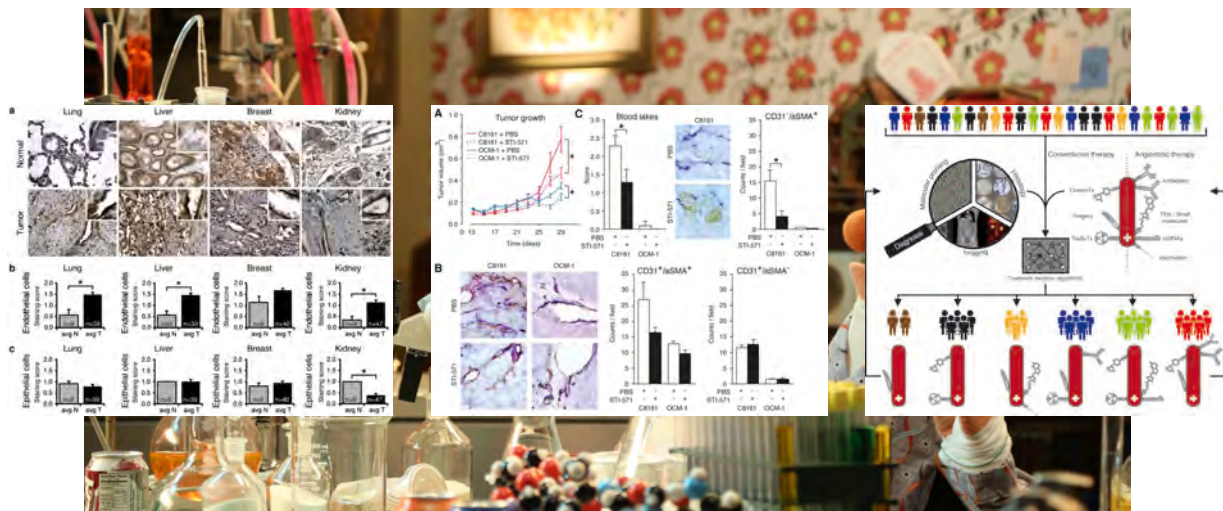**Amsterdam UMC**
University Medical Centers

The ins and outs of Adobe Illustrator
&
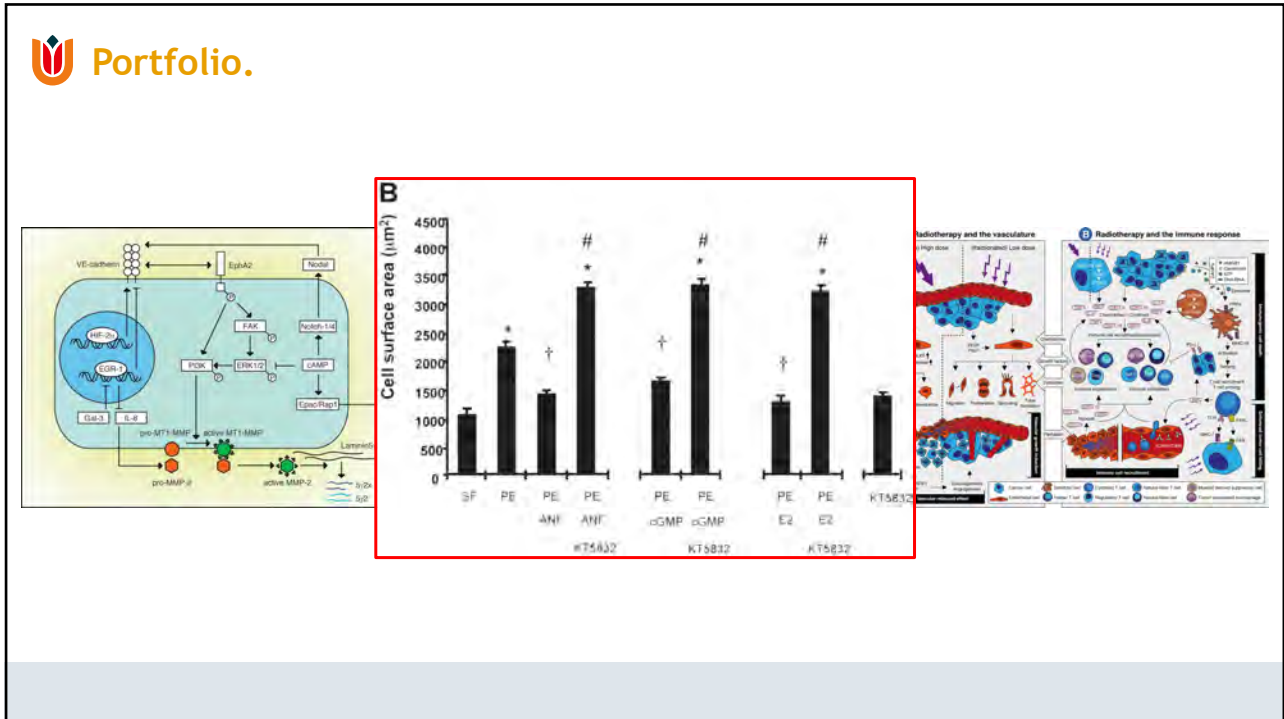## The do's and don'ts of Photoshop

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Amsterdam UMC | location VUmc, Radiation Oncology,
Center for Experimental Molecular Medicine | LEXOR,
Cancer Center Amsterdam,
www.radiobiology.nl.

