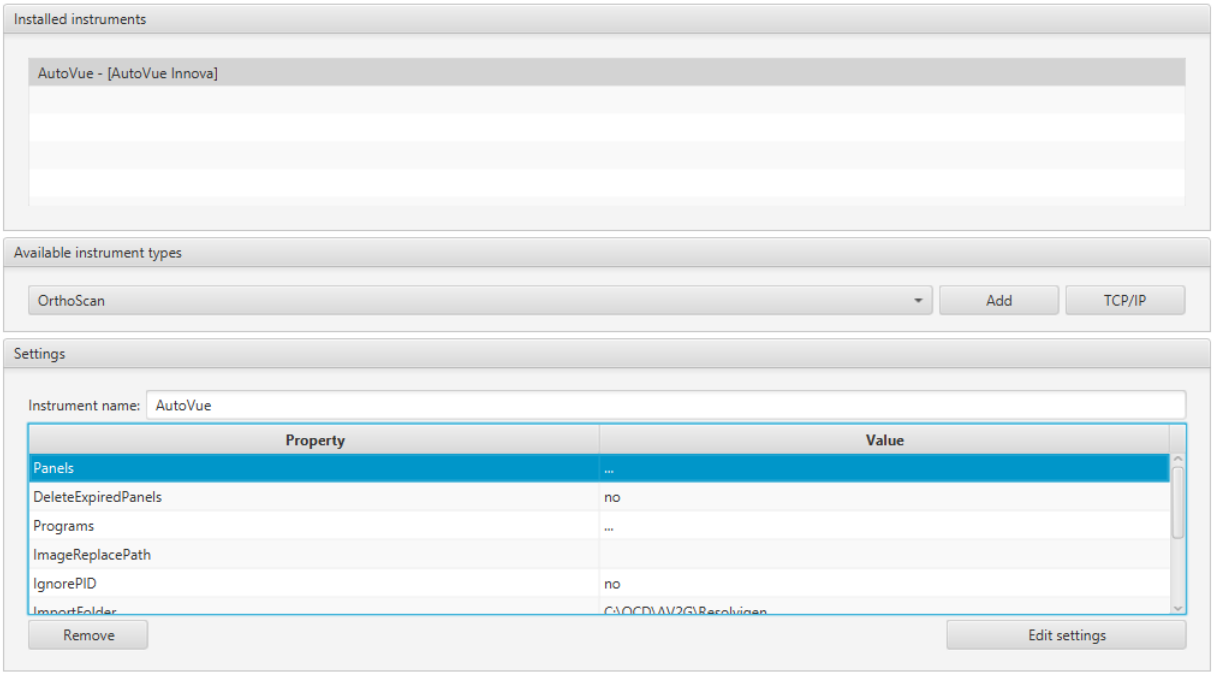
Patients codes are usually ordered alphabetically, that is '98' comes before '99', but also '100' comes before '98' (because '1' comes before '9'). If **Order by numeric patient's code** is set, the natural numerical order is observed.

Antigrams are quite wide for older computer screens, with resolution at 1024x768 and below. In this case, checking **Set for small monitor**, it is possible to display the central part, the one with the antigenic expressions, in a scrollable panel, so that the Rh aplotypes and the reaction scores are visible at the same time on the screen.

3. The Instruments tab

This page is used to manage instruments interfaced to Resolvigen 4. At the top a list of the currently interfaced instruments is shown.

Figure 10.6. The Instruments tab



Select an instrument model in the **Available instrument types** box and click **Add** to add a new instruments with default settings.

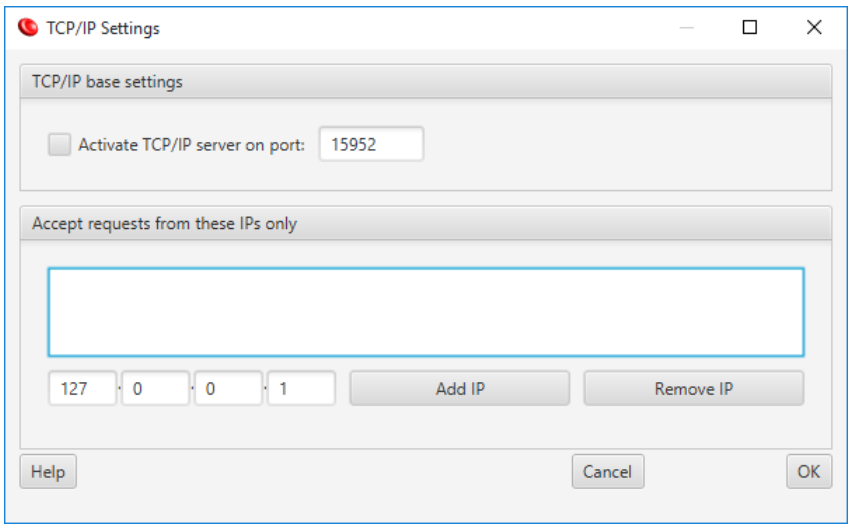
To modify instruments settings to suit your needs, select it in the list at the top: in the Settings box at the bottom of the window the current settings are displayed; you can edit the name, which is just used as a label in the **Instruments** menu to identify the instrument or click the **Edit settings** button to modify settings.

