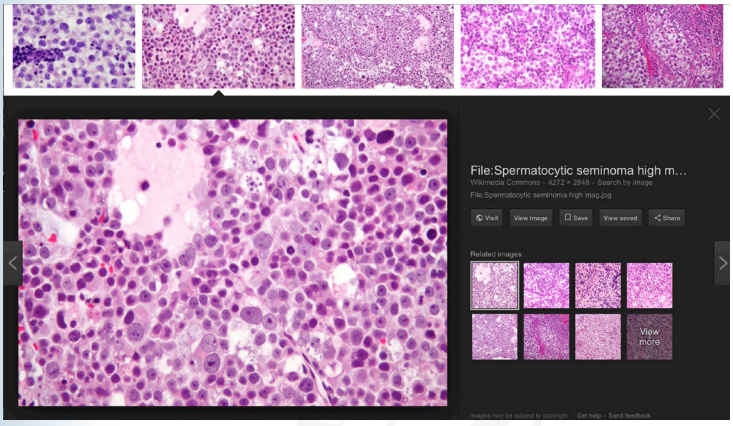
THE ACQUISITION AND USE OF WEB IMAGES FOR ABP EXAMINATIONS



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prepared by: Eric F. Glassy, MD

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Introduction

When writing questions for the ABP, it is always better to include an image rather than a pure text question. Images form the basis of the practical exams. Getting good images can be difficult and sometimes you may have a great idea for a question but just don't have access to a glass slide to photograph. The purpose of this paper is to cover ways to safely appropriate images from the web.

There are two methods discussed. The first uses whole slide image repositories to find a virtual glass slide that can then be used to take a screen shot of region of interest. The second is to search the web for static images that are either in the public domain or have usage rights that only require attribution.

Suggestions and improvements to this document are always welcome.

Executive Summary

There are two ways to get images from the web to use in ABP questions.

Option 1: Whole Slide Images
There are many websites that contain virtual slide pathology files. One of the easiest to use is PathPresenter.net. Here are the steps:

1. Log in (free account)
2. Click on Slide Library
3. Perform a search
4. Manipulate the whole slide image to find a region of interest
5. Click on the Camera icon to save the field of view to the desktop

Option 2: Google (or Bing) Image Search
The web has millions of pathology images but many are copyright protected. Google and Bing allow you to display only images that are either in the public domain or can be used without royalties (ie., free use). In the latter instance, attribution may have to be given. The instructions below are for Google.

1. Do an image search
2. Click on the *Tools* button
3. Click on the *Usage Rights* drop down menu
4. Select *Labeled for Reuse with modification*
5. Click on an image from the filtered list to enlarge it and show image info
6. Drag the image to the desktop to save it
7. Go to the image website and get the attribution requirements (if any)
8. If attribution is required, add it to the references field in the item bank

Note: In most instances, the images will be from WikiMedia/WikiCommons, Fickr, or other image-sharing site. WikiCommons will list the specific attribution required. A typical example would be: *Copyright ©Jack Jones / CC-BY-SA-3.0*

Resize and/or Reformat the Image
Data Harbor requires images be in jpeg format and no larger than 1500 x 1500 pixels. A resolution of 72 ppi (or slightly higher, up to 180 ppi) is best. Use the *Preview* app on the Macintosh or *Paint* on a Windows PC to change the format to jpeg, if needed and to adjust the image size.

Part 1: Using Whole Slide Image Repositories

An excellent option for creating images is to use any of the whole slide image repositories on the web.

In this scenario, a virtual slide displaying the requisite diagnostic features is used for a screen capture. Some of the whole slide image viewers have image capture built in but if not, a simple screen shot of the area of interest will be almost as good.

PathPresenter is one such site and the following pages walk you through the procedure for finding a suitable virtual slide, zooming into an area of interest, and then grabbing a screen shot. Several other whole slide image repositories are listed at the end of this section.

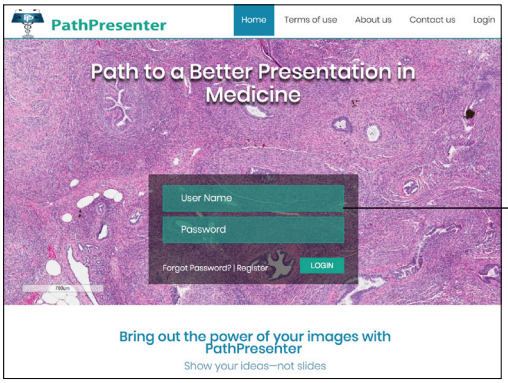
Please keep in mind that not all these sites have been curated by experts, so some diagnoses may be erroneous. This was noted by one of the MOC TDAC members (Matt Kuhar) who found several incorrect diagnoses when searching the repository for a dermpath image.

One advantage of using a virtual slide as the basis for capturing a field of interest is that there are no copyright issues to contend with. The whole slide image files themselves may be subject to licensing but zooming into an area of interest and capturing a static image is analogous to taking a photomicrograph of a glass slide. Attribution is not required.

