

# IQ Image Quality

## User's Guide

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ImageServer is intended for use with the SVS file format (the native format for digital slides created by scanning glass slides with the ScanScope scanner). Educators will use Aperio software to view and modify digital slides in Composite WebSlide (CWS) format.

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# 1 Overview

Aperio Image Quality (IQ) technology gives pathologists and other scientists who view digital slides the ability to customize the view of those slides to boost productivity and visual clarity by digitally adjusting the stain colors, viewing the individual stain images, and/or re-mixing the stains on the fly while they navigate the image.

In many cases, the judgment of what is a “good” slide depends on:

- What you are trying to accomplish in viewing that slide
- Personal preferences concerning color, lightness versus darkness, cell structure emphasis, and so on.

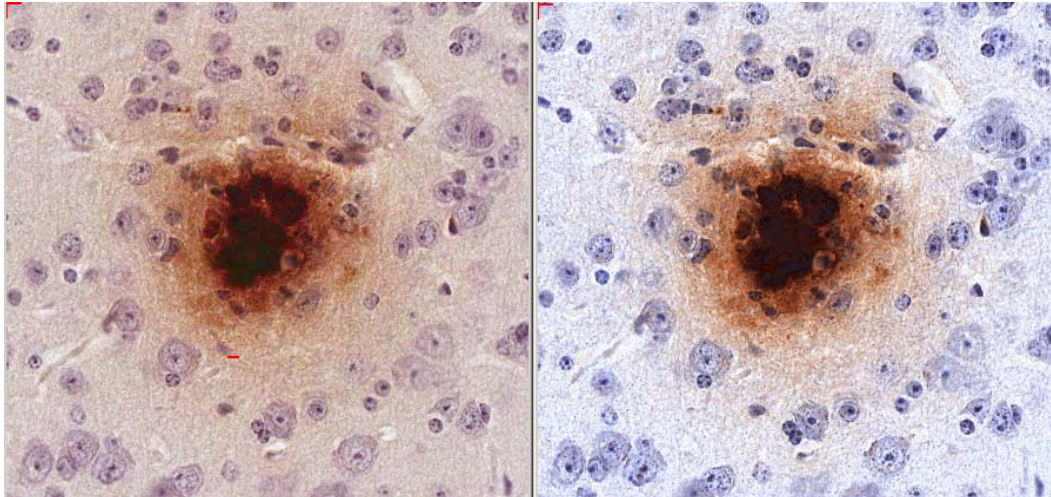
IQ allows you to choose for yourself what view of the digital slide gives you the best results and makes it easier for you to identify the features of the slide you are most interested in.

## IQ Features

IQ uses color processing—analyzing each pixel of the digital slide image—to identify stains and modify their appearance on the digital slide. Some of its features include the ability to:

- View a selected stain as you navigate the digital slide. IQ uses color deconvolution to separate the stains and present them as you pan or scroll about the image.
- Boost or dilute the displayed concentration (especially useful for overstained or understained slides, or to suit your personal preference).
- Enhance cellular detail such as nuclei.
- Digitally adjust individual stain colors for visual clarity and personal preferences (for example, darker/lighter, more or less vibrant, bluer/redder, and so on).

Here is a simple example of what IQ can do for you. IQ transformed the view of a poorly stained Hematoxylin & DAB slide (on the left) to one in which tissue structures are clearly delineated (on the right):



## How IQ Works

IQ is an option within the ImageScope digital slide viewer. IQ enhances the view of a digital slide by allowing you to define visual characteristics of the stains you use. IQ does not change the actual digital slide, and the visual enhancements it makes are applied only for the current ImageScope viewing session. However, you can save the stain adjustments you make so you can apply them to the view of other digital slides. At any time you can turn IQ on or off for a specific digital slide even when viewing multiple slides simultaneously.

## Prerequisites

ImageScope must be installed on each workstation on which users will be viewing digital slides.

Your site must be licensed for Spectrum Plus and you must open images in ImageScope in Spectrum Plus to use IQ (that is, you cannot use IQ for images you open locally on your workstation or local area network).

## Stains

IQ's perspective on all digital slides is that they are composed of individual stains. Stains to IQ are a *color vector*—a color that ranges in intensity from dark to light.

Many stain definitions are delivered with IQ. You can replace the delivered IQ stain definitions with measurements from your control slides or from single-stain areas on test slides. Similarly, you can extend the list of IQ stains.

## Stain Sets

You are already familiar with the stains used in your tests—for example an H&E slide uses Hematoxylin and Eosin stains and an ER slide uses Hematoxylin and DAB stains. With IQ, you define your *stain set*—the two or three stains that make up your test and the IQ enhancements to be performed on each of those stains. For example, you may devise one IQ stain set for a lightly stained H&E digital slide, one for a darkly stained H&E digital slide, and another for a HER2/neu digital slide.

To use IQ when viewing a digital slide, select a stain set from the IQ drop-down list on the ImageScope toolbar. Then, as you navigate the digital slide, IQ applies the enhancements defined in that stain set to the image.



# 2

## Quick Tour

This chapter gives a tour of the IQ user interface, showing a quick example of using IQ on a digital slide created from an H&E-stained slide. For details on each function, see the following chapters.

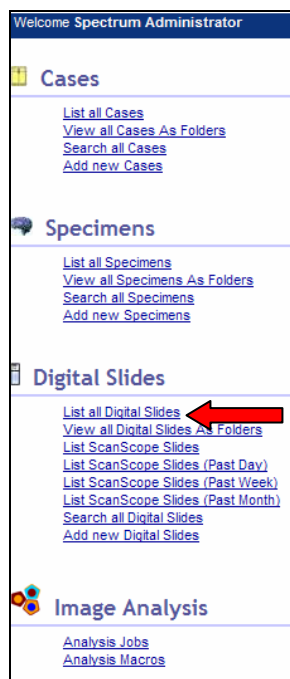
### Opening an H&E Digital Slide in ImageScope

You can use IQ with a slide stained with any stain, but for this quick introduction we will use an H&E-stained slide.

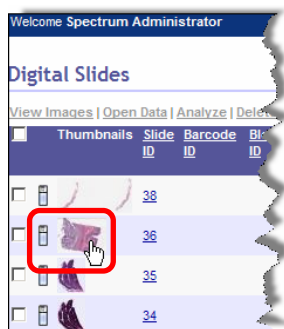
To open an H&E digital slide:

1. Log into Spectrum with your user name and password.
2. On the main Spectrum page, click **List All Digital Slides** in the Digital Slides section:

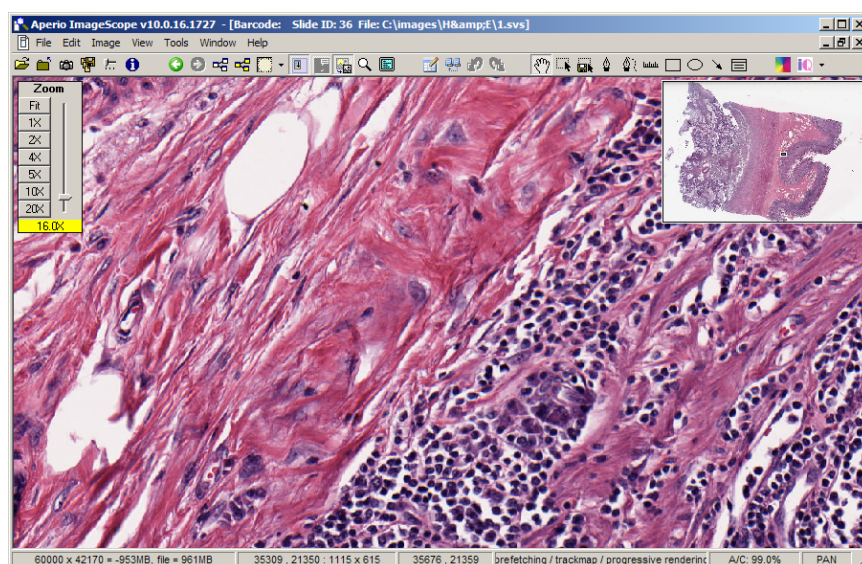
The appearance of the Spectrum main page may differ slightly from the example depending on how Spectrum is configured at your site.




- On the Digital Slides list page, click the thumbnail image of an H&E-stained digital slide to open it in ImageScope:

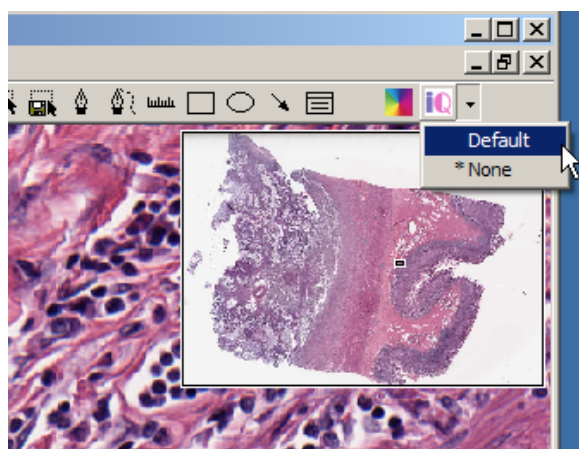


The digital slide appears in the main ImageScope window:



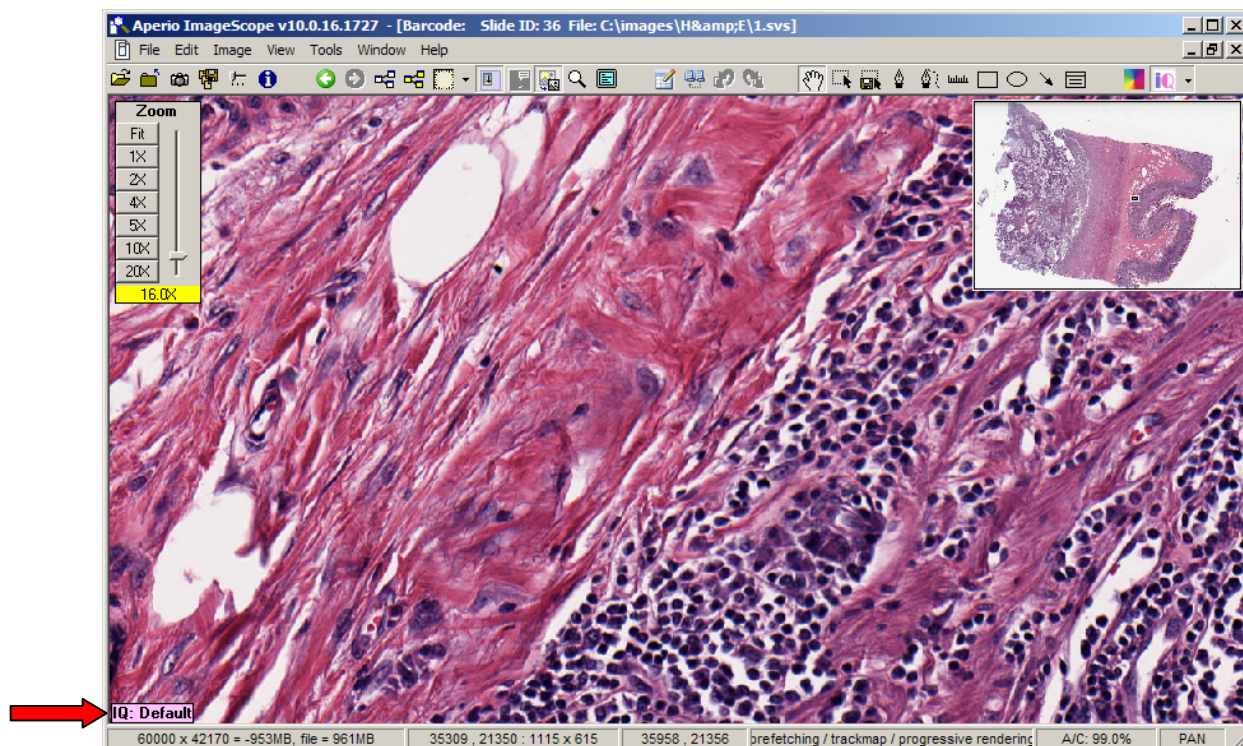
This is the default view of this digital slide before IQ is applied to it.