The dialog displayed to edit settings depends on the specific instrument. Refer to Chapter 11, *Interfacing to instruments* for further details.

To delete the currently selected instrument click the **Remove** button at the bottom left of the page.

Resolvigen 4 can receive commands from external programs through a TCP/IP connection; if you need to configure this option click the TCP/IP button.

Figure 10.7. The TCP/IP Settings tab



Resolvigen 4 displays a window in which the user may enable the TCP/IP server and select the IP port to use.

It is possible to select which machines are enabled to issue commands; to enable a machine just enter its TCP/IP address and click Add IP. The value 127.0.0.1 always means 'this machine'.

4. Modules

This page contains a list of keys used to enable different add on modules for Resolvigen 4.

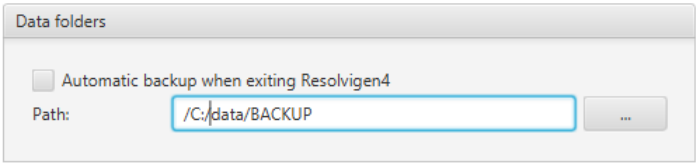
Click **Add module** button to add another row and enter the module name and key to enable the new module. Select a module and click the **Remove module** button to remove it.

Additional modules may be made available in the future.

5. Backup

In this page it is possible to set the default directory used by Resolvigen 4 to perform backups.

Figure 10.8. The backup settings page



If the option **Automatic backup when exiting Resolvigen 4** is set, Resolvigen 4 will backup data when exiting.

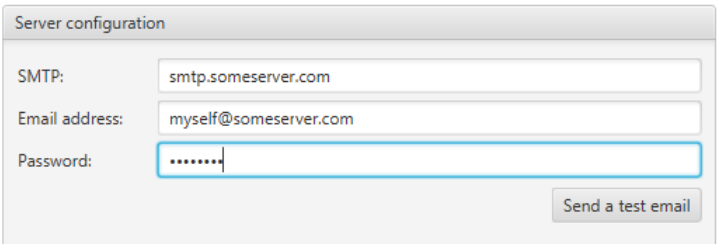
6. RBCs online

This page is used for setting the service for sharing selected RBC samples in the RBCs archives among different Resolvigen 4 users. This service has not yet been activated.

7. Email configuration

In this page it is possible to configure the email service used when exporting patients, RBCs or tests by email.

Figure 10.9. The mail configuration page



Ask your system administrator for the configuration required by your email server.

8. System information

This page displays a detailed description of your system; information shown here may be useful to technical support while helping you.

Chapter 11. Interfacing to instruments

Resolvigen 4 can import data from different instruments; normally the data received from the instrument just contain references to identify the context in which the reaction was obtained (RBC used, patient, phase of reaction): antigenic profile of RBCs is normally not available to the automatic instrument.

If this is the case, antigrams for panels being used must first be imported into Resolvigen 4 archives. These antigrams can normally be obtained directly from Ortho Clinical Diagnostics in electronic form. For instruments supporting this function, you will be able to view an image of the tube for the relevant reaction by right clicking on the related score cell.

1. Autovue (Innova or Vision)

Resolvigen 4 can import screening and identification test results from AutoVue instruments.