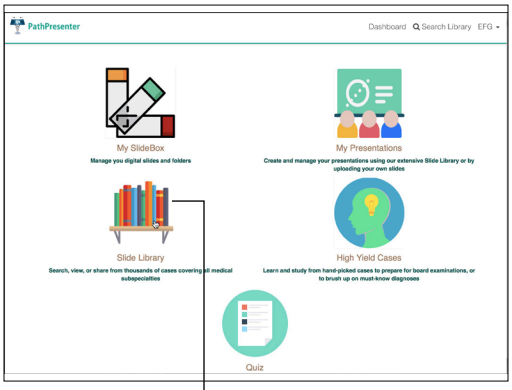
1. Capture Images from PathPresenter

This site was developed by Rajendra Singh, Associate Director of Dermatopathology at Mt. Sinai School of Medicine in New York City. It contains thousands of whole slide images from many organ systems. Most are of excellent quality although some diagnoses may be erroneous. Raj and his team are slowly fixing this.

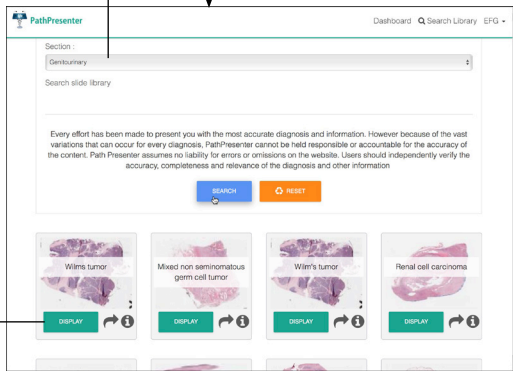
Go to **PathPresenter.net**
Create a free account if this is the first time you are accessing the site.



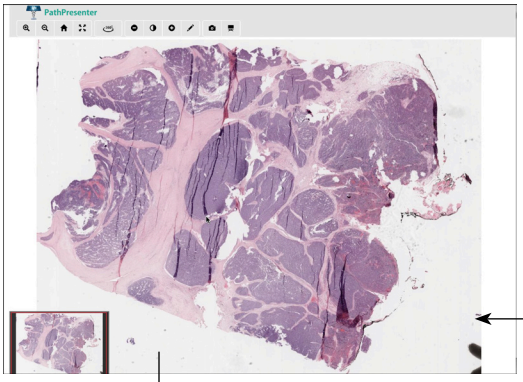
Click on **Slide Library** *to search for a whole slide image.*



select an organ system



Scroll to an image you want to capture. Click the **Info Icon** *to see details of the case. Click the* **Display** *button to open the whole slide image.*



Click and hold the mouse button to move around the image. Zoom in and out with the scroll wheel or use the navigation bar.

Toggle the tracker thumbnail on and off

Camera tool

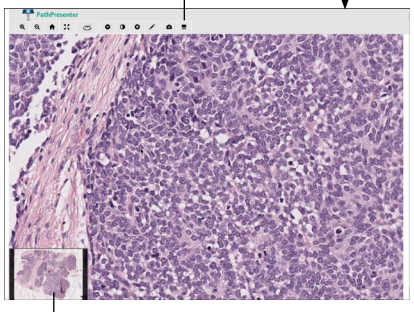
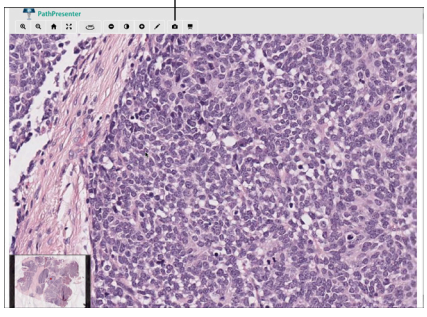
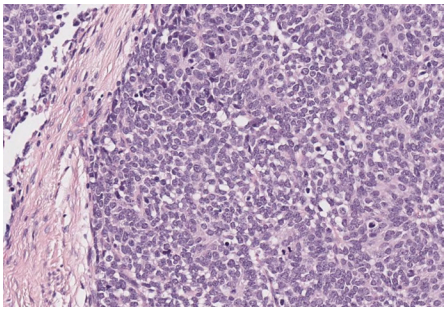


image tracker thumbnail



Find a region of interest and capture it using your computer's built in screen capture software or click on the camera icon which will save the current view to your desktop.



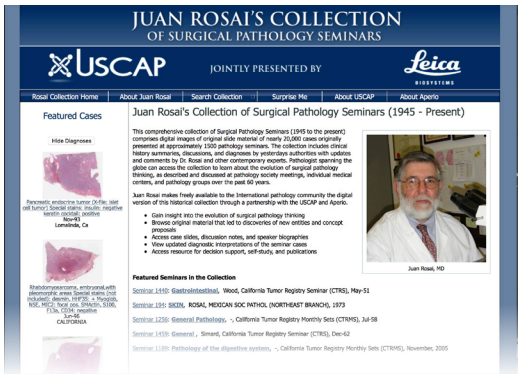
captured image

2. Other Whole Slide Image Repositories

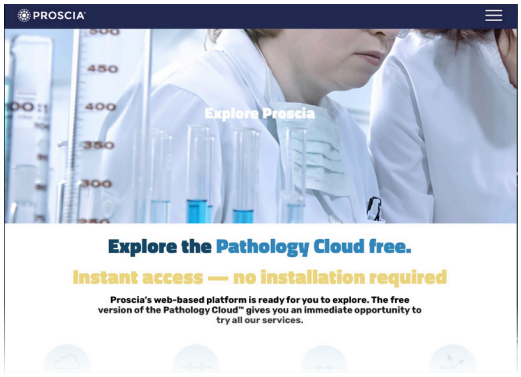
Besides PathPresenter, there are a number of very good whole slide image repositories on the web. Some are behind academic firewalls but others are freely accessible. A good starting point is found on the Digital Pathology Association's website:

https://digitalpathologyassociation.org/whole-slide-imaging-repository

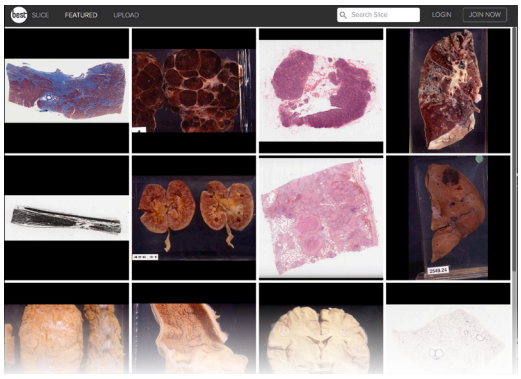
Note that creating static images from whole slide images does not require attribution because of the derivative nature of the process— it is similar to photomicroscopy of a glass slide. Attribution is only needed if a link to the whole slide image is used by the ABP.



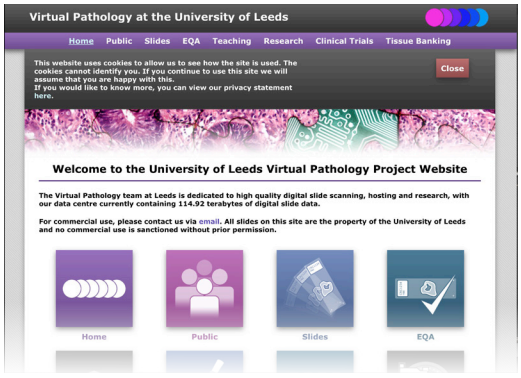
http://www.rosaicollection.org



https://proscia.com/explore



https://www.best.edu.au/s/featured



http://www.virtualpathology.leeds.ac.uk

Part 2: Searching for Static Web Images

Introduction
Finding images on the web is not a problem but filtering those images so that only specific ones are displayed requires advanced search techniques. This section of the document discusses how to find an image that is free to use without copyright restrictions and how to properly attribute it (if required).

Image search can be done using Google or Bing but this document will focus primarily on a Google search.

Advanced Search Criteria
When you do a Google Search, you can filter your results to find images, videos, or text that you have permission to use. This is done with an Advanced Search filter called "usage rights" that lets you know when you can use, share, or modify something you find Online.

Until a few years ago, the Advanced Search filter (found under the Settings button) was the only way to apply specific search criteria to a set of images, such as size, color, type and—most importantly for this discussion—usage rights. Google added a shortcut so that it is easier to apply usage rights search criteria. This is discussed on page 10.

Search Tips
Most people just type in a few search words to initiate a Google search but there are specific symbols or words you can add to your search terms to make the results more precise.

Google Search usually ignores punctuation that isn't part of a search operator. Specific operators that can be used are quotes, minus, plus, and asterisk, as follows:

To search for an exact match, put a word or phrase inside quotes. For example, "spermatocytic seminoma".

To exclude words from your search, put a minus (-) in front of a word you want to leave out. For example, in a search for lymphomas, to eliminate images of Hodgkin lymphoma use: *lymphoma -Hodgkin*.

To search for wildcards or unknown words, put a * in your word or phrase where you want to leave a placeholder. For example, "largest * in the world".

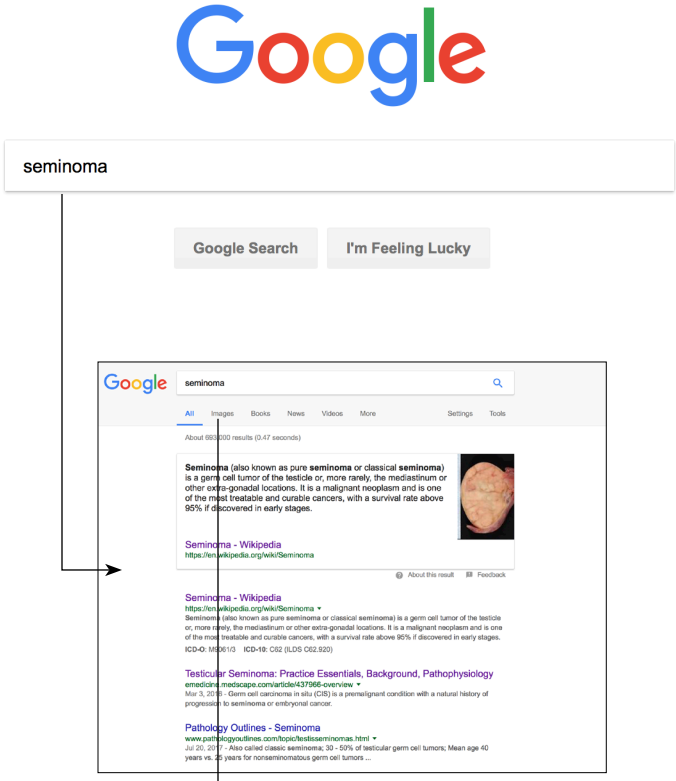
To combine searches, put "OR" between each search query. For example, *CK7 OR CK20 positive tumors*. You can also add "AND" to give a narrower search that includes multiple terms.