1

From data collection to data presentation.

2

🌷 Portfolio.

3

🌷 Background.

Adobe Illustrator	**Adobe Photoshop**
A vector graphics editor	A raster graphics editor
Illustrative drawings, Technical drawings, Graphic products. (figures, folders, posters)	Enhance and clean up images. Modify and combine images.

Vector graphics are based on geometrical shapes (points/lines/curves) defined by formulas describing a definite position on the x and y axes of the work plane and the direction of the path. Further, each path may be assigned a stroke color, shape, curve, thickness, and fill. One advantage of vector graphics is easy resizing without loss of resolution.

A raster graphics image is a dot matrix data structure representing a generally rectangular grid of pixels, or points of color, viewable via a monitor, paper, or other display medium.

4

🌷 Strict 'code' for images (Photoshop).

Image alterations are inappropriate if they result in misrepresentation of the data, make the data impossible to be interpreted by others or, lead to false conclusions.

Manipulation of images with the intent to misrepresent data is nothing less than falsification, a serious breach of scientific integrity.

5

🌷 Strict 'code' for images (Photoshop).

1. No specific feature within an image may be enhanced, obscured, moved, removed, or introduced.

2. Adjustments of brightness, contrast, or color balance are acceptable if they are applied to the whole image and as long as they do not obscure, eliminate, or misrepresent any information present in the original.

3. The grouping of images from different parts of the same gel, or from different gels, fields, or exposures must be made explicit by the arrangement of the figure (e.g., dividing lines) and in the text of the figure legend.

4. Nonlinear adjustments must be disclosed in the figure legend or materials and methods.

5. Treat images as data. The best file format for saving such data is the TIFF format.

6. Never edit or manipulate the original image. Editing should always be done on a copy of the original image.

7. The original image should be saved unchanged, preferably in an electronic laboratory notebook (ELN) system. Your immediate colleagues and especially your group leader should always be able to check the original image.

8. When images become part of a manuscript, all authors should review the images prior to their submission for peer review.

9. Authors should report how image data were manipulated, even if the manipulations are considered acceptable practice, or state that image data were not manipulated.

6

Loose 'code' for figures (Illustrator).

7

Making a figure.

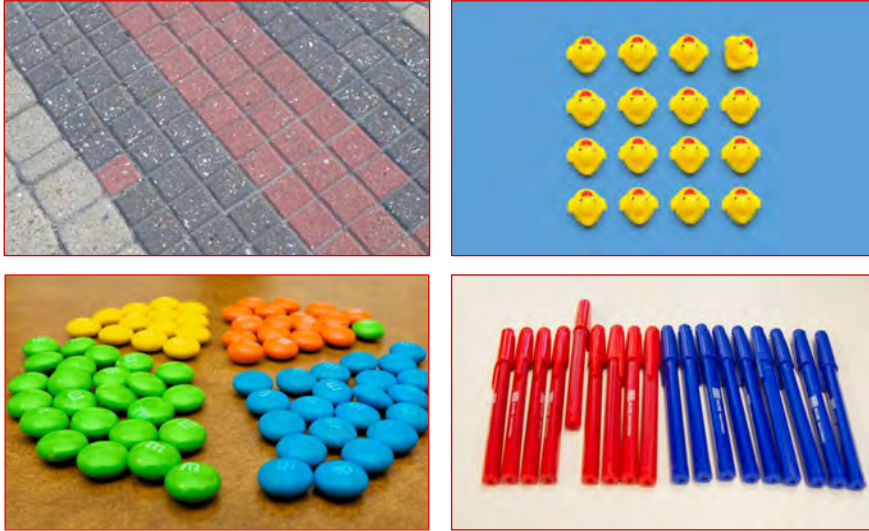**Guidelines when making a figure:**

- Check figure requirements of journal of choice.
  column width / max. figure dimensions / max. number of figures / font / file
  format / color charge / max. figure size (Mb) / etc.

- Prepare an outline/sketch of your figures on paper.

- Combine images with diagrams.

- minimal font size is 6 pt.

- minimal line thickness is 0.5 pt.

- Journals do not like white space.

- Journals do not like single panel figures.

TIP: BE CONSISTENT IN YOUR STYLE

8

What helps: Obsessive Compulsive Disorder...

9

Good example of a bad figure.

Font size (from 6 pt to 14 pt)
Font style (bold / regular)

Line thickness

Font type (Arial / Times New Roman)

Number representation
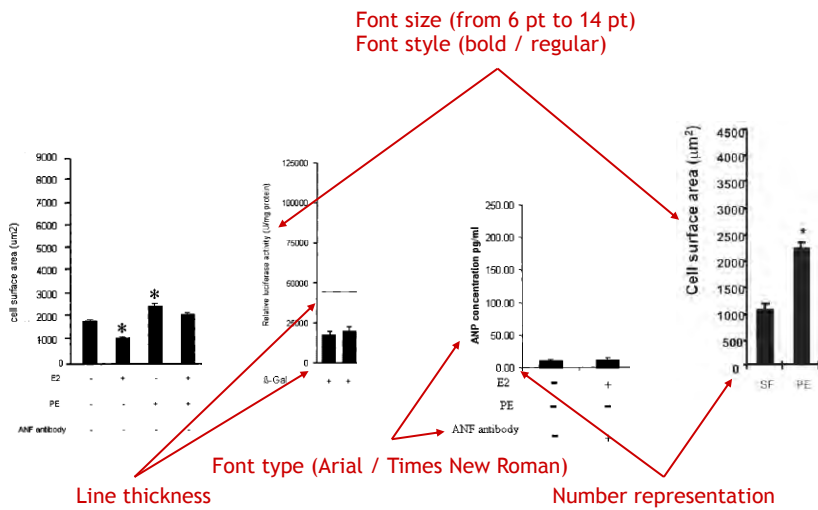
10

The workspace (comparable for Photoshop and Illustrator).