- Click the down-arrow next to the  icon and select **Default**:





This applies the Default stain set to the image:




Notice the small pink box at the bottom left, which tells you that the Default stain set has been applied to the image.

5. To turn IQ off, click the  icon again and the pink box at the bottom left disappears as IQ is turned off.

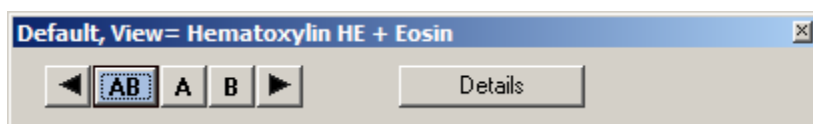
Because most glass slides are stained with Hematoxylin and Eosin (H&E), the Default stain set contains basic settings for H&E-stained digital slides. Depending on your particular digital slide, turning on IQ and using the Default stain set may make a meaningful difference in the view or the results may be more subtle. (Some of the more subtle changes may be difficult to see on the printed page in this guide, but will be more obvious when you see the digital slide in ImageScope.) In later chapters, we will show you how to develop your own stain sets that are optimized for your preferences and staining process.

## Viewing Individual Stains

To open the IQ application:

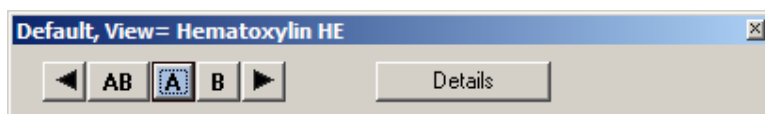
1. On the ImageScope menu bar, go to the Image menu and select **Quality**. (If the **Quality** command is not enabled in the Image menu, click the  icon on the ImageScope toolbar to turn on IQ.) Or, type Control Q after turning on IQ.

The Image Quality viewing toolbar appears:

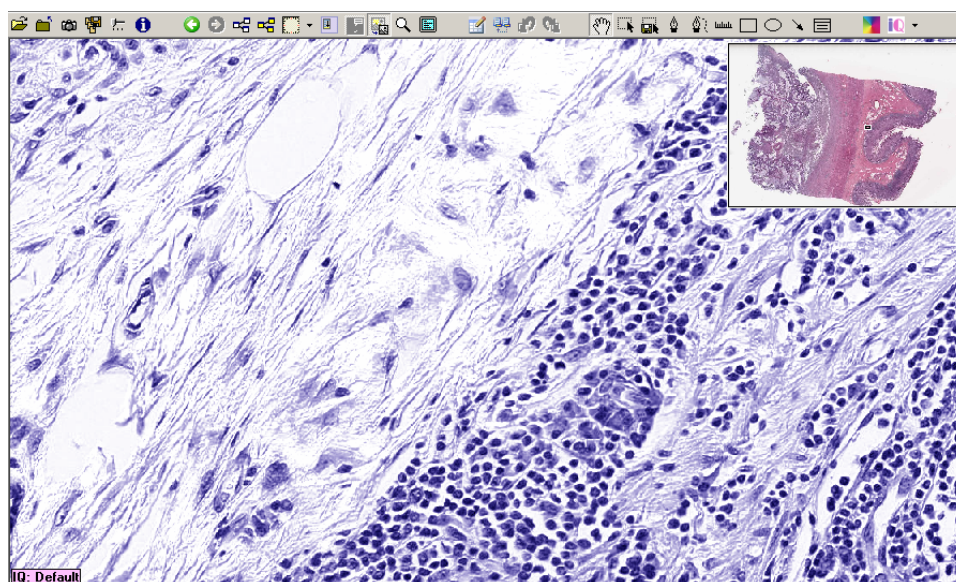


This viewing toolbar is available on every tab of the IQ application window.

- To see the digital slide with only Stain A (Hematoxylin in this case) applied, click **A**:



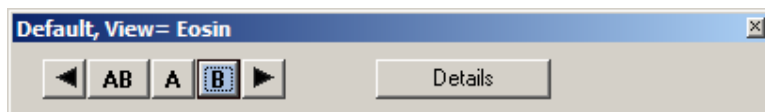
and only the Hematoxylin stain is displayed:



With the cursor on the viewing toolbar controls, you can progress through the views by pressing the keyboard space bar.

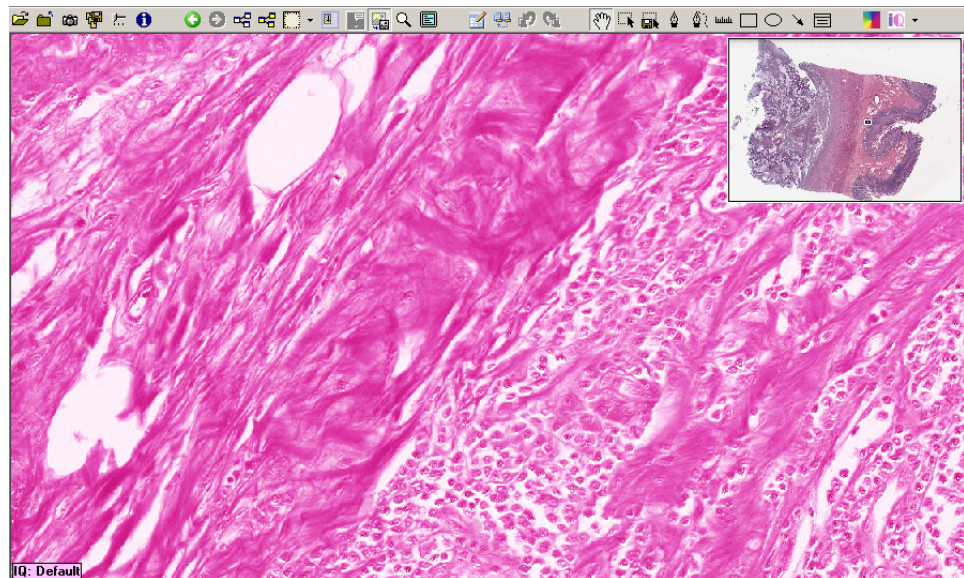
Subtracting the visual representation of a stain from an image of a digital slide that was stained with more than one stain is called *color deconvolution*. Notice that the image thumbnail always shows the original image with all stains applied.

- To see the digital slide with only Stain B (Eosin in this case) applied, click **B**:

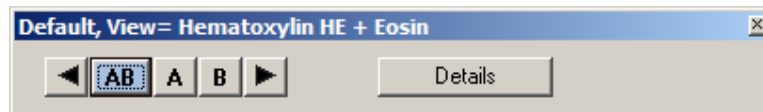




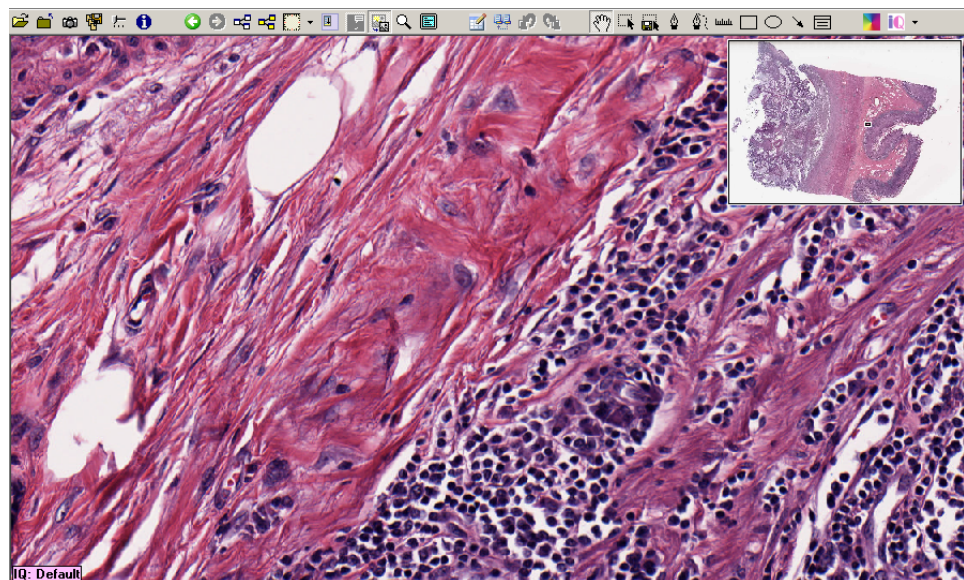
and only the Eosin stain is displayed:



4. To see the digital slide with both stains applied, click **AB**:



and both stains are displayed:




## Measuring Stains

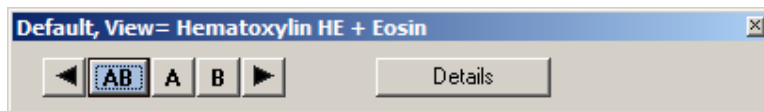
Several IQ functions are for defining and saving stain sets based on manually selecting stains, and changing concentration, intensity, and color settings. IQ also allows you to measure the color of the stains you use in your lab to create new stain definitions you can use in those stain sets.

For best results, we recommend scanning a control slide stained with a single stain. Then measure the stain on the digital slide to get a good representation of the stain used in your lab.

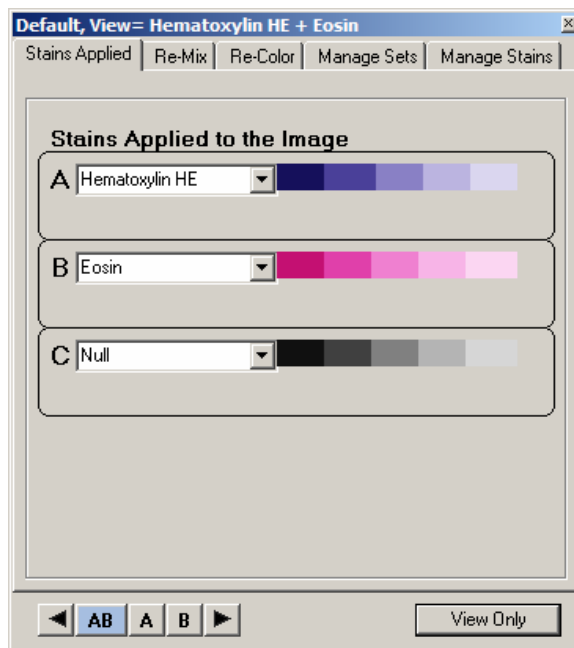
To open the IQ application:

1. On the ImageScope menu bar, go to the Image menu and select **Quality**. (If the **Quality** command is not enabled in the Image menu, click the  icon on the ImageScope toolbar to turn on IQ.) Or, type Control Q after turning on IQ.