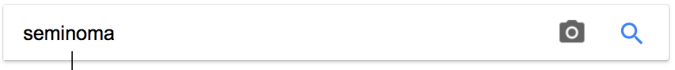
1. Initiate a Search

Enter the search term into the dialog box on the **Google Images page** (https://images.google.com), or just use Google's default search page. If you use the default search page, you will have to then click on the **Images** link in the top menu bar, just beneath the search box.

http://www.google.com

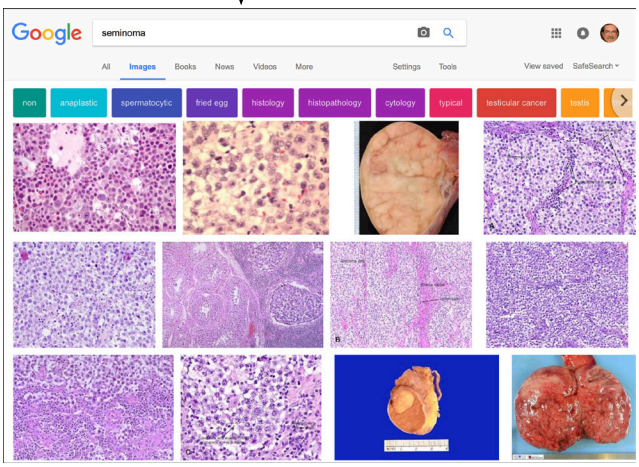
https://images.google.com





this Google website displays only images

click on the **Images** button to view thumbnails after a search which starts at the Google default page



2. Filter the Images by Usage Rights

Click on the Search tools menu and then select the drop-down menu for Usage Rights. That menu offers five choices:

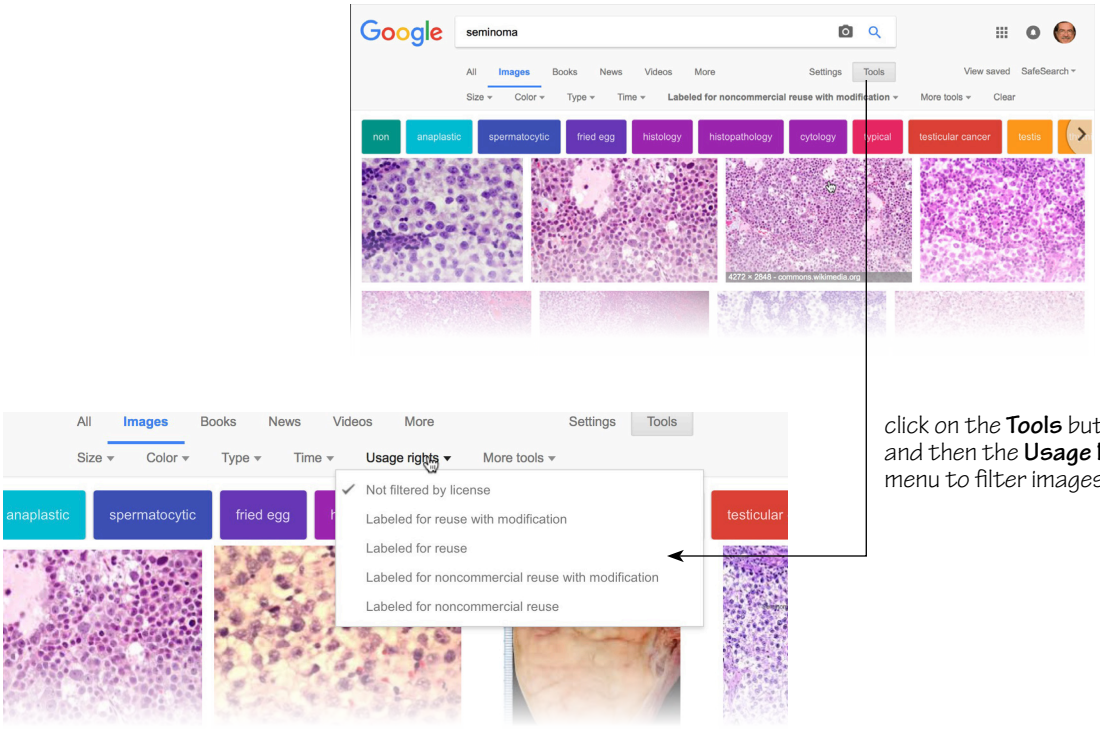
- Not filtered by license
- **Labeled for reuse with modification**
- **Labeled for reuse**
- **Labeled for non-commercial reuse with modification**
- **Labeled for non-commercial reuse**

Select an option and the page refreshes to include only those images flagged with the associated usage rights.