1 Menus with several layers of drop down menus & dialogues.

2 Tool bar, full of selection tools, brushes, erasers, and other fun things.

3 Information windows Show information about e.g. layers, colors, text.

4 Active image area Your active work space.
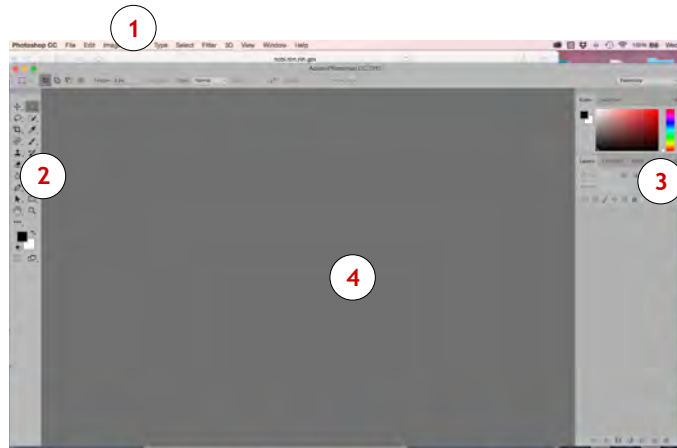
11

The active windows (Menu: Window > ...).
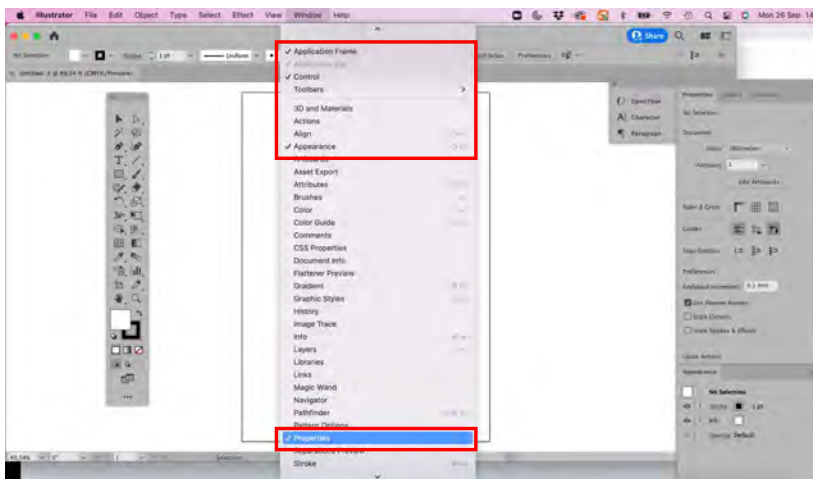
12

🌷 Open new figure file. Menu > File > New.

- Keep the required figure dimensions of the journal in mind, e.g. 1 column width, or page width).
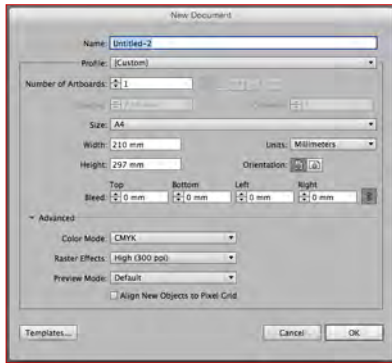
13

🌷 Grid and rulers. (Menu > View > 'Show grid' and 'Show rulers')

Menu > Window > Properties
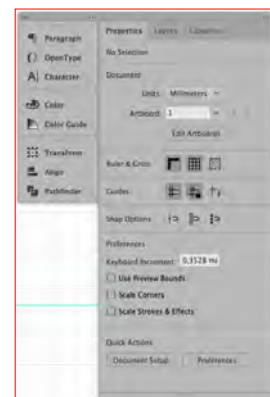
14

Grid and rulers. (Menu > View > 'Show grid' and 'Show rulers')
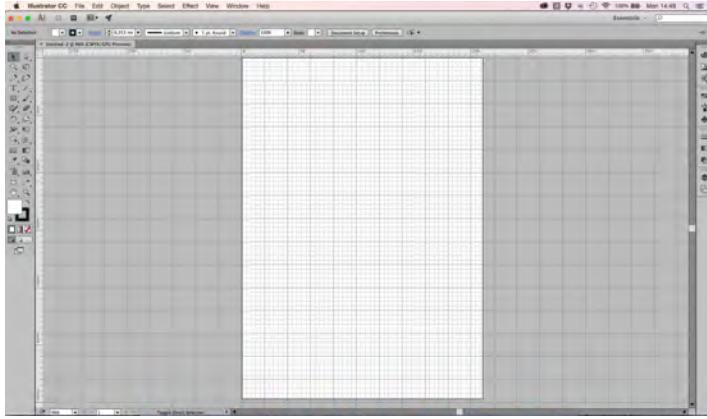
TIP: You can customize these setting via 'preferences'.

15

Using guides.