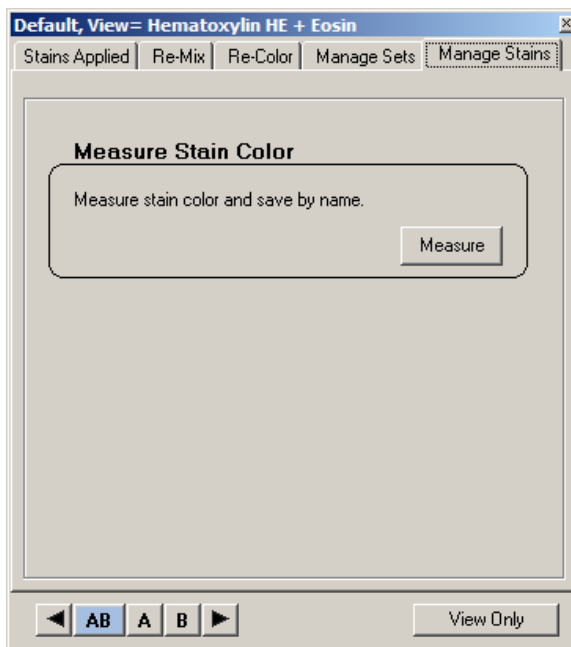
The IQ viewing toolbar appears.



2. Click **Details** to see the entire IQ window:

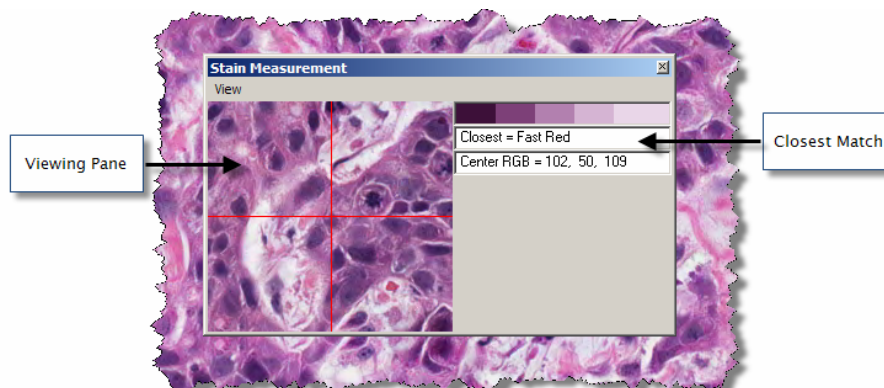


3. Click the Manage Stains tab. We will go into more details on using this tab in Chapter 5, “Measuring Stains” on page 29. However, for now we will point out a few features.



4. Click **Measure**.

This opens the Stains Measurement window. As you move it to different areas of the digital slide, you see the area of the digital slide that is under the viewing pane.



- IQ chooses a stain that is the closest match to the color being viewed and displays it in the text window.
- The color bar shown is a representation of the dominant color of the area you are measuring.
- You can save the stain you are measuring using your own stain name in the Save box or you can use the closest match name, overwriting that saved stain with this measurement from your lab.

- Additional viewing options are available in the View menu on this window (explained in Chapter 5, “Measuring Stains” on page 29).


## Defining the Stain Set

The Stains Applied, Re-Mix and Re-Color tabs of the IQ application allow you to identify the stains you are using and modify the display settings for the stains and save them as a custom stain set.

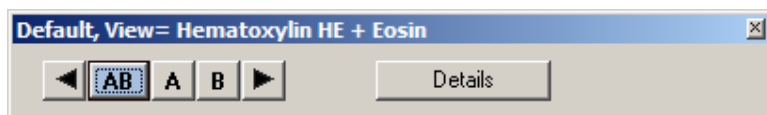
As soon as you begin to change the stain set settings, notice that the name of the stain set at the top of the IQ window becomes **Custom**. You will be able to save and name your newly created stain set later—see Chapter 6, “Creating or Modifying a Stain Set” on page 33.

## Identifying Stains

To open the IQ application:

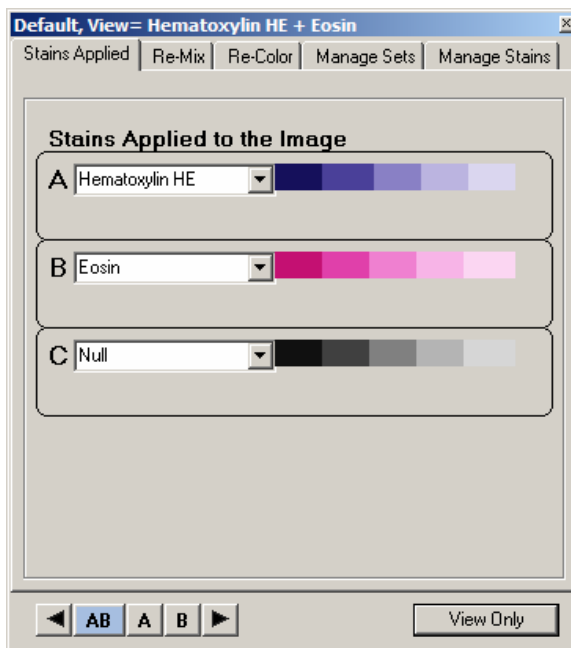
1. On the ImageScope menu bar, go to the Image menu and select **Quality**.  
(If the **Quality** command is not enabled in the Image menu, click the  icon on the ImageScope toolbar to turn on IQ.)

The Image Quality viewing toolbar appears.



The color bar next to the stain name shows the basic color range for that stain, darkest to lightest absorption. Each block is the same color (*hue*), but a different intensity.

2. Click **Details** to see the entire IQ window:

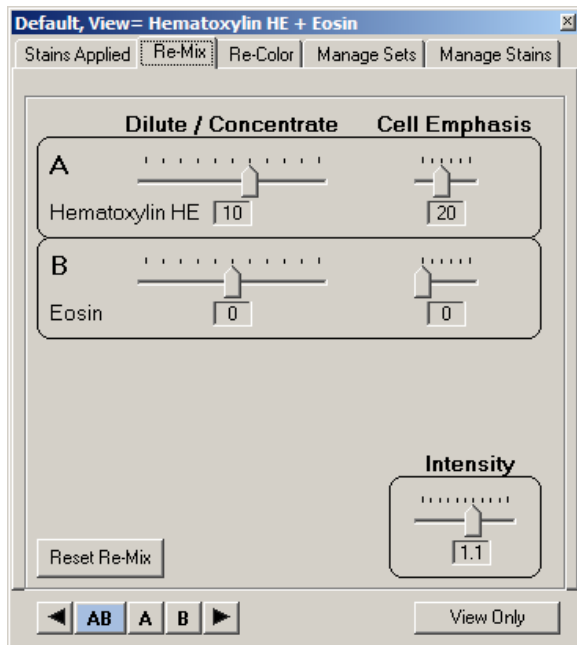


On this window, you can select the stains that were used to stain the current digital slide. Because we applied the Default stain set, which is based on Hematoxylin and Eosin, IQ already knows that the digital slide we opened was stained with H&E and so displays **Hematoxylin HE** in the Stain A box and **Eosin** in the Stain B box. Since no third stain is defined in this stain set, **Null** appears in the Stain C box.

On another IQ tab you will be able to measure the visual representation of the stains used in *your* lab, so that the stain selections match your own control slides.

## Re-Mixing Stains

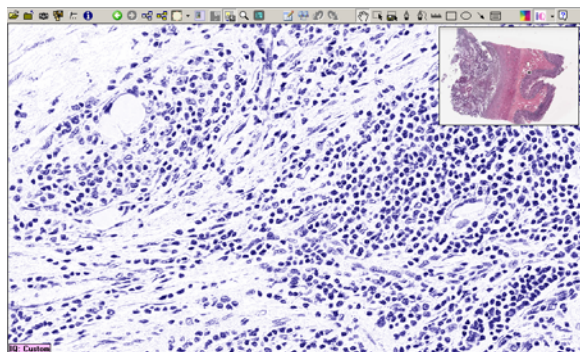
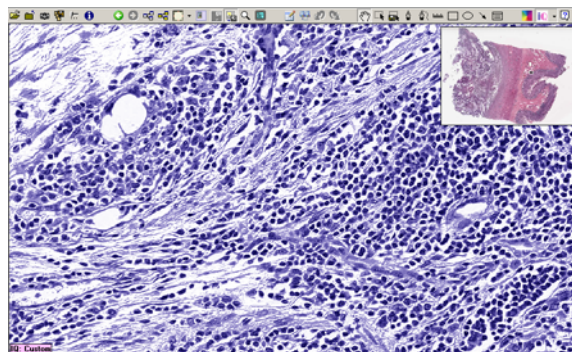
The results of staining glass slides in your lab differ depending on the concentration or dilution of your stains (for example, slides made at the end of a staining run might be lighter in color than those made at the beginning). The Re-Mix tab gives you a way to change the visual representation of your stain concentration:



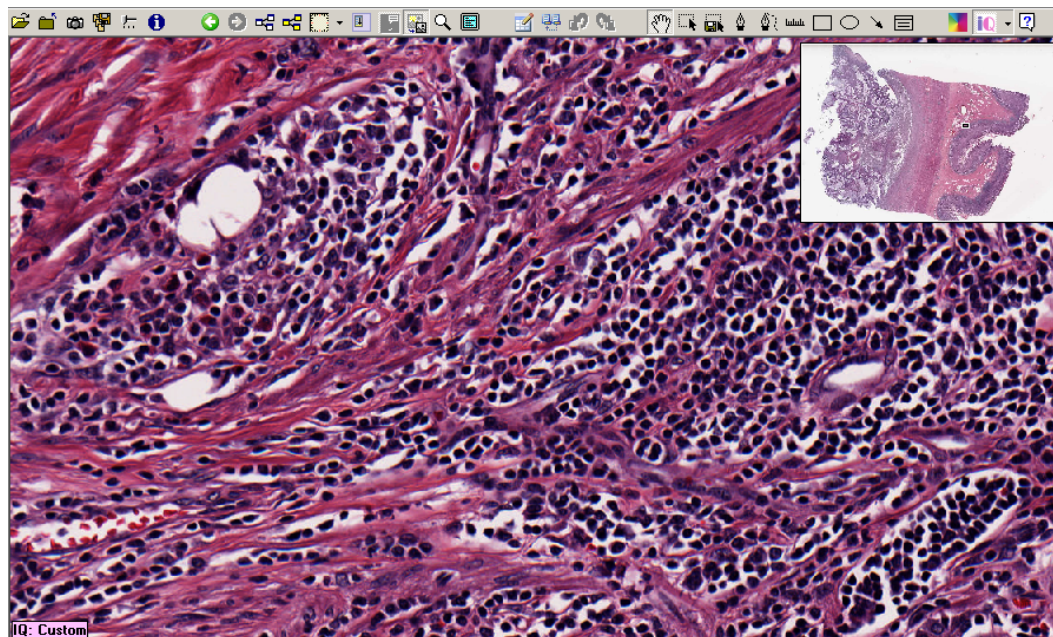
To see the clearest representation of your changes, you may want to use the viewing toolbar to view a single stain at a time. For example, when adjusting Stain A (in this case, Hematoxylin), set the view to Stain A.