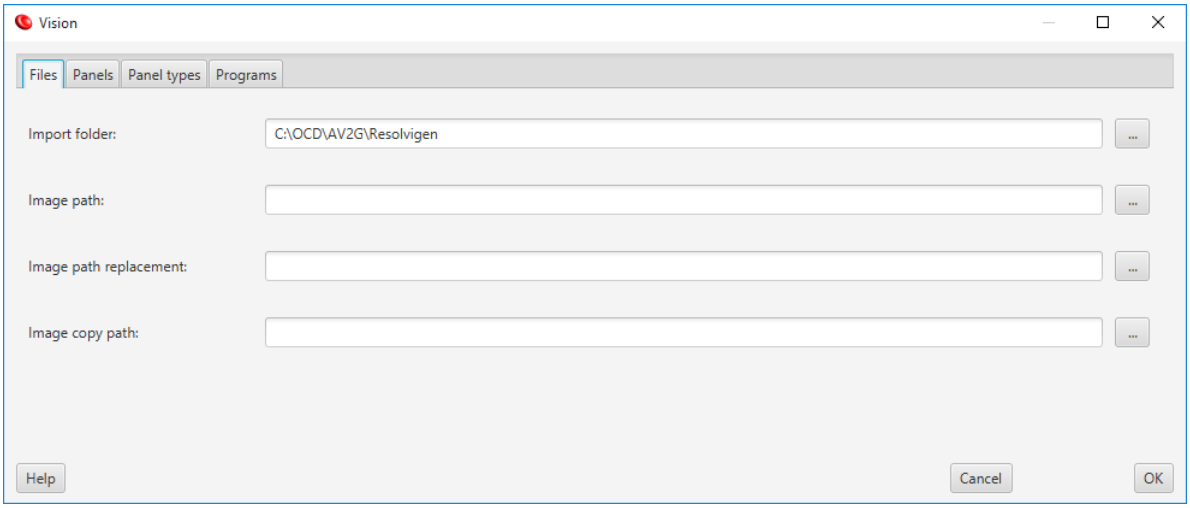
1.1. Configuring AutoVue import module

In order to configure AutoVue import module, select the +**File** → **Configure**, then select the **Instruments** tag.

Select Innova or Vision in the **Available Instrument Types** list and click the **Add** button. Resolvigen 4 will add an instrument to the **Installed Instruments** list; you may edit the instrument name.

Select this new instrument and click the **Edit Settings** button at the bottom of the window; the **AutoVue Configuration** window will appear; the first tab, **Files**, will be selected.

Figure 11.1. The Files tab



The following items must be configured:

- **Import folder**: this should be set to the folder used by AutoVue to export tests files (these files are named IdentXXXX.XML where XXXX is replaced by four digits). Resolvigen 4 will read files in this directory, import the tests they contain and delete them.
- **Image path**: this field and the next one are used to handle different naming conventions between Resolvigen 4 and Autovue environments; leave these fields blank if both applications run on the same PC
- **Image path replacement**: see **Image path**.
- **Image copy path**: depending on your AutoVue configuration, files in Image path directory may be deleted after some time. If you specify a path in Image copy path a copy of the images of the imported cassettes will be stored here.

If Resolvigen 4 and AutoVue run on different machines, you will most likely need to edit the **Image path** and the **Image path replacement** fields. This may be made clear with an example.

If files are stored inside `C:\OCD\AV2G\Resolvigen\Images` on the PC running AutoVue and directory `C:\OCD\AV2G\Resolvigen` is mapped to `X:\` on the PC running Resolvigen 4, just set:

- **Image path** to `C:\OCD\AV2G\Resolvigen`
- **Image path replacement** to `X:\`

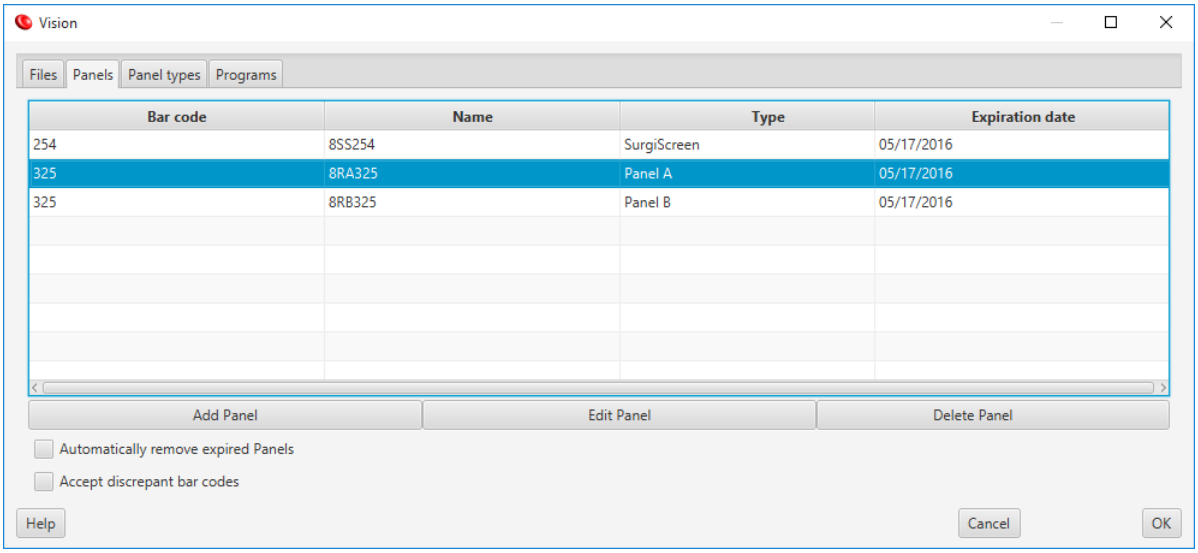
This way, when the file `C:\OCD\AV2G\Resolvigen\Images\22065488_001.jpg` is required, Resolvigen 4 will actually search for `X:\Images\2065488_001.jpg`.