- Drag from vertical or horizontal ruler.
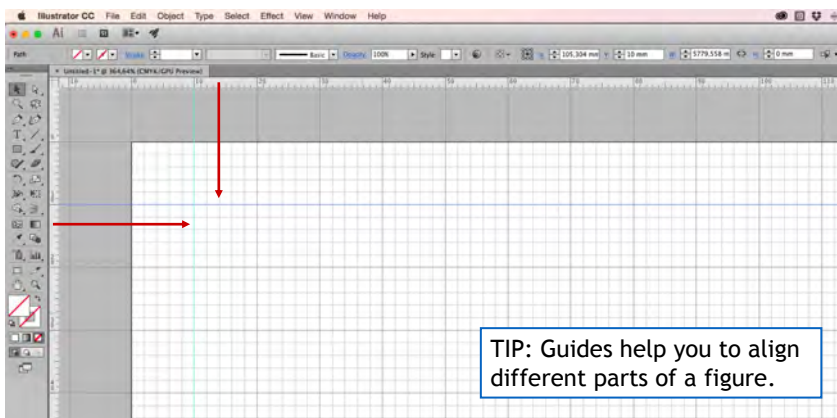
TIP: Guides help you to align different parts of a figure.

16

🌷 The main Illustrator toolbar.

Press to open underlying menu

Selection tool → → Direct selection tool
→ Lasso tool
Pen tool →
Text tool → → Line tool
Shape tool →
Pencil tool →

→ Transform tools

Eyedropper tool →
Paint brush tool →

→ Zoom-in tool (+'Alt' = zoom-out)
(Edit) Fill color → → (Edit) Stroke (line) color
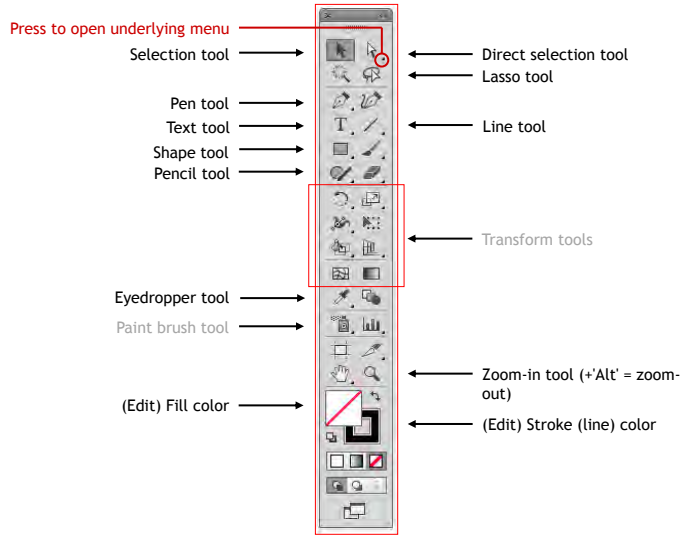
17
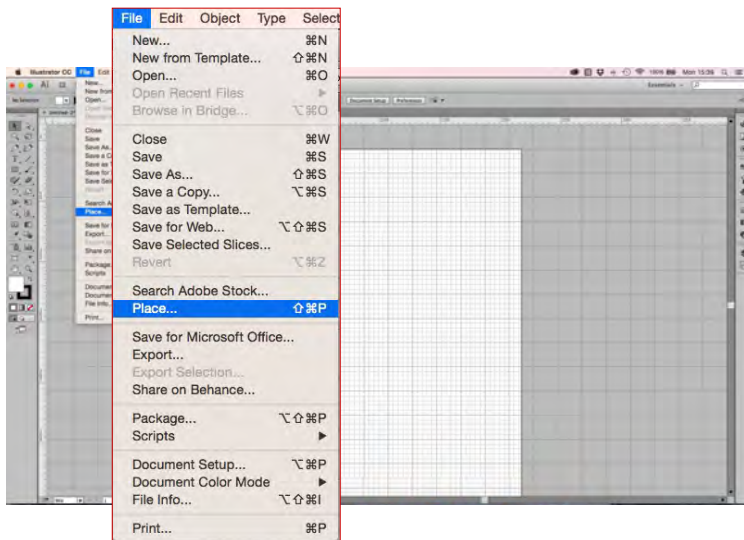
🌷 Import (place) image.