- For each stain, use the Dilute/Concentrate controls to visually dilute or concentrate the stain (sliding to the left dilutes the stain; sliding to the right concentrates it). The results are visible in the main ImageScope window. For example, the images below show diluted versus concentrated Hematoxylin stain:

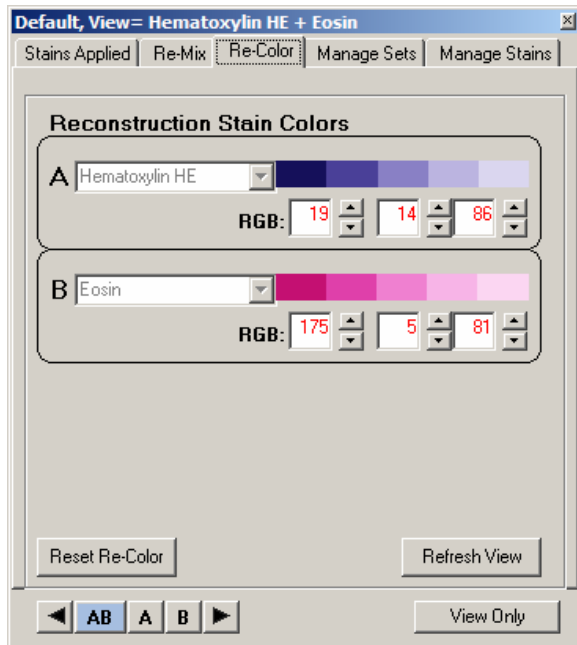
**Diluted****Concentrated**

- For each stain, use the Cell Emphasis controls to boost or reduce the visual emphasis of cell structures. (Of course, not all stains are used to identify cell structures, so you must decide if this control is appropriate for your application.)
- Use the Intensity control to boost the intensity of the entire image. For example, in the image below we set intensity to 1.5, which resulted in a much darker image:



## Re-Coloring Stains

The Re-Color tab gives you the opportunity to change the color for your stains. For example, if your personal preference is that Hematoxylin appear more “blue,” you can use this tab to make that change.



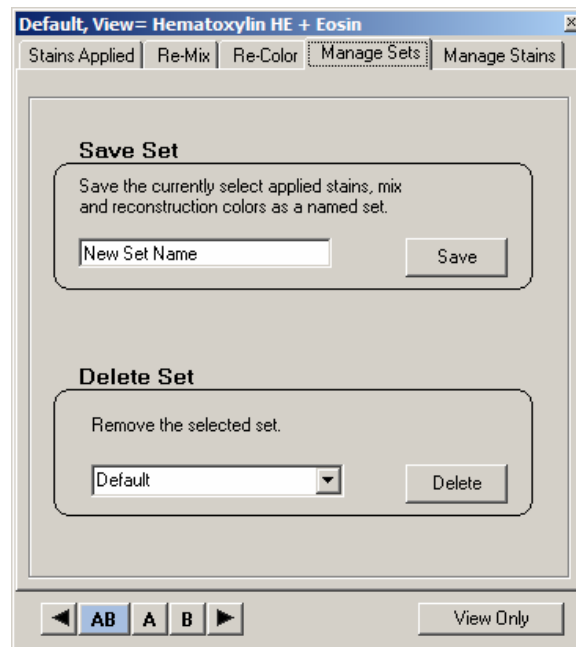
As on the Stains Applied tab, the color bar next to the stain name shows the basic color range for that stain, darkest to lightest absorption for the definition of that stain. The three numeric boxes starting from the left are the numeric representations of the stain vectors in RGB format (red, green, and blue) from zero to 255. For example, to boost the “redness” of Eosin, we would increase the number in the first box under that stain (and perhaps reduce the amount of blue in the third box). To see the effects of your re-color changes, click the **Refresh View** button.



## Saving the Stain Set

You can save a maximum of 100 stain sets.

Once you have set the stain settings to suit your preferences, you can save the settings as a new stain set on the Manage Sets tab. You can both save and delete stain sets.





# 3

## Getting Started

This chapter discusses how to get started with IQ and its different modes of use.

IQ offers two modes of use:

1. Enhance the view of a digital slide by applying an existing stain set (a stain profile) to the digital slide. You will use this mode after you have developed and fine-tuned your own stain sets that are appropriate for your staining process and personal preferences.
2. Create and fine-tune stain sets that you can apply to the view of digital slides. When creating your own stain sets, you can:
  - a) Measure the color of the actual stain used and save it as the standard for that stain. See Chapter 5, “Measuring Stains” on page 29.
  - b) Tell IQ what stains were used on a specific digital slide (either using the predefined stain definitions shipped with IQ or your own stain definitions saved when you measured your stains) and then fine-tune the settings for those stains until you are pleased with the view of those stains. See Chapter 6, “Creating or Modifying a Stain Set” on page 33.

IQ is an option of the ImageScope digital slide viewer. The enhancements it makes to the view of the digital slide are in effect only for that session of ImageScope and are not stored with the digital slide.

You can turn IQ on and off for a specific digital slide even when viewing multiple digital slides simultaneously.

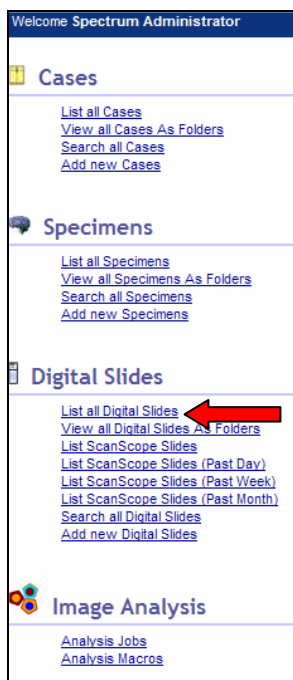
### Enabling IQ in ImageScope

IQ can be used in ImageScope only on a Spectrum site licensed for Spectrum Plus and when opening an image from Spectrum (that is, not when viewing a local digital slide on your workstation or local network).

## Opening a Digital Slide in Spectrum

To open a digital slide from Spectrum:

1. Log into Spectrum with your user name and password.
2. On the main Spectrum page, click **List All Digital Slides** in the Digital Slides section:

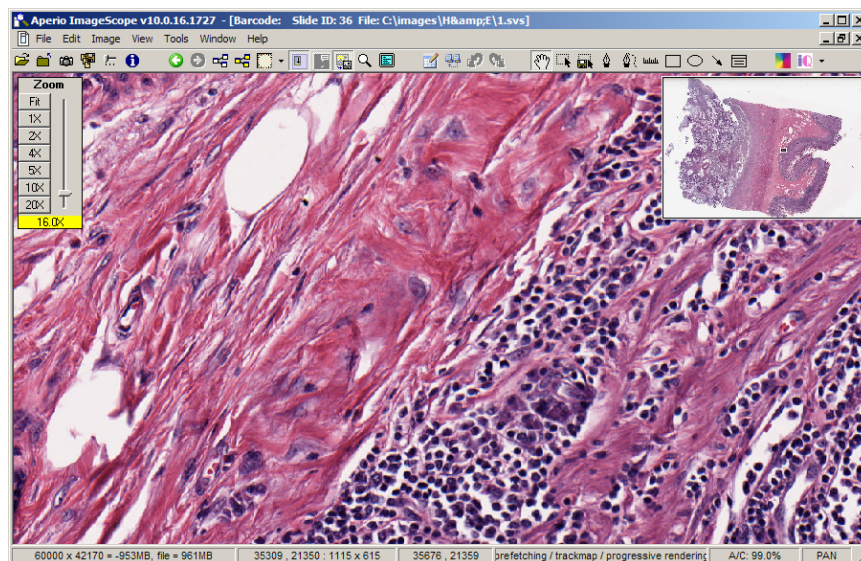


(The exact list of items you see on the main Spectrum page differs depending on the Spectrum configuration.)

3. On the Digital Slides list page, click the thumbnail image of a digital slide to open it in ImageScope:



The digital slide appears in the main ImageScope window:



This is the default view of this digital slide before IQ is applied to it.

## Applying a Stain Set

Two stain sets are provided with IQ:


- **Default** – Because most slides are stained with H&E, IQ comes with a Default stain set that has been optimized for H&E-stained slides. You can fine-tune this stain set by overwriting it with one modified for your preferences.
- **None** – This stain set contains no settings. Apply it when you want to develop your own stain set not based on an existing one.

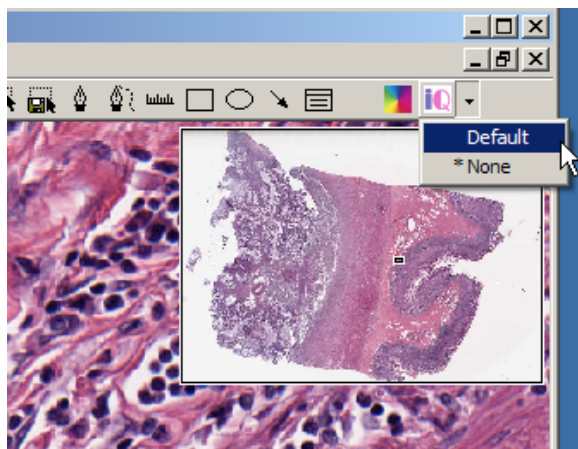
Later in this guide you will develop your own stain sets that can be applied to digital slide views.

To apply a stain set:

1. Open a digital slide in ImageScope.

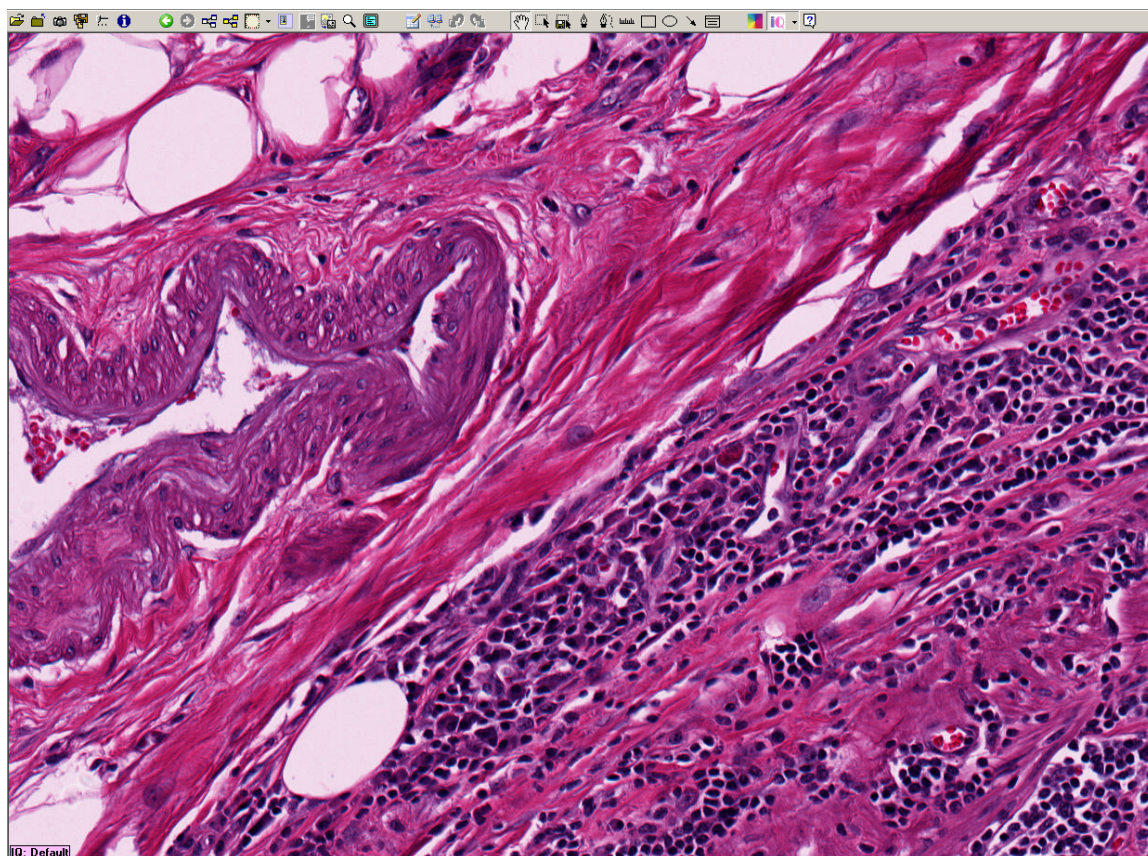


2. Click the down-arrow next to the  icon and select a stain set:




As you create your own stain sets, each new stain set will be added to the list of stain sets that can be applied to digital slide views. The currently applied stain set is shown with an asterisk in the list.