The next three pages, **Panels**, **Panel codes** and **Programs**, contain information needed to import tests; if this information is missing or incomplete when importing tests, Resolvigen 4 will prompt you for the needed pieces of information.

Although it is possible to configure the following pages before importing data from AutoVue, it is recommended to avoid doing this: Resolvigen 4 will prompt you for all the required information when importing from the AutoVue and most fields will be pre-filled with the data received from the AutoVue.

The second tab, **Panels**, contains information needed to match the barcodes read by AutoVue with the panels stored in Resolvigen 4 archives.

Figure 11.2. The Panels tab

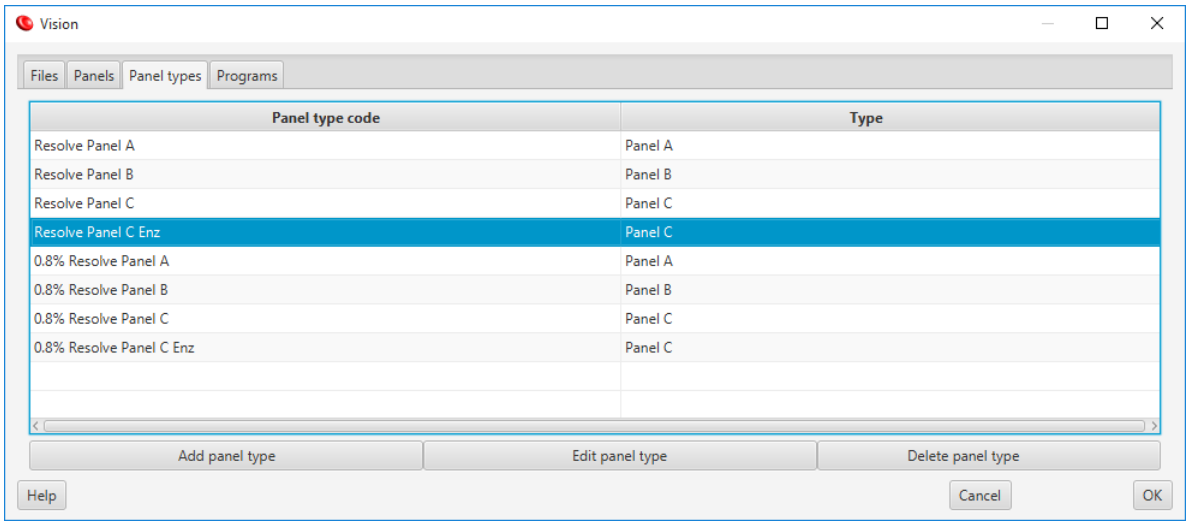


To add a new entry, click **Add Panel**; Resolvigen 4 will display a window in which you can enter the barcode and select the matching panel.

For deleting or editing an entry, select it in the table and click the **Delete Panel** or the **Edit Panel** button.

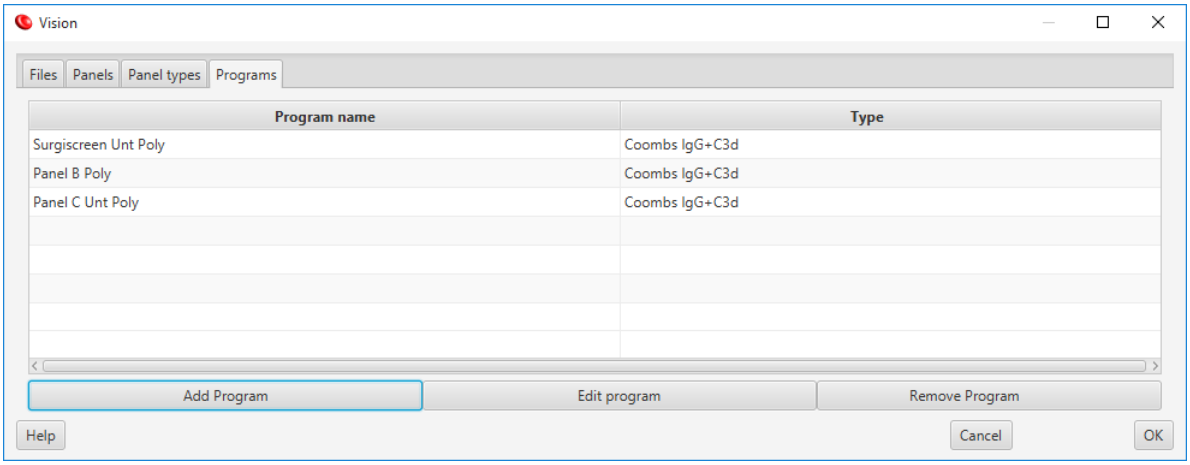
The third tab, **Panel types**, describes the correspondence between the names used by AutoVue and the names used by Resolvigen 4 to identify panel types.