The images on the page are typically ones licensed by Creative Commons or GNU Free Documentation, or are items in the public domain.

The *Not filtered by license* choice displays all the images. The *Labeled for reuse* option allows you to use the image for commercial and non-commercial purposes as specified in the license. The *labeled for reuse with modification* option grants you the ability to alter the image (add annotations).

For CERTLink purposes, the safest choice is to use images designated as *Labeled for reuse with modification*. This allows you to add text, arrows, or other annotations to the image.

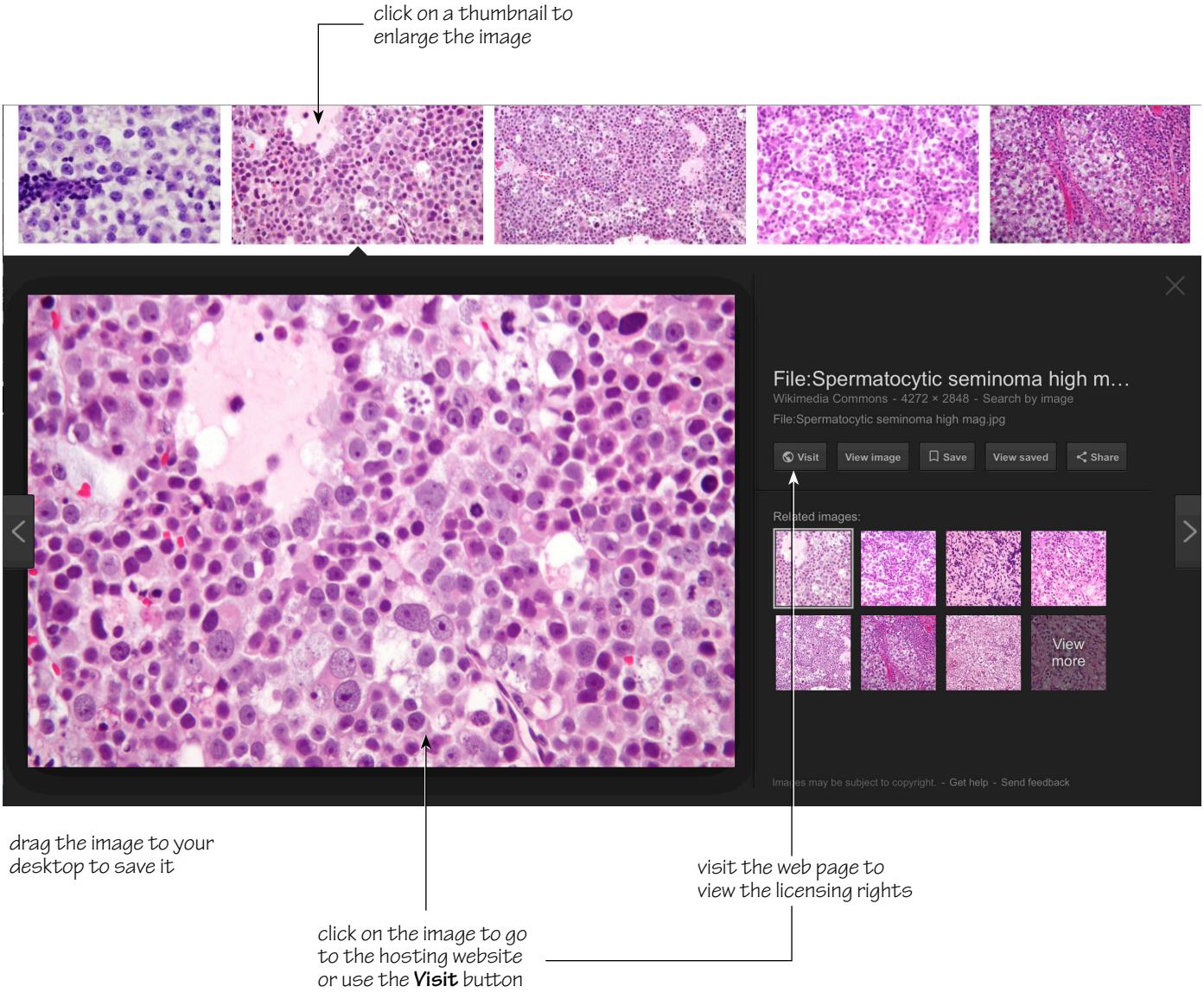


3. Select an Image and Download It

Click on an image to enlarge it. You can see specific information about the image, such as its size, type (jpg, png, tif, gif, etc.) and where the image can be found on the web.