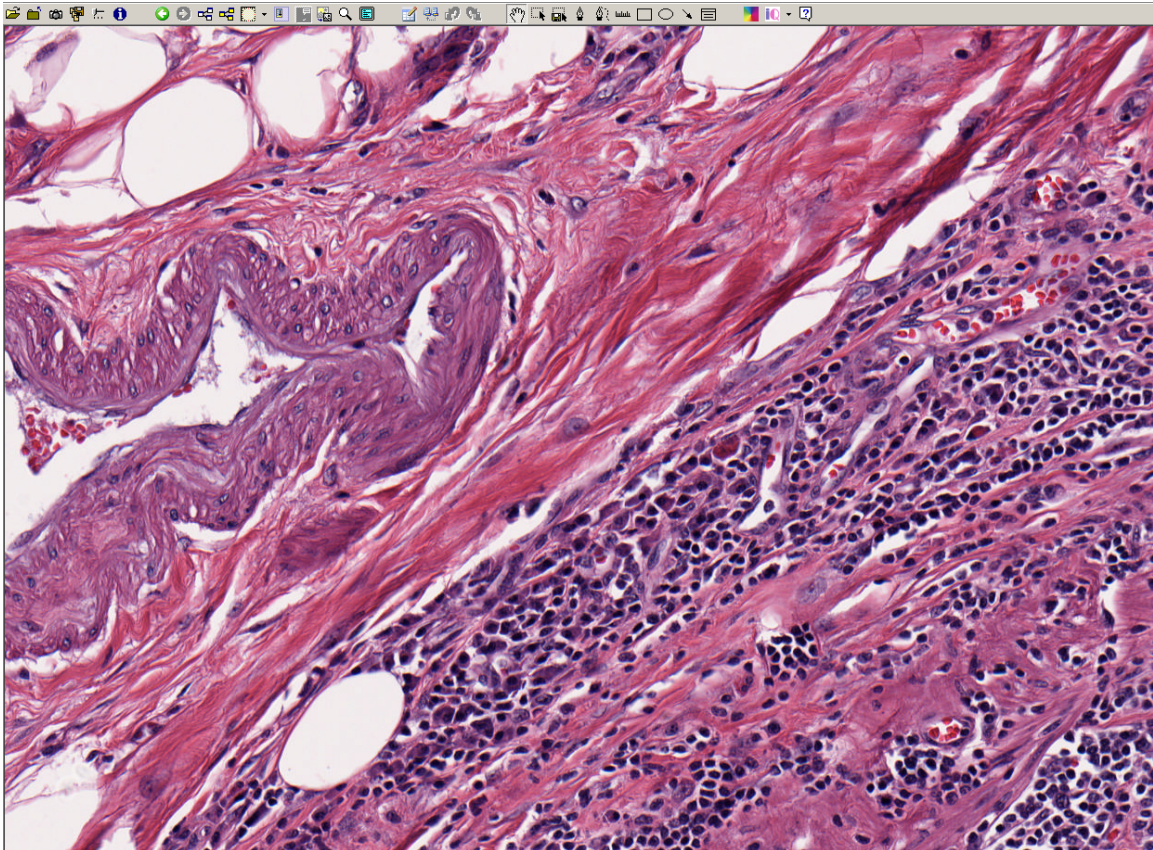
Selecting a stain set applies the selected stain set to the image:



Notice the small pink box at the bottom left, which tells you which stain set has been applied to the image.

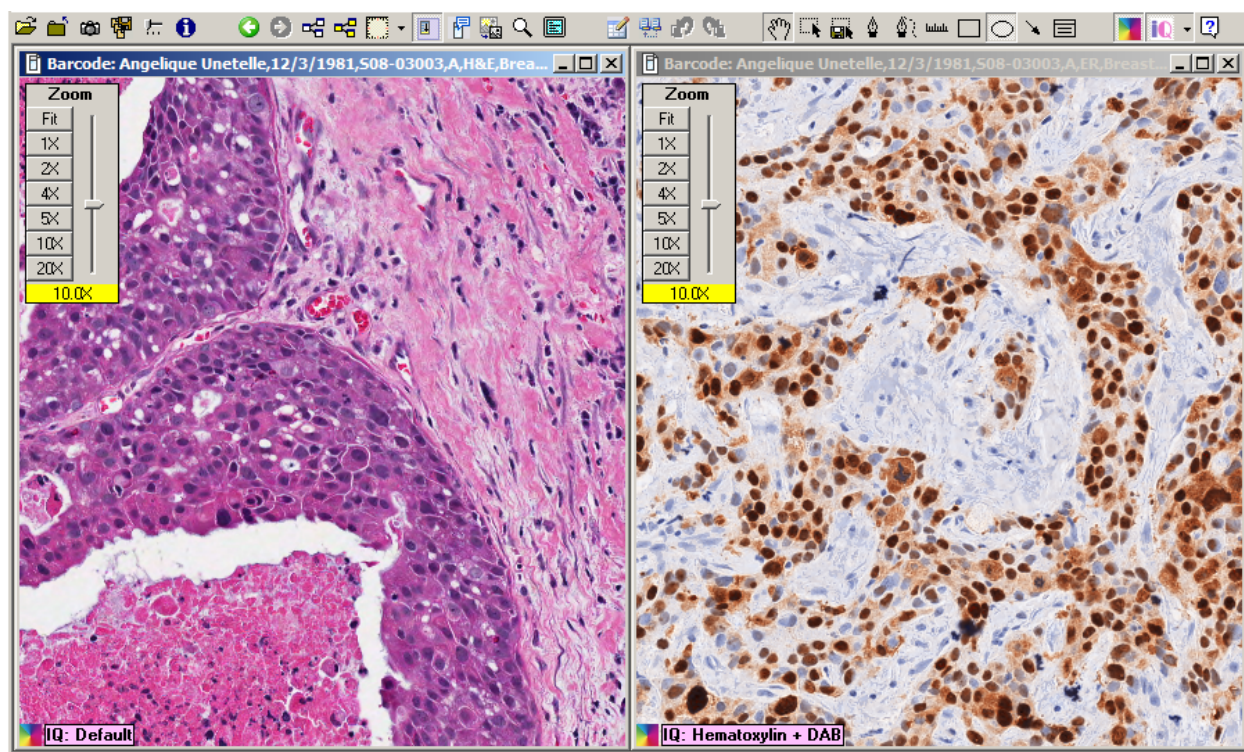


3. To turn IQ off, click the  icon again and the pink box at the bottom left disappears as IQ is turned off. For example, below is the view of the same digital slide as above with IQ turned off. Note that the small pink box at the lower left is gone and image looks slightly different than in the previous example.



## Viewing Multiple Digital Slides with IQ

With more than one digital slide in the ImageScope viewing window, select each digital slide image separately by clicking on it and then applying the IQ stain set you want to use with that digital slide. In the example below, one digital slide has the Default stain set applied and the other has a Hematoxylin + DAB stain set applied:






# 4

## Viewing Individual Stains

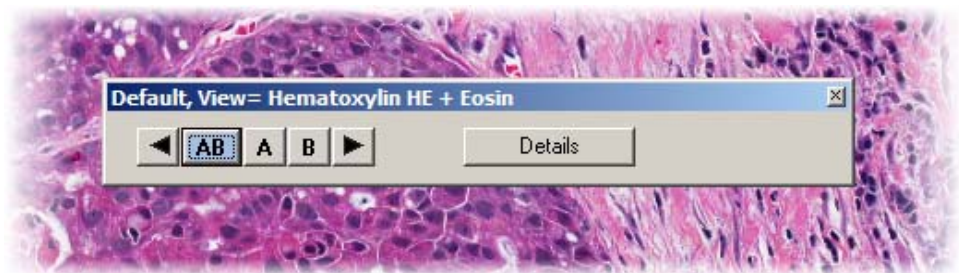
An important feature of IQ is that it allows you to easily see separate views of the stains used to stain your slide. This chapter discusses using the viewing toolbar to see separate stain channels.

By separating the view of a digital slide into separate stain color channels, you can isolate features of interest.




### Using the Viewing Toolbar

1. Open a digital slide in ImageScope as discussed in Chapter 3, “Getting Started” on page 19.
2. Apply a stain set to the digital slide (see “Applying a Stain Set” on page 21).
3. Go to the ImageScope Image menu and select **Quality** to open the IQ application. (If the **Quality** command is not enabled in the Image menu, click the  icon on the ImageScope toolbar to turn on IQ.) Or, type Control Q after turning on IQ.

The IQ viewing toolbar appears.



By using each viewing toolbar control, you can see just a single stain channel or all combinations of the stains. The button for the stain or stain combination currently being viewed is shaded in blue.

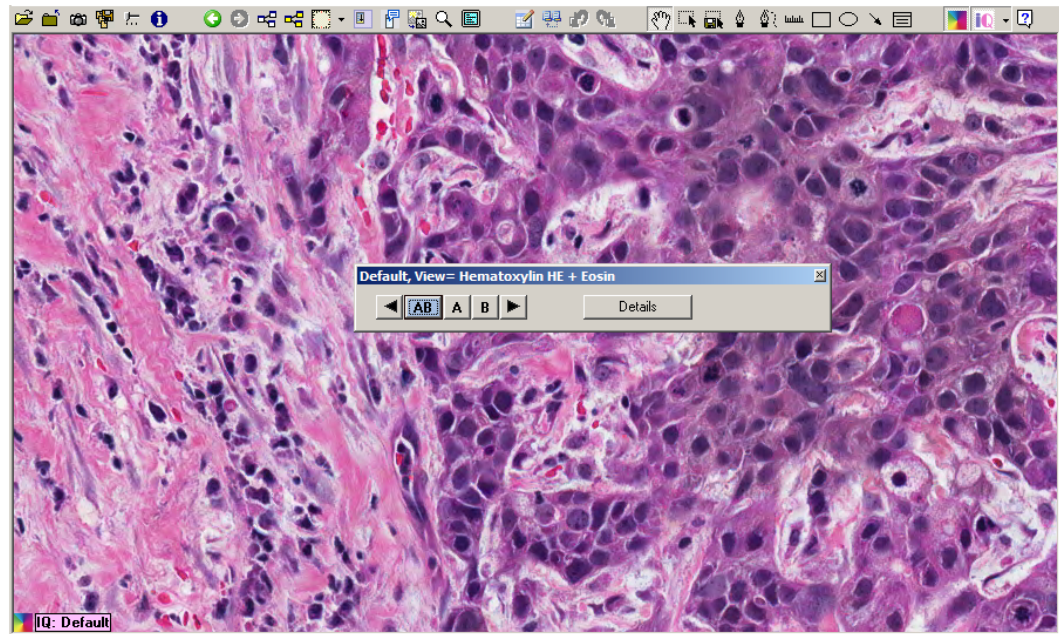
Toolbar Control	Description
	Go to the next stain channel.
	Go to the previous stain channel.
	Select stain channel. Every combination of the stains defined appears on a button.
<b>Details</b> button	Return to the detailed IQ application window.
<b>View Only</b> button	Return to just the viewing toolbar display.
Space bar	When your cursor is on the viewing toolbar, you can navigate through the stain channel buttons, moving one button ahead with each press of the keyboard space bar.