18

Import (place) image.
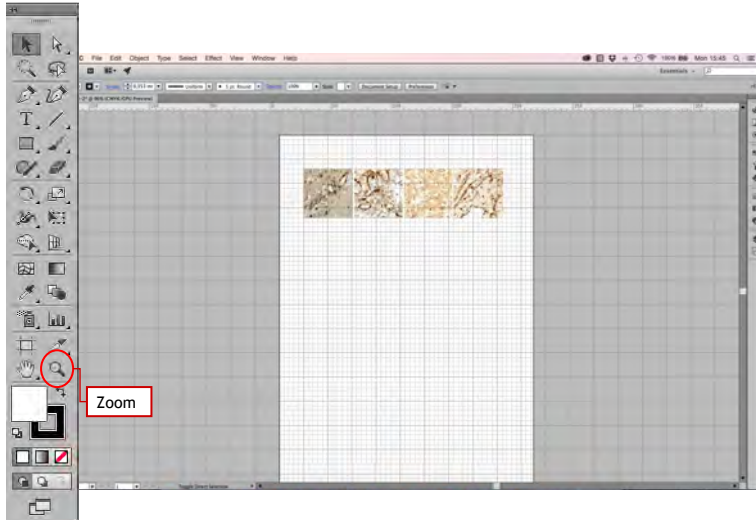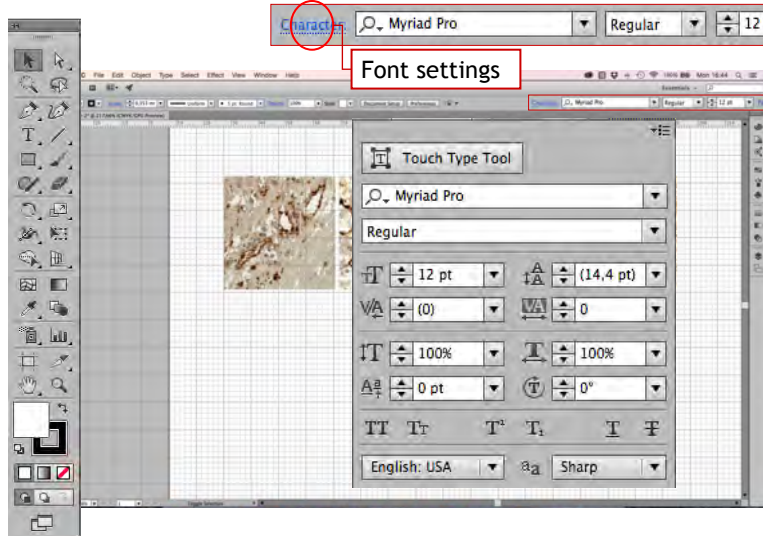
19

Add text.
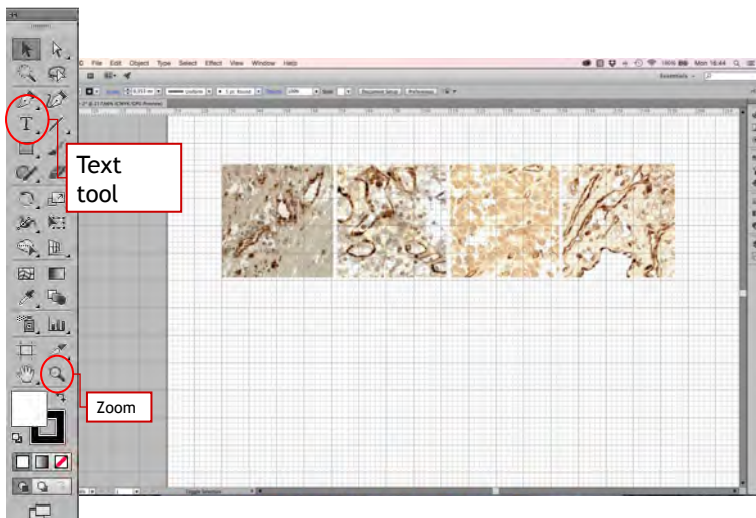
20

🌷 Adjust text settings.
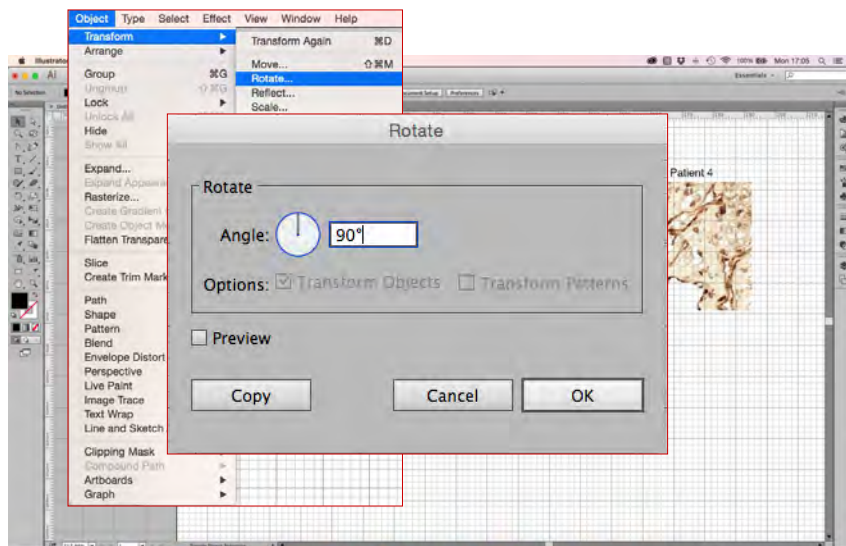
Font settings

Check journal requirements.

Helvetica or Arial are common.

Use a minimal font size of 6 pt.

Be consistent with size and type.

21

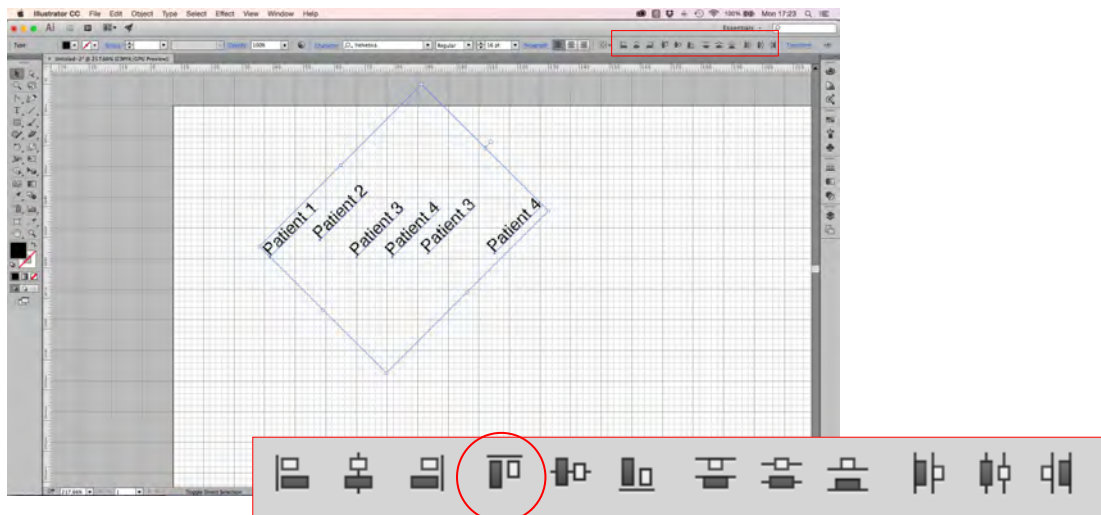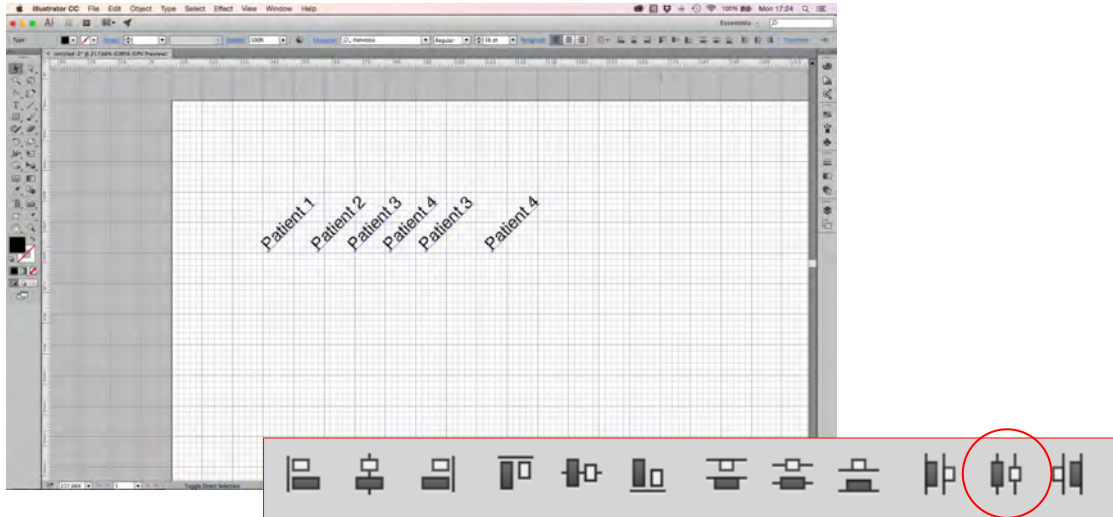## 🌷 Rotate text. (Menu > Object > Transform > Rotate)

22

Rotate text.
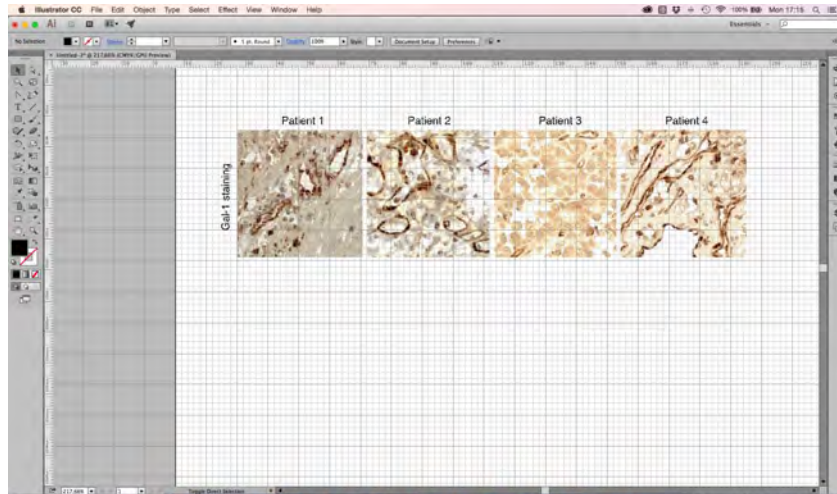
23

Add and align multiple objects (e.g. text boxes).

24

Distribute multiple objects evenly (e.g. text boxes).

25

Distribute multiple objects evenly (e.g. text boxes).
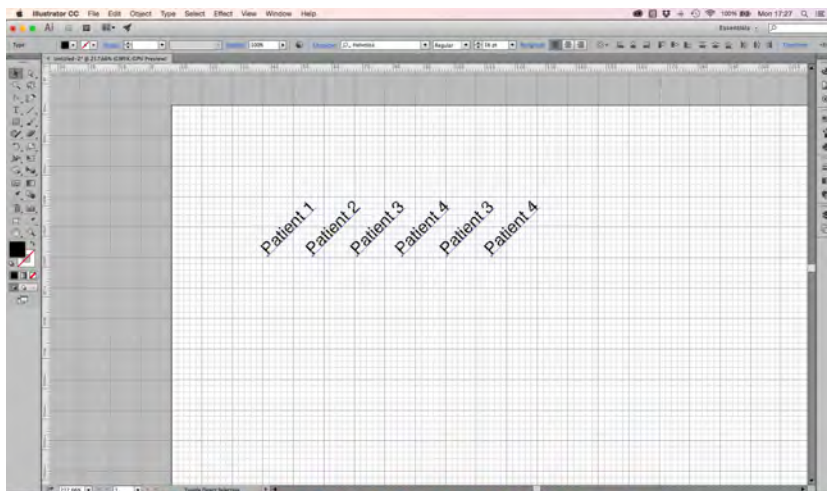
26

🌷 Import graphs. (e.g. from Excel, Graphpad, SPSS)

The easy way 1 (works for e.g., SPSS):

- Try to save/export/print the graph as a *.eps.
- Open in Illustrator and adjust to specific needs.

The easy way 2 (works for e.g., Graphpad):

- Copy/Paste.
- Adjust to specific needs.
- Remove clipping masks and adjust text and graph to specific needs.

The more difficult way ('works' for Excel):

- Adjust the graph settings.
- Copy/paste the graph from the specific application to the Illustrator work space.
- Remove clipping masks and adjust text and graph to specific needs.

27

🌷 Import graphs. (e.g. from Excel, Graphpad, SPSS)

Remove as much 'Excel layout features' as possible:
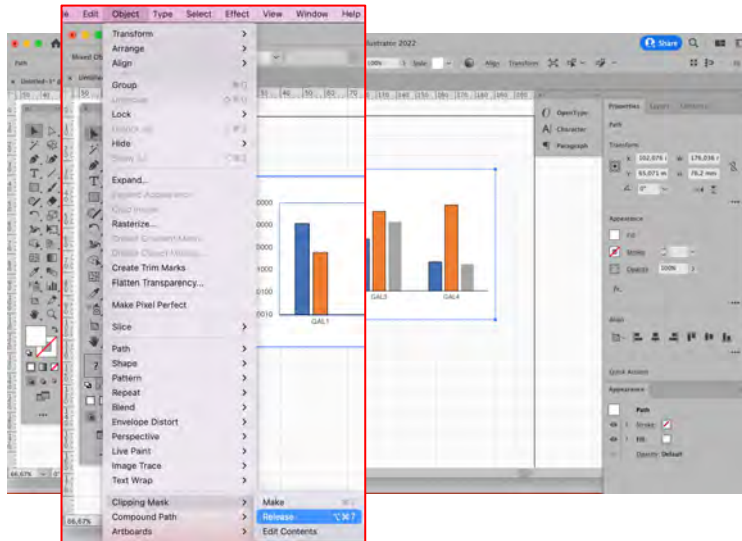- Shading
- Fill color

Set font to 'helvetica' without any other styles.

Copy/paste graph into figure workspace.
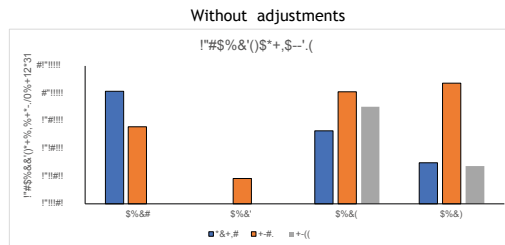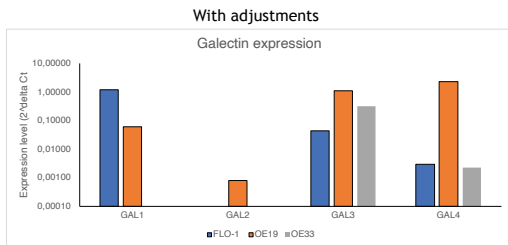
28

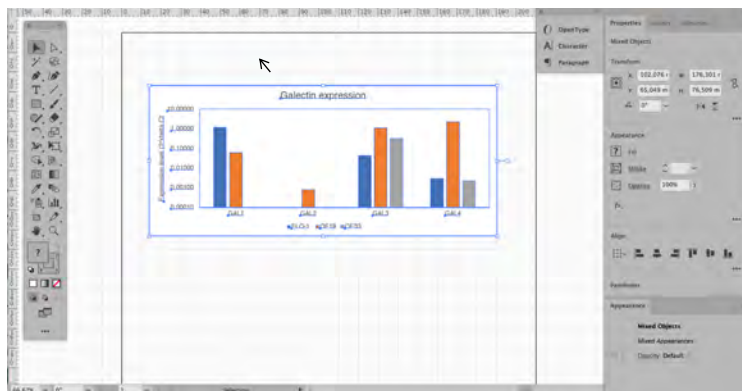## 🌷 Remove clipping mask. (Menu > Object > Clipping Mask > Release)

29

🌷 Remove all redundant clipping masks.

Use mouse cursor to select areas that are not relevant to the graph.
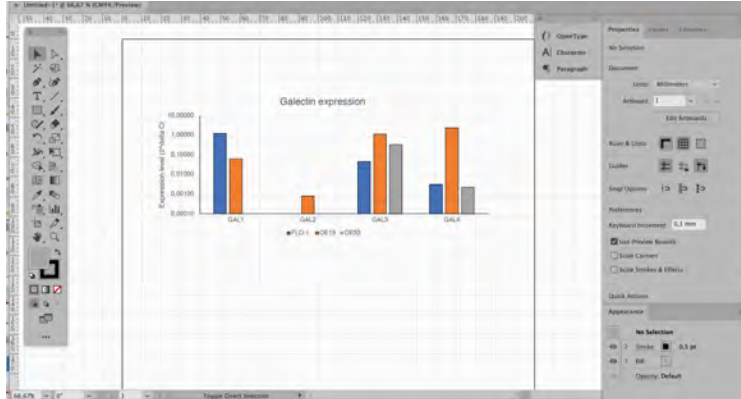
Delete selected areas.

30

🌷 Remove all redundant clipping masks.

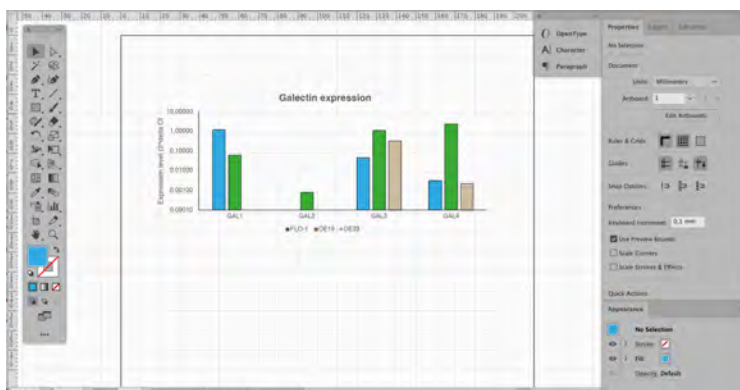Use mouse cursor to select areas that are not relevant to the graph.

Delete selected areas.

31

🌷 Customize your graph.

- Select the text boxes and adust font.
- Select entire graph and set line thickness to 0.5 or 1.0 pt.
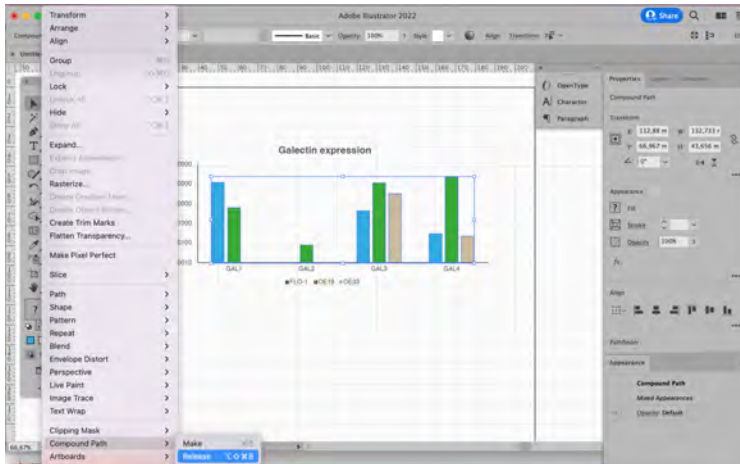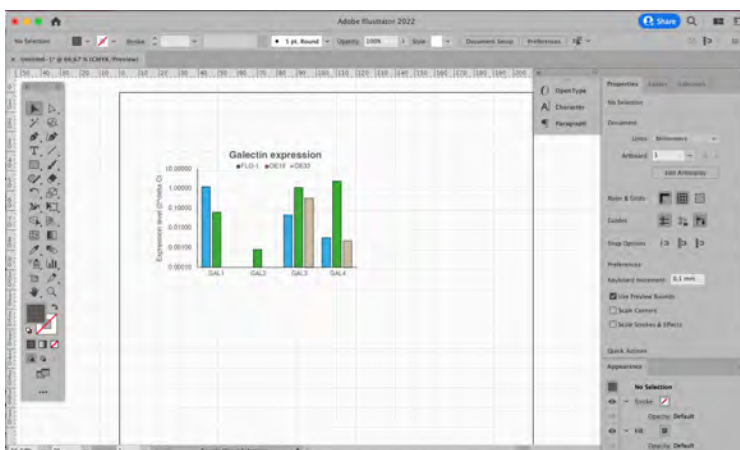- Select the bars and change 'fill color'.
- Etc.

32

Customize your graph.

- If you want to give the bars different colors or put them closer together you first have to release the 'compound path'. (samengesteld pad)
    >> Menu > Object > Compound path > Release.
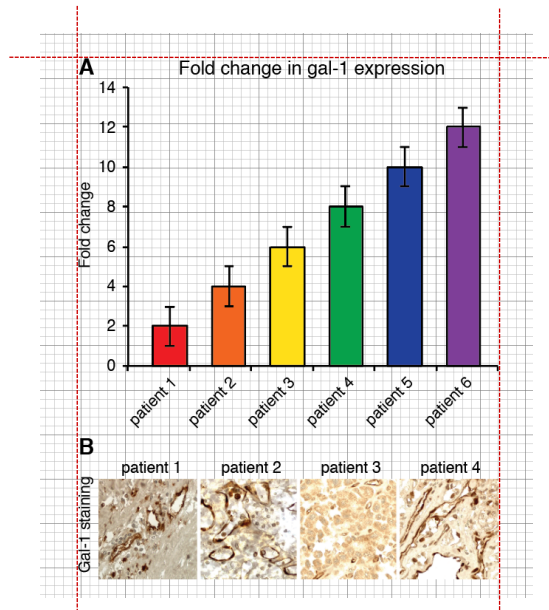

33

Customize your graph.

- Move bars/text etc. (use SHIFT to maintain vertical position).

34

Customize your graph.

Consistent use of font:
Font type (Helvetica)