Figure 11.3. The Panel types tab



The fourth tab, **Programs**, contains informations needed to match different parts of imported tests with different test phases.

Figure 11.4. The Programs tab



To add a new entry, click **Add Program**; Resolvigen 4 will display a window in which you can enter the program name and select the matching phase.

1.2. Importing from AutoVue

In order to import data from an AutoVue, select it from the **Instruments** menu.

Normally Resolvigen 4 will complete importing data in a few seconds; if some information is missing Resolvigen 4 will prompt the user. If, for example a new panel is being used, Resolvigen 4 will prompt the user with the barcode found by AutoVue and ask the user to select the matching panel in the archives.

If the panel you need has not been imported yet, click the **Import new panels** button and follow the standard procedure for importing panels into Resolvigen 4.

The first few times that the import utility is used, Resolvigen 4 will probably encounter new types of AutoVue programs; in this case Resolvigen 4 will prompt the user for the matching panel phase.

If everything goes fine the new tests will be imported, and a new icon will appear in the toolbar.

Figure 11.5. Imported data available icon

Click on it to browse a list of recently imported tests.

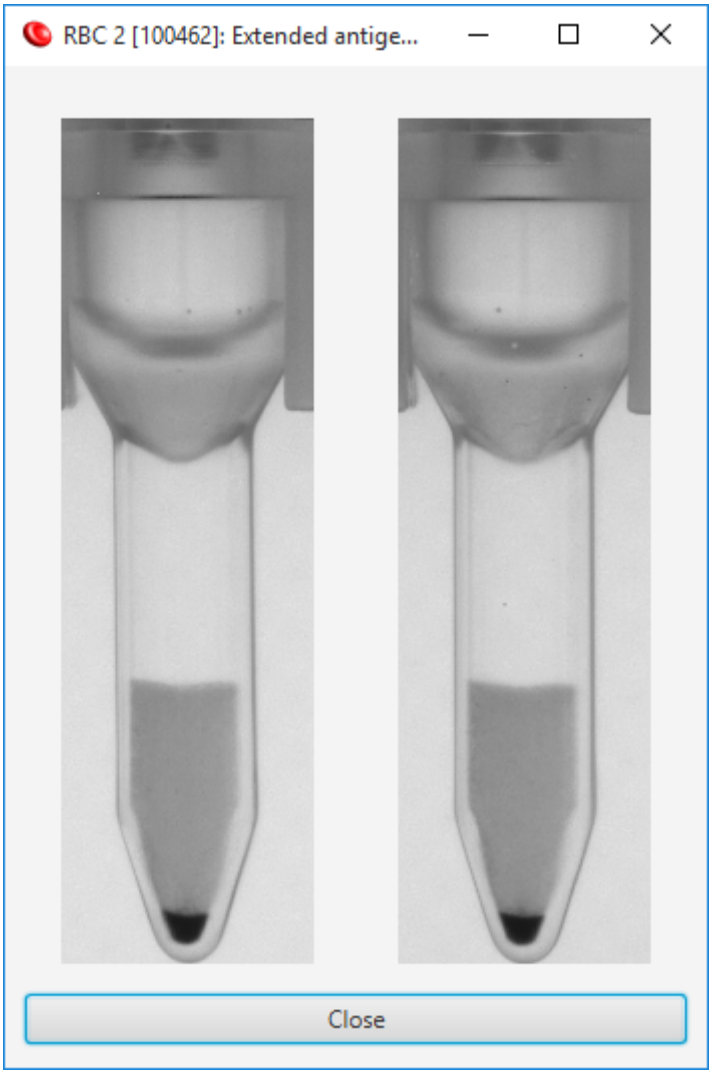
Select the test you wish to view and click **OK**.

Imported tests are added to Tests archive; select the Tests page to view them.

The Patients will not be imported immediately, but as soon as you double click the test line to view tests, Resolvigen 4 will check for the corresponding patient in Patients' archive.

When images for a given test are available, you may view them by clicking with the right mouse button on the field in the antigram matching the reaction phase and test RBC.

Figure 11.6. The BioVue window



Chapter 12. Access and security settings

When Resolvigen 4 is first installed. two users are defined:

- **guest**: if enabled, this user may login without password; if guest login is enabled, the login dialog is not displayed at program startup. In any case, it is still possible to login as a different user.
- **root**: this user has full privileges to assign and revoke accesses to other users and to set security preferences for Resolvigen 4; even if you are the only user of your Resolvigen 4 software, you should avoid to access the system as root for routine operation and also to leave the system unattended when you are logged in as root: a malicious user could tamper with your security settings and make the hardware protection key unusable.