If three stains have been defined, the viewing toolbar shows buttons for all three stain channels and all combinations of those channels:

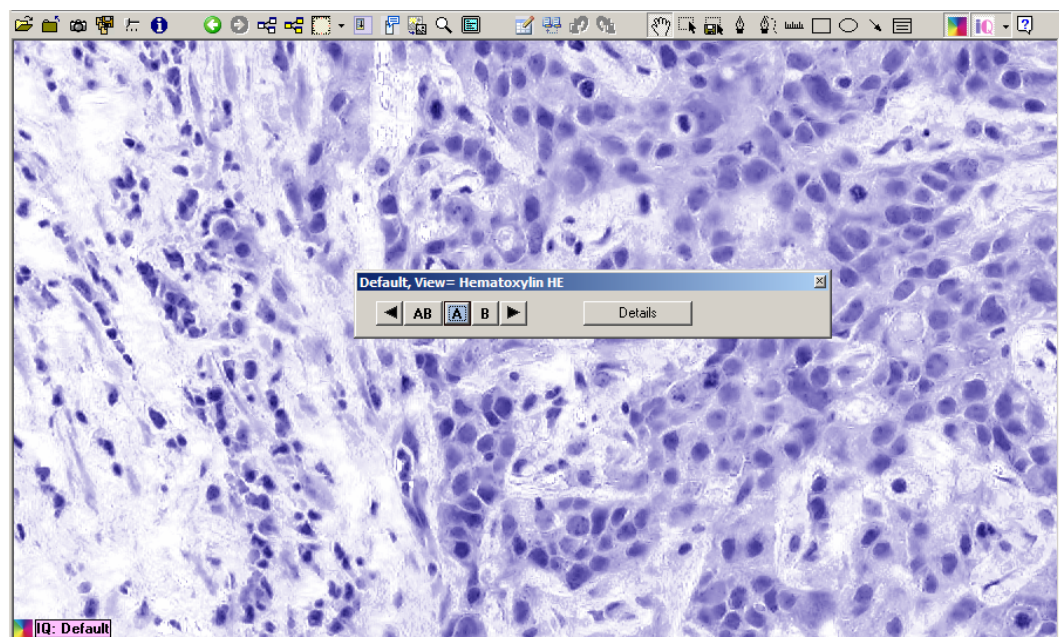


## Examples of Separate Stain Channels

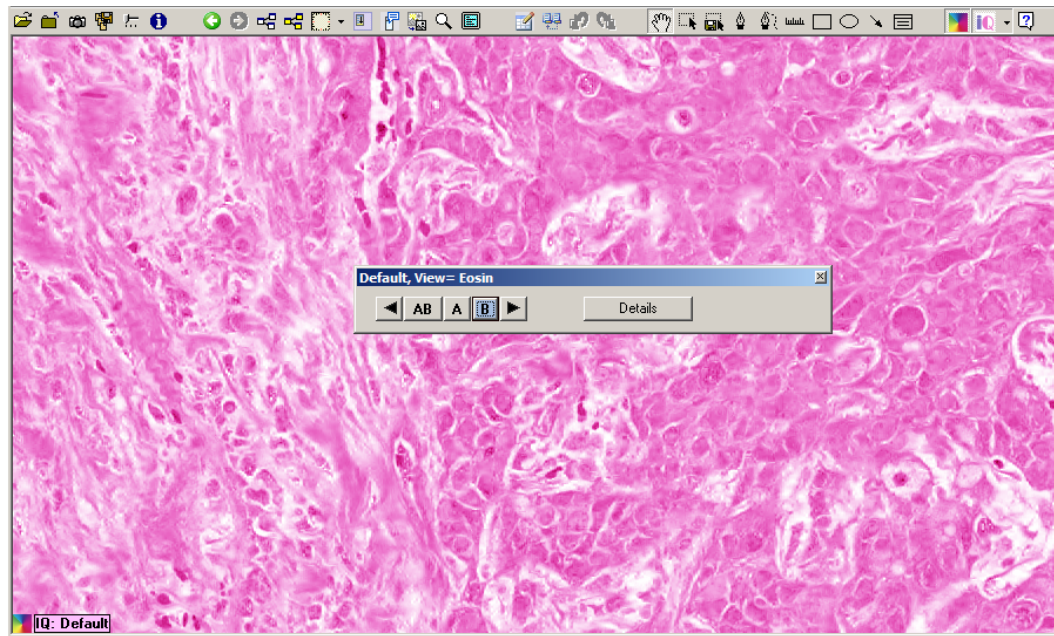
The samples below show an H&E-stained slide image being viewed as separate and combined stain channels.



Hematoxylin and Eosin Channels



Hematoxylin Channel



**Eosin Channel**



# 5

## Measuring Stains


Measuring stains allows you to define the visual characteristics of the stains you use.

The next chapters discuss manually changing the settings for stain sets to make them more appropriate for your preferences and staining process.

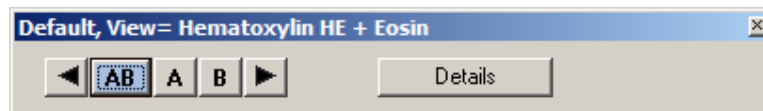
In this chapter you will learn how to measure the colors used by your specific stains and save those settings as stain definitions that you can use in your stain sets.

### Measuring Stains

We recommend using this procedure on a digital slide that was scanned from a control glass slide (that is, a good quality slide that was stained with only one stain). If you don't have a control slide, use a digital slide that was scanned from a slide in which you can easily identify areas stained with a single stain.

1. Open a digital slide in ImageScope and enable IQ. (See Chapter 3, "Getting Started" on page 19.)
2. Go to the ImageScope Image menu and select **Quality** to open the IQ application. (If the **Quality** command is not enabled in the Image menu, click the  icon on the ImageScope toolbar to turn on IQ.) Or, type Control Q after turning on IQ.

The IQ viewing toolbar appears.

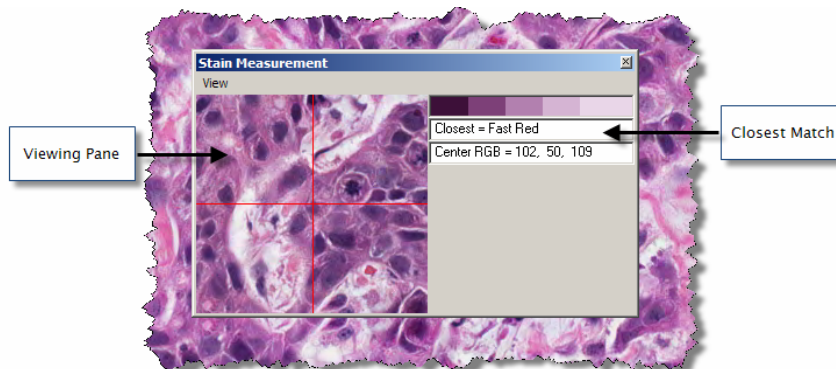


3. Click **Details** to open the entire IQ window.

4. Go to the Manage Stains tab:



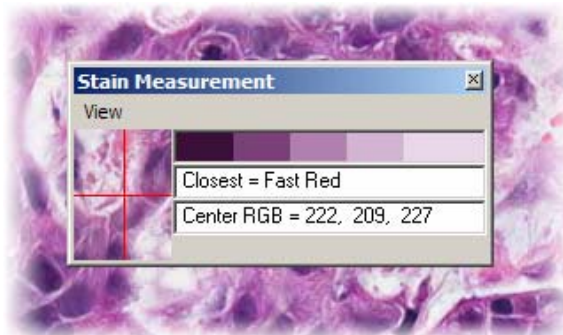
5. Click **Measure**. A Stain Measurement window appears:



When you are using the Stain Measurement window, IQ does not apply any settings made in the other IQ tabs. That is, the measurement is taken on the raw/base image before any IQ adjustments are applied.

6. Move the Stain Measurement window so that the viewing pane is placed over the area of the digital slide that you want to measure. The viewing pane measures the dominant color in the area under the viewing pane.

Note that you can grab the lower left corner of the viewing pane (the cursor changes to a double arrow) and drag the window so that the viewing pane is the appropriate size for the area you want to measure.

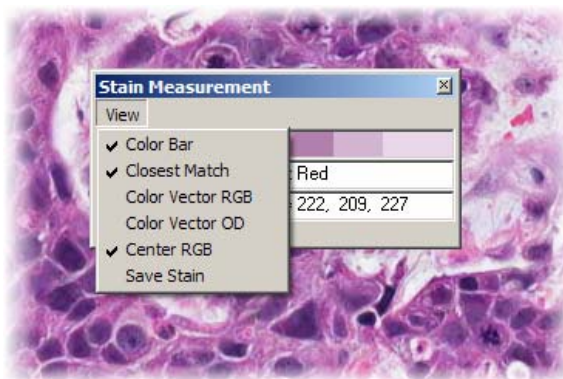


Based on the color in the viewing pane, IQ suggests the closest stain match it can find and displays it in the first text box. In the example above, this is **Fast Red**.

7. Save the sample as a new stain name by typing its name in the second text box and clicking **Save**. For example, if you save the stain as **Fast Red 2**, in the future you can select Fast Red 2 on the Stains Applied tab when identifying the stains used on digital slides. IQ will then adjust the display of the Fast Red stain used on digital slides to the visual representation of the Fast Red stain used in *your* lab.

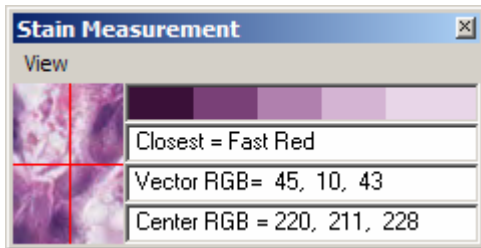
## Stain Measurement Display Options

By using the View menu on the Stain Measurement window, you can choose from a variety of viewing options:



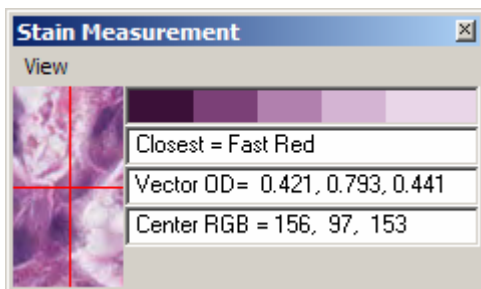
- **Color Bar** – The stain color bar shows the basic color range for that stain, darkest to lightest absorption.
- **Closest Match** – The stain in the IQ list of stains that most closely matches the current sample based on its color. This is IQ's best guess; you may want to overwrite it with the sample of your own stain.