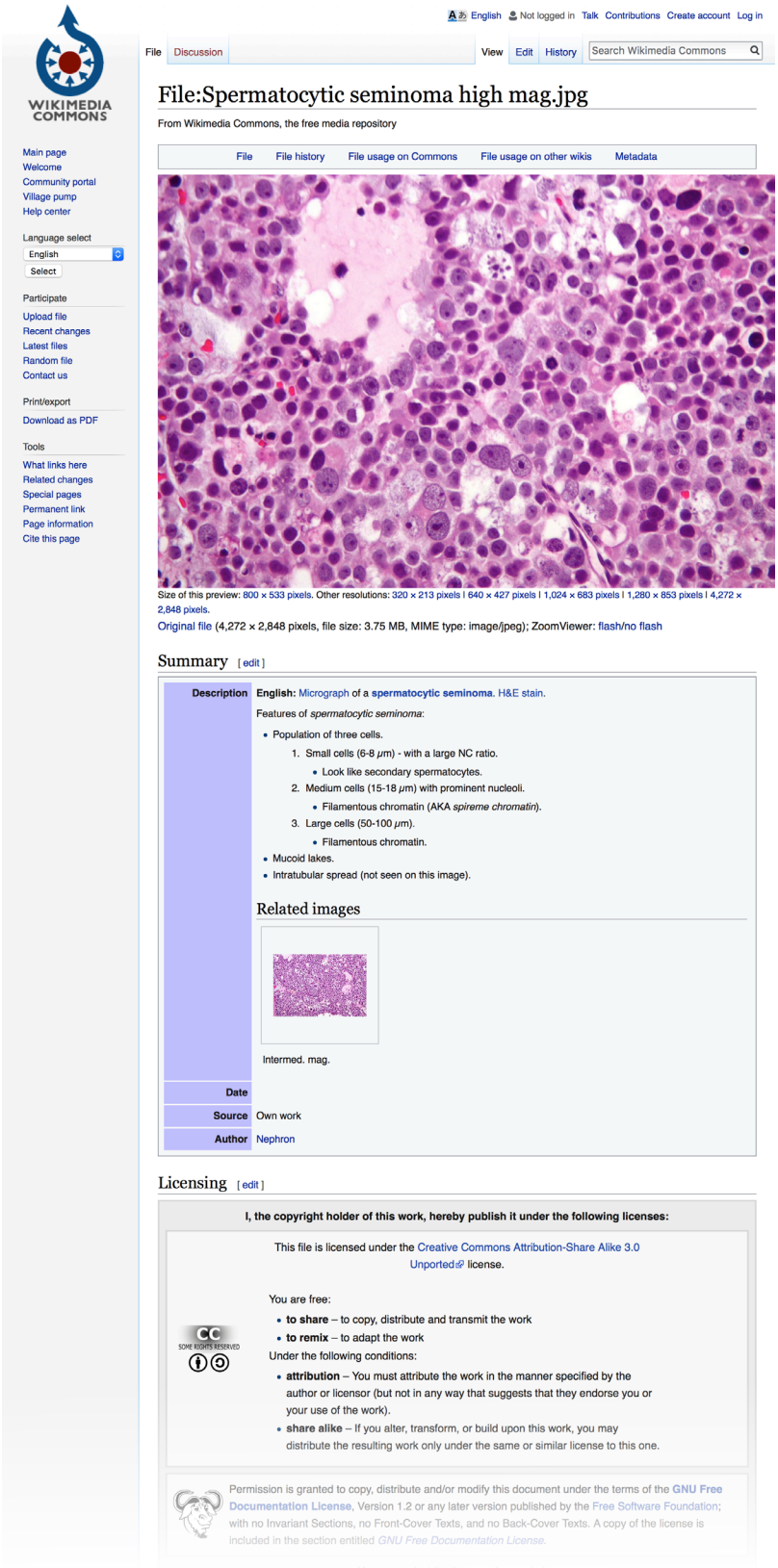
Click on the View Image button to enlarge the image even more. You can then drag it to your desktop to save it or you can also drag the enlarged image from the image detail page. Do not drag the thumb nail image because the resolution is too low.

Finally, click on the Visit button to go to the website that is hosting the image. Most of the images will be on the Wikimedia Commons site but some will be from Fickr or other image hosting website.



4. Determine Image Rights and Attribution

Because you selected the image filter to show only images that can be used for both commercial and non-commercial use (*labeled for reuse with modification)*, the web page displaying the image will usually indicate what the usage-rights are. In most cases, the images will have a Creative Commons license.



Other web pages may have a link to the license information. It is important to review the specifics of the license so that you do not violate the intended use.

On the Creative Commons Wikimedia page, the specific image rights are in the Licensing section.

Verify that the image is free to share and change (if you plan to add text or any other annotation).

The image may require attribution. In that case, follow the guidelines shown. In most cases, that means indicating who provided the photograph.

When used for CERTLink, for example, this information can be inserted after the reference. Here is an example attribution for this seminoma image:

Image Copyright © 2011 Michael Bonert / CC-BY-SA-3.0 / via WikiMedia

or

Image Copyright © 2011 Michael Bonert (https://commons.wikimedia.org/wiki/User:Nephron). CC BY-SA 3.0 (https://creativecommons.org/licenses/by-sa/3.0/legalcode).

The next page discusses image attribution in more detail.

5. Notes on Licensing

Wikimedia Commons only accepts free content—images and other media files that are not subject to copyright restrictions which would prevent them being used by anyone, anytime, for any purpose.

Therefore, almost all of the content hosted on Wikimedia Commons may be freely reused subject to certain restrictions. You do not need to obtain a specific statement of permission from the licensor(s) of the content unless you wish to use the work under different terms than the license states.