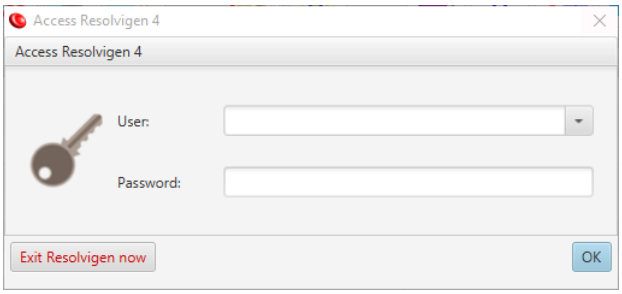
More users can be added, but these two predefined users cannot be edited or deleted; it is nevertheless possible to forbid access to the guest user.

User names are case sensitive, so Guest, GUEST and guest are different users.

1. Logging into Resolvigen 4

To change the currently logged user, double click on the user name in the bottom right corner of Resolvigen 4 window or select +**Access** → **Change user**.

Figure 12.1. The login dialog



A login dialog will appear: select a user in the **User** listbox and type the user password in the **Password** field, then click **OK**.

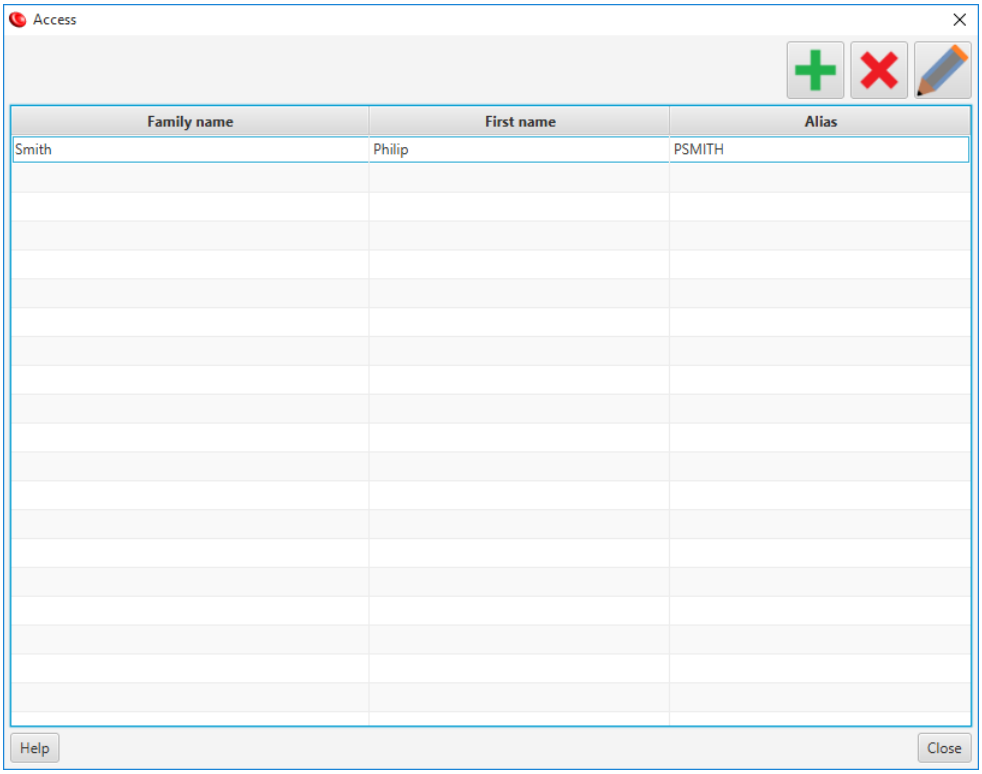
If guest login is allowed, you may leave the **User** and **Password** fields blank and click **OK**.

As soon as this dialog is displayed, the previous user is logged out, so it is not possible to simply dismiss the dialog and continue with the previous user; short of logging as a new user, the only other possibility is clicking the Exit Resolvigen now button to exit Resolvigen 4.