- **Color Vector RGB** – The RGB values for the current sample:



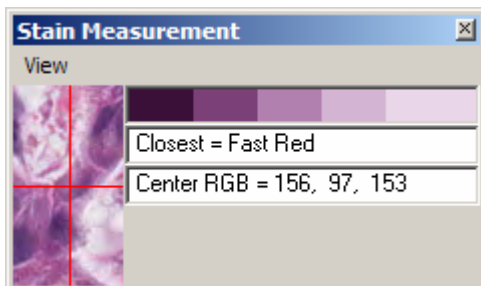
For a discussion of color vectors, see “The Color Vector” on page 40.

- **Color Vector OD** – Color optical density is another method of quantifying color values.

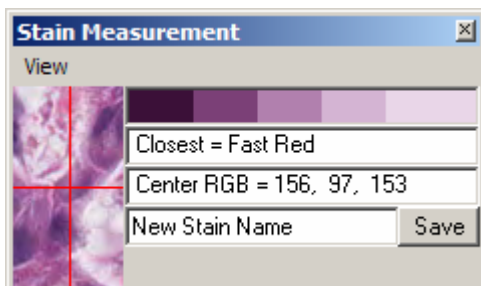


TIP: Color vector OD values can be used as input to the Aperio Color Deconvolution or Colocalization algorithms.

- **Center RGB** – Selecting this option causes a cross hair to appear in the viewing pane. The RGB values for the pixel that lies at the exact center of the cross hair are displayed.



- **Save Stain** – Selecting this option enables the save stain box and button.





# 6

## Creating or Modifying a Stain Set

In this chapter you will use several IQ features to create or modify a stain set.

### Identifying the Stains Used on Your Slide

In this section you will select the stains used to stain the glass slide from which the current digital slide was created.


The list of stains provided by IQ give good approximations of the color definitions for those stains, but may not precisely match the values of the stains you use. This is why the Re-Mix and Re-Color tabs are provided to allow you to fine-tune the definitions to more closely match your stains and your personal preferences.

You may want to use a digital slide made from a control slide to precisely measure the color of a stain used by your lab to create a stain definition based on that stain. See Chapter 5, “Measuring Stains” on page 29 for details.

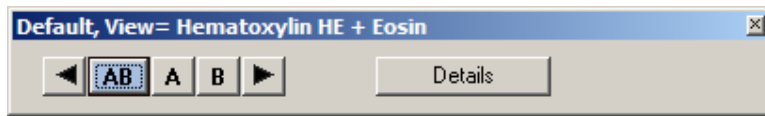
### Opening the IQ Application

Open a digital slide in ImageScope and apply the None stain set to the slide view. (See “Applying a Stain Set” on page 21 for instructions.) If instead of creating a new stain set you want to modify an existing one, apply the stain set you want to modify.

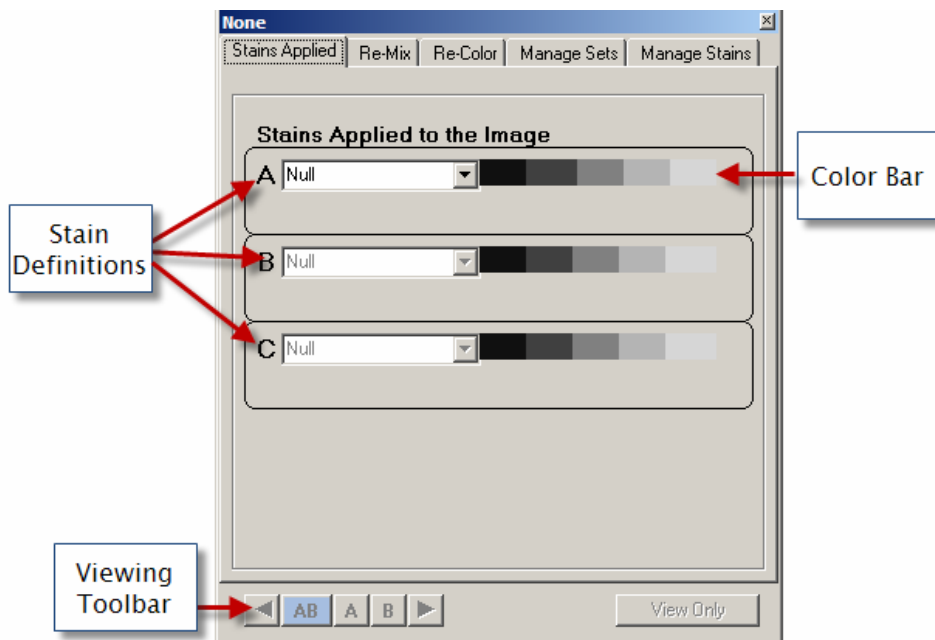
To open the IQ application:

1. Go to the ImageScope Image menu and select **Quality** to open the IQ application. (If the **Quality** command is not enabled in the Image menu, click the  icon on the ImageScope toolbar to turn on IQ.) Or, type Control Q after turning on IQ.

The IQ viewing toolbar appears.



2. Click **Details** to open the entire IQ window. The IQ application window appears:

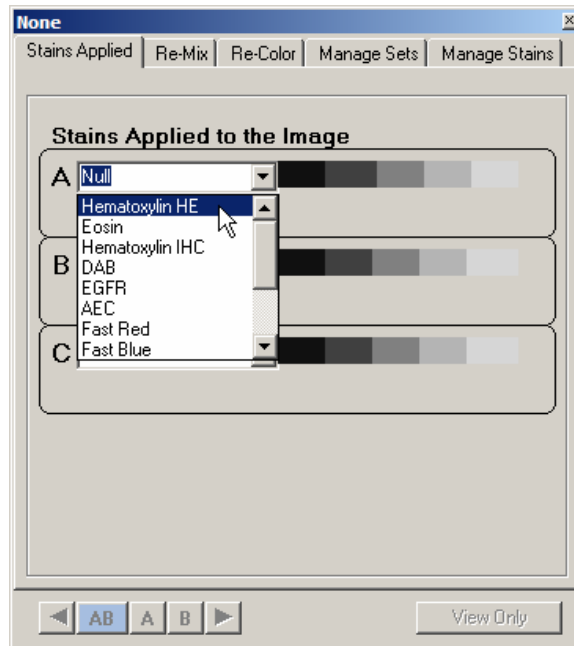


Notice that the stain set applied is shown in the window title bar.

If you have applied the None stain set, no stains will yet be defined and the color bars after the stain definition boxes will be monochrome and the viewing toolbar will be disabled. (For information on the viewing toolbar, see Chapter 4, “Viewing Individual Stains” on page 25.)

## Selecting the Stains

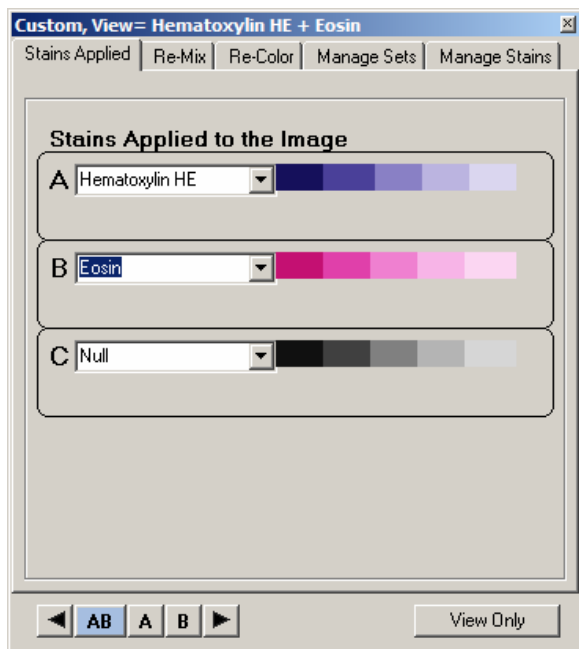
1. Click the down-arrow next to stain definition box A and choose a stain used to stain this digital slide.



2. Repeat for each of the stains used.

You can specify up to three stains. If you used less than three stains, leave one or more stain definition boxes set to **Null**.

In the example below we have selected Hematoxylin and Eosin. Note that the window title bar now shows **Custom, View = Hematoxylin HE + Eosin**. The word “Custom” means that we have begun to create a new stain set.



- The stain color bar shows the *color vector*, the basic color range for that stain, darkest to lightest absorption for the current definition of that stain. For a discussion of color vectors, see “The Color Vector” on page 39.
- The Custom stain set will not be saved when you exit the IQ application. If you want to save the Custom settings you have made, go to the Manage Sets tab and save the settings as a new stain set or override an existing one.
- Once stains have been selected, the viewing toolbar at the bottom of the window is enabled for viewing the digital slide’s different stain color channels separately or together. See Chapter 4, “Viewing Individual Stains” on page 23.

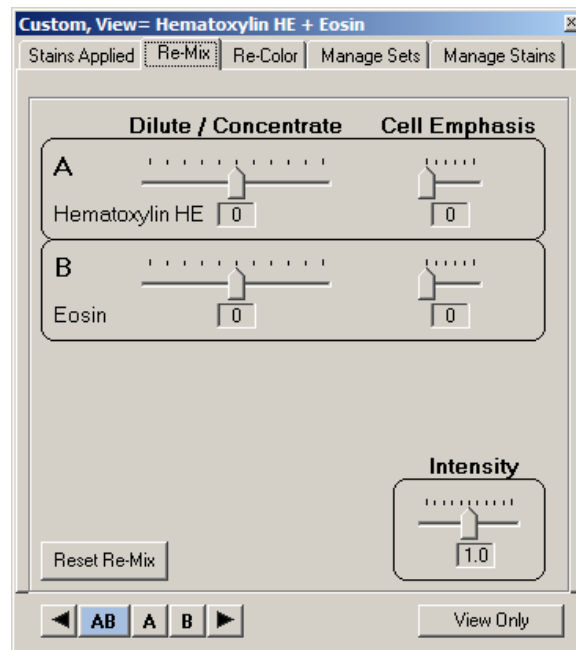
## Re-Mixing Stains

Once you have defined the stains used for your digital slide, you can use the IQ Re-Mix tab to change the “mix” for each stain visually diluting or concentrating the stains used for that slide. To a certain extent, your re-mix settings will reflect personal preference, but these settings can also be useful if you are using a batch of slides that were understained or overstained as you can correct that condition when viewing the digital slide made from those slides.