Images under open content licenses may be reused without any need to contact the licensor(s), but just keep in mind that:

- some licenses require that the original creator (or pseudonym, if applicable) be attributed
- some licenses require that the specific license be identified when reusing (including, in some cases, stating or linking to the terms of the license)
- some licenses require that if you modify the work, your modifications must also be similarly freely licensed (i.e., you cannot be more restrictive than the original image)

The author may give specific verbiage for the attribution. If not, the simplied attribution shown below is acceptable:

Image Copyright © 2011 Michael Bonert / CC-BY-SA-3.0 / via WikiMedia

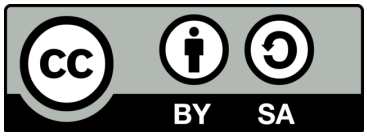
The **CC** means Creative Commons licensure (version 3.0 in this case).
BY means give attribution. The **SA** means "share alike." This indicates that others can remix, tweak, and build upon the author's work even for commercial purposes, as long as they credit the author and license their new creations under the identical terms.

The *CC-BY-SA* designation is the license used by Wikipedia / WikiMedia.

It is worth noting that content in the public domain may not have a strict legal requirement of attribution (depending on the jurisdiction of content reuse), but attribution is recommended to give correct provenance.

GNU Free Documentation logo

Creative Commons logo



License type (CC-BY-SA)

Part 3: Adjusting Images to ABP Specifications

Introduction: Image Size and Resolution
In the previous sections, images were captured from a whole slide image or were downloaded from the web after an image search. These images may need to be adjusted to conform to the requirements of the ABP item database vendor, Data Harbor.

Data Harbor requires that all images uploaded to the item database are in jpeg format and are no larger than 1500 x 1500 pixels. When downloading an image from the web, in general it is best to err on the side of using a large image so that as much detail as possible is preserved.

Besides pixel dimensions, images also have resolution (pixels per inch). The usual resolution for web images is 72 ppi. Such images will look fine on a computer screen but will be jagged when printed on paper— closer to 300 ppi is needed for a crisp printed image. For ABP purposes, 72 ppi is fine or slightly larger (120 ppi).

For purposes of images used by the ABP for items, an image size no greater than1500 x 1500 pixels and a resolution of at least 72 ppi is preferred. Note that higher resolutions images will take longer to load which may cause anxiety among our diplomates.

Image types
Regarding image type, there are 5 main formats: tiff, jpeg, png, gif, and raw. Most web graphics are jpegs and png files.

JPEG files are images that have been compressed to store a lot of information in a small-size file. A JPEG is compressed in a way that loses some of the image detail during the compression in order to make the file small (so called "lossy" compression). Each time an image is saved, a small amount of data is thrown away. Repeated compressions (saving a file multiple times) will degrade jpeg images.

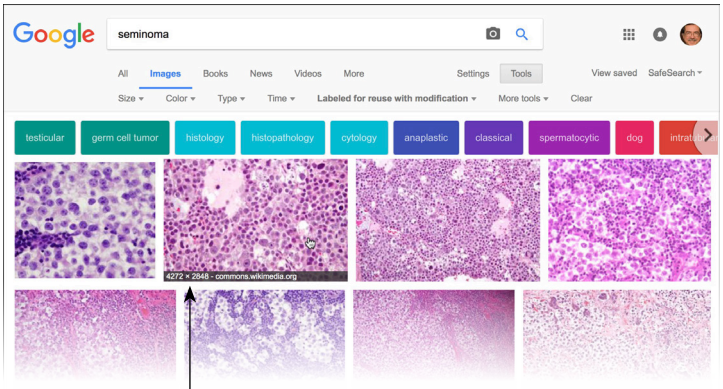
The png format is a "lossy" compression format but file sizes are larger than jpegs. The reason png files are used so widely on the web is that they can have transparency (no white background) and also they handle text much better than jpegs.

Tiff images are lossless, so repeatedly saving the image does not result in any degradation but the file size will be larger than either jpegs or png files.

There are many software programs than can perform the functions of resizing and reformatting but two especially stand out because they are free and are part of a normal software installation: Microsoft's **Paint** and Mac OS **Preview**. The following pages explain how to use these programs.

1. Resize and Reformat the Image

Data Harbor requires images be in the jpeg format and no larger than 1500x1500 pixels. The images you download from the web or screen capture from virtual images are quite variable in size and may need to be adjusted. Try to keep the image size close to the maximum because smaller images will be blurry or pixelated when diplomates try to zoom in for a closer look.

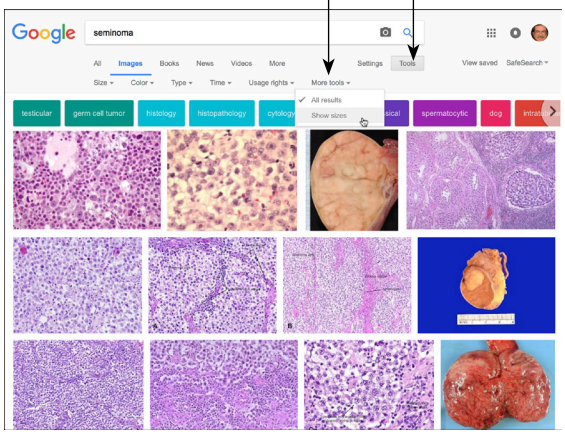


when the cursor hovers over an image, a banner at the bottom shows the image size and sometimes the web location

You can see the image size when the cursor hovers over an image, as shown on the left.