2. Managing accesses to Resolvigen

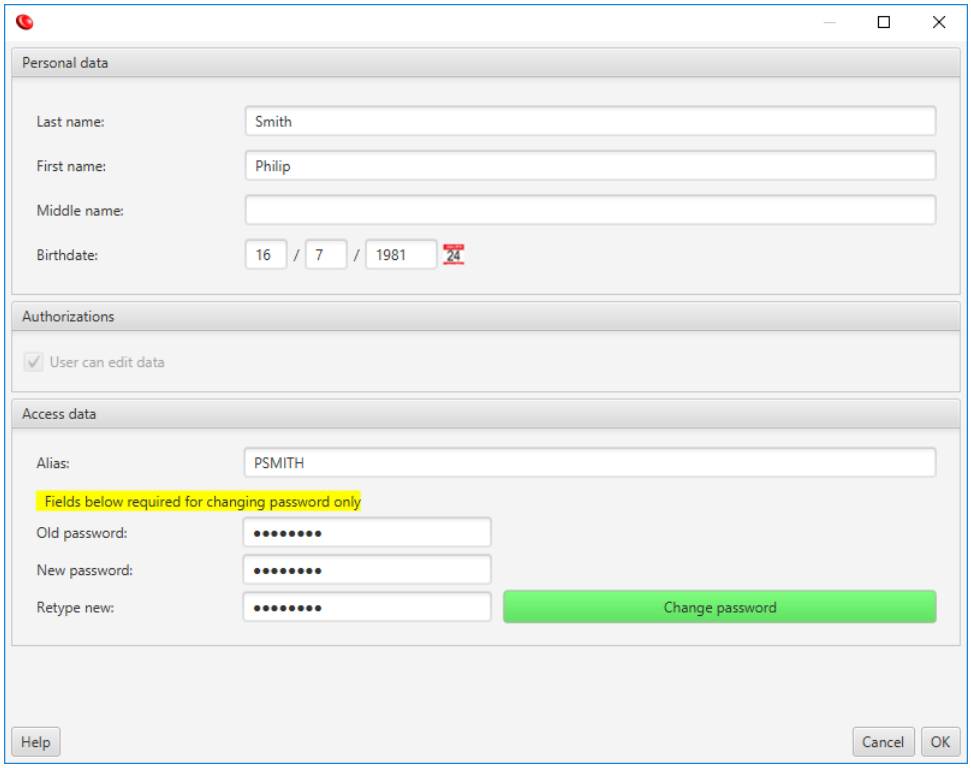
To edit the list of current users, select +**Access** → **Edit users**; Resolvigen 4 will display a list of the already defined users.

Figure 12.2. The users' window



Double click on one user or select it and click the **Edit** button to display all the details for that user.

Figure 12.3. The user's details window



If the user being edited is the same as the user currently logged in, it is possible to change the password; to do this:

1. Enter the old password in the **Old password** field.

2. Enter the new password in the **New password** field

3. Retype the same password in the **Retype password** field.

4. Click the **Change password** button; if the password is accepted, this button will become green, otherwise it will become red.

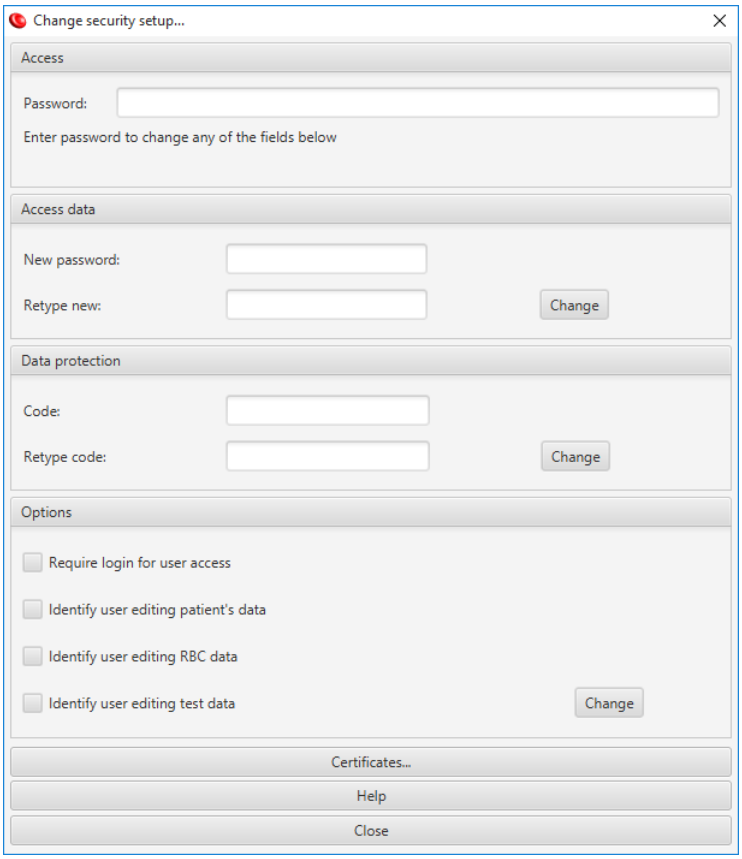
When the root user is logged in, all field are editable; further, the **Add** and **Delete** buttons are enabled so that it is possible to add new users and delete existing users. Note that the root user does not need to enter the old password in order to set the new password.

3. Configuring security setup

Only the root user is allowed to change the security setup; login as root to access the security setup window.

Select +**Access** → **Change security setup** to display the **Security Setup** window.

Figure 12.4. The Security Setup window



Change root password

The root password is the password for the root user; for security reasons this password is recorded in the hardware protection key.

To change this password:

1. Enter the old password in the **Password** field in the **Access** section.

2. Enter the new password in the **New password** field in the **Access data** section.
3. Enter the new password again in the **Retype new** field in the **Access data** section.
4. Click the **Change** button in the **Access data** section.

The new password is now effective.

Change data protection code

The data protection code is used to encrypt the user passwords when they are stored in the Resolvigen 4 database.

To change the data protection code:

1. Enter the current password in the **Password** field in the **Access** section.
2. Enter the new data protection code in the **Code** field in the **Data protection** section.
3. Enter the new data protection code again in the **Retype code** field in the **Data protection** section.
4. Click the **Change** button in the **Data protection** section.

The new data protection code is now effective.

Changing the data protection code, invalidates the passwords of all users.

Change login requirements

It is possible to request that only authorized users can login into the program and edit data; four options control access to the program:

- **Require login for user access**: if this option is checked a login with a valid account is required when starting Resolvigen 4; in this case the guest account is disabled.
- **Identify user editing patient's data**: if this option is selected, Resolvigen 4 will ask the user to confirm his login credentials when trying to save data for a patient.
- **Identify user editing RBC data**: if this option is selected, Resolvigen 4 will ask the user to confirm his login credentials when trying to save data for an RBC sample.
- **Identify used editing test data**: if this option is selected, Resolvigen 4 will ask the user to confirm his login credentials when trying to save data for a Test; Resolvigen will also ask the user to confirm his credentials when exporting Results to LIS (Laboratory Information System).

To change these options:

1. Enter the current password in the **Password** field in the **Access** section.
2. Set the desired options in the **Options** section.
3. Click the **Change** button in the **Options** section.

The new options will be effective immediately.

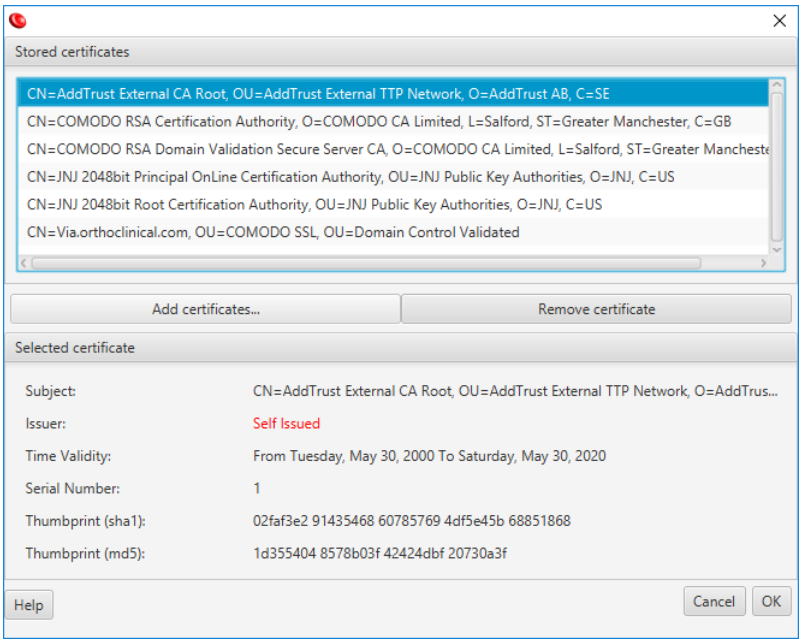
The login name of the user that has edited some data is recorded in the Resolvigen 4 archives.

4. Managing digital signature certificates

Only the root user is allowed to change the security setup; login as root to access the security setup window from which you will be able to access the Digital Signature Certificates window.

Select +**Access** → **Change security setup** to display the **Security Setup** window; at the bottom of this window, click the **Certificates** button to display the **Certificates** window.

Figure 12.5. The Certificates window



A list of the available certificates is displayed at the top; select one of these certificates to display full details in the lower part of the window.

From time to time new certificates are required to validate the new panels; you should obtain new certificates through Ortho Clinical Diagnostics; to import these certificates, that should come in a PKCS7 format file (normally with extension .p7b) click the **Add certificates** button.

Verifying digital signature certificates in conformance to current standards requires checking Certificate Revocation Lists (aka CRLs) online. To do this, your computer must be connected to the Internet during the signature verification process. In order to avoid such strict requirements, Resolvigen 4 does not check CRLs, making digital signature verification somewhat less secure, but more practical.