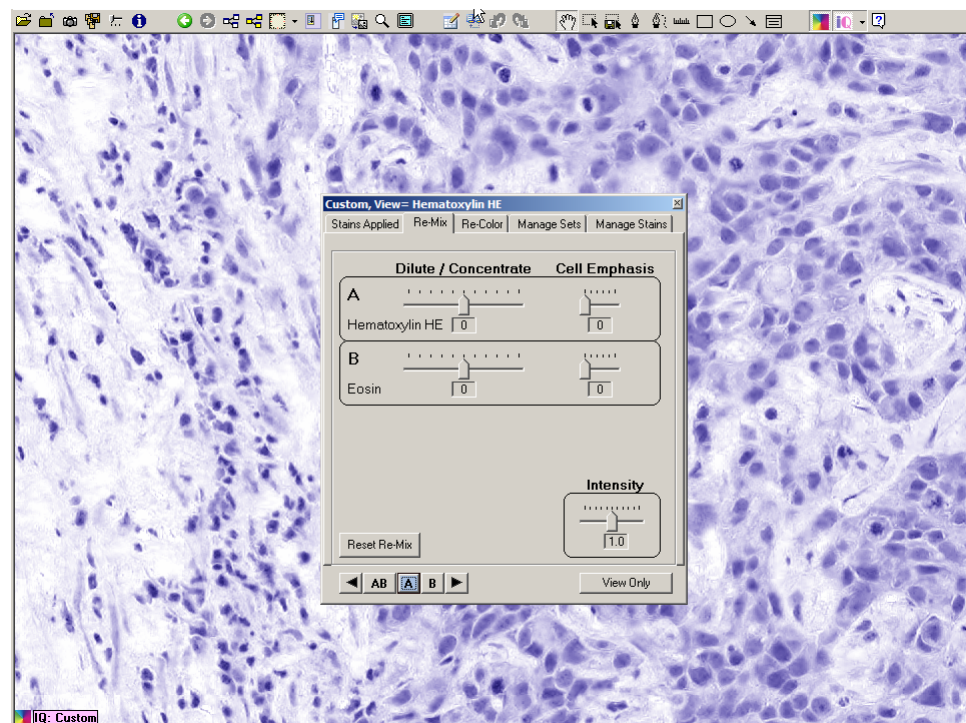
### Diluting/Concentrating Stains

Normal variation in the staining process and in the stain itself can result in slides that are lighter or darker than you prefer. You can use IQ to concentrate or dilute the visual representation of the stains on your digital slides.

1. Go to the Re-Mix tab:



2. Click a channel button on the viewing toolbar to select one stain channel.  
For example:



3. Now slide the **Dilute/Concentrate** control to the left to dilute the stain or to the right to concentrate it until you are pleased with the result.



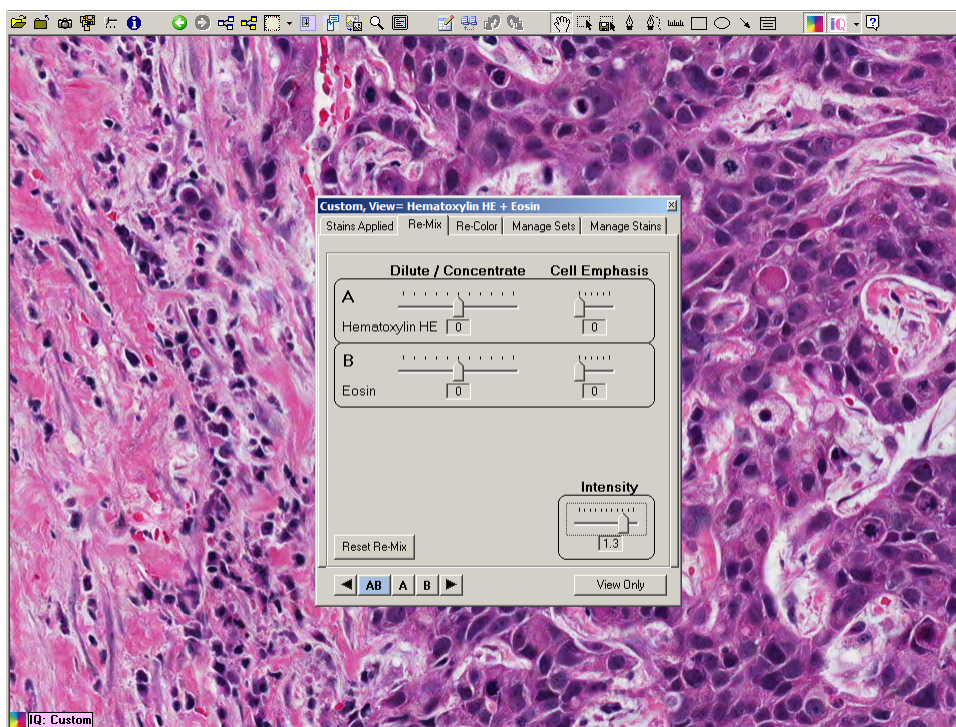
4. Click another channel button on the viewing toolbar to select another stain channel and repeat step #3 until all stains are adjusted.

## Changing Cell Emphasis

Some stains, like Hematoxylin, are specifically designed to make it easier to identify cell structures. If you wish to emphasize cell structure for that stain channel, select the channel on the viewing toolbar and use the **Cell Emphasis** slider to increase or decrease cell emphasis.

## Changing Overall Intensity

To change the overall intensity (lightness/darkness) for the entire image to your personal preference, select the button on the viewing toolbar that selects all channels and move the **Intensity** slider to the left to reduce intensity or to the right to increase it.



## Resetting Re-Mix Values

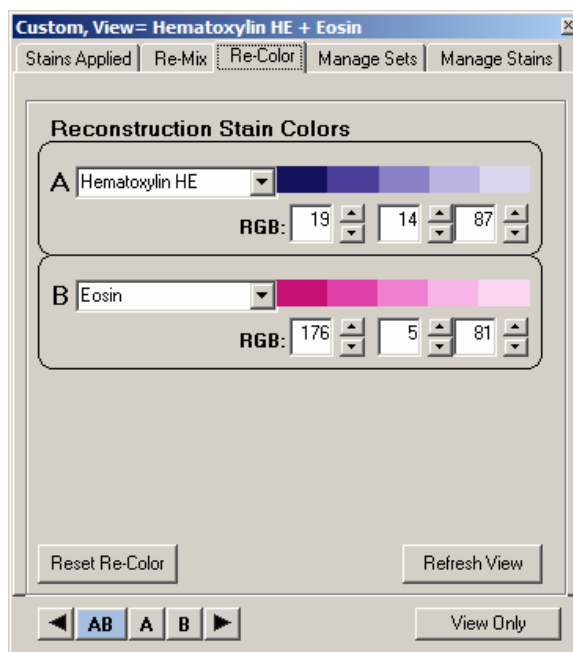
To return all settings on the Re-Mix tab to the last-saved values, click the **Reset Re-Mix** button.

## Re-Coloring Stains

In “Identifying the Stains Used on Your Slide” on page 33, you selected the stains used for your digital slide. In this chapter you can fine-tune the colors displayed for those stains.

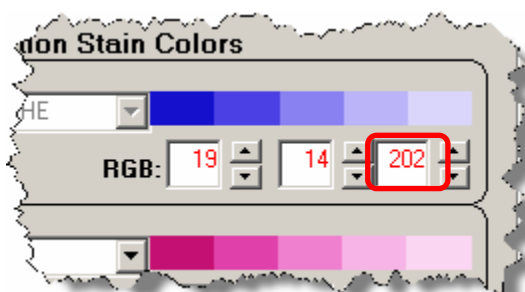
## Changing Stain Colors

1. Go to the Re-Color tab:



The RGB values are displayed for each stain, which define the Red, Green, and Blue channel values from zero to 255.

2. Select a single stain channel in the viewing toolbar and adjust the RGB values for that stain to your preference. Either type the new value in one of the RGB boxes or click the arrows to increase or decrease the value. For example, if you want Hematoxylin to display as more “blue,” increase the number in the third RGB box for that stain.



3. Click **Refresh View** to see your changes in the ImageScope window. (Unlike other IQ tabs, this tab requires that you manually apply your changes to the image view by clicking **Refresh View**.) Note that it is usually necessary to half or double the R, G, or B values to see a difference.

## The Color Vector

The color bars on the Stains Applied and Re-Color tab show color vectors. If you consider a color wheel in which traveling around the wheel changes the color (or hue), but traveling outward in a straight line from the center of the wheel keeps the hue the same but changes the intensity, the color vector represents that straight line from the center of the wheel (see the illustration). The RGB values define the hue of the stain when it is at its most concentrated.

## Resetting Colors

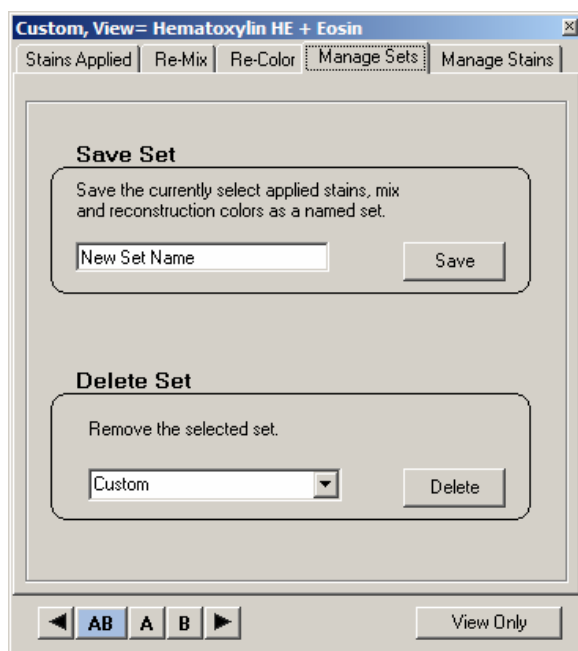
To reset the colors to the last-saved values, click **Reset Re-Color**.

## Managing Stain Sets

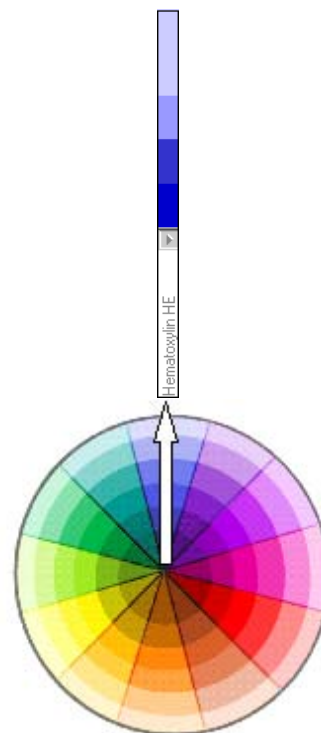
You can create and save your own stain sets as well as delete existing stain sets.

### Saving Settings as a New Stain Set

1. Go to the Manage Sets tab:



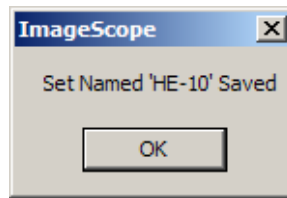
2. Type a new stain set name in the Save Set text box and click **Save**. Note that you can overwrite an existing stain set, including Default, by specifying its name.



Sample Color Vector

Changing the Default stain set and overwriting it will permanently change that stain set. If this is *not* what you want to do, we suggest you use a new stain set name rather than Default when saving the modified stain set.

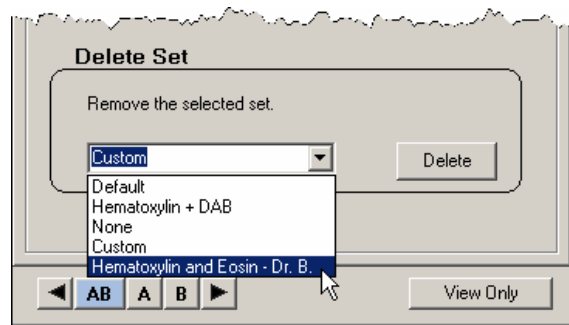
3. A message tells you that the stain set was saved:



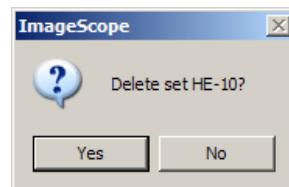
## Deleting Stain Sets

To delete a stain set:

1. On the Manage Sets tab, select the stain set you want to delete from the Delete Set drop-down list:



2. Click **Delete**. A confirmation window appears:



3. Click **Yes**.





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