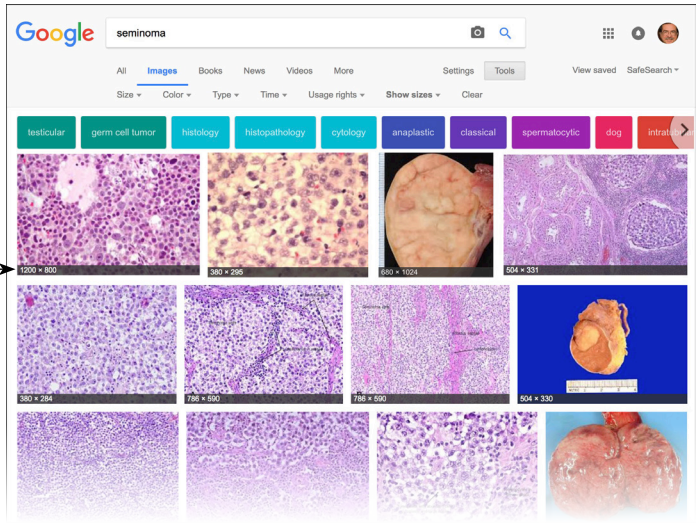
When selecting an image, give preference to larger image files. You can always down-size the image to 1500 x 1500 (see next page).

*click on the **Tools** button then select **Show sizes** from the **More tools** drop down menu*



An easier method is to turn on an image-size tag for all the images on the web page. Do this by clicking on the **Tools** button and then select the **Image size** option from the drop down menu beneath **Size**.

all of the images display their size in pixels

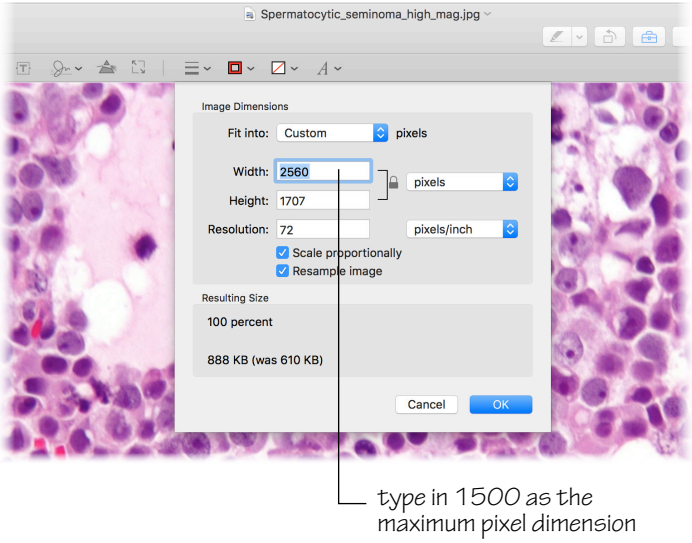


2. Software to Resize and Reformat Images

There are several software programs you can use to change the file type and to resize images.

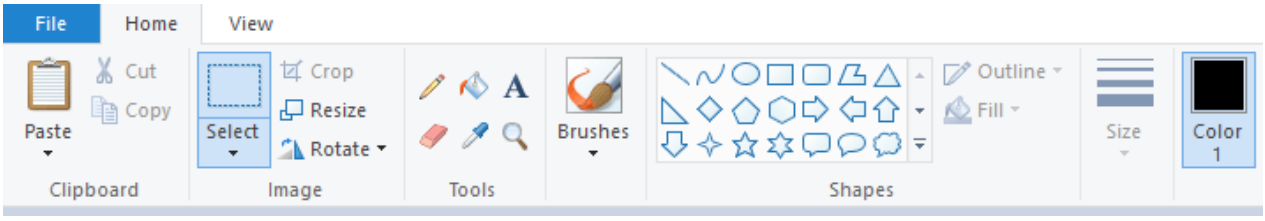
On the Mac, the **Preview** programcomes already installed. Open the image and then select the *Tools menu* > *Adjust size*. Change dimension labels to pixels and type 1500 into the largest of the two numbers for height and width. Resolution can be 72 pixels per inch or higher. (72 ppi is a good resolution for images displayed on a computer screen. Higher resolutions are needed if you want to print the image). Be sure to check the *Scale proportionally* and *Re-sample image* boxes.

Mac OS Preview App



Microsoft Paint

On the Microsoft Windows platform, the **Paint** program comes already installed. In the toolbar, select the *Home* tab and then the *Resize* tool which is located just to the right of the *Select* option.



To convert images to a different file format (such as png to jpg), use the **Export** function in Preview or the **Save as…** function in Microsoft Paint.

Here is a link to a page that discusses other free software programs than can change the image size and file type:

https://www.digitaltrends.com/computing/how-to-resize-an-image/

Main office:
One Urban Centre, Suite 690
4830 West Kennedy Boulevard
Tampa, Florida 33609-2571
Telephone: (813) 286-2444
Fax: (813) 289-5279
http://www.abpath.org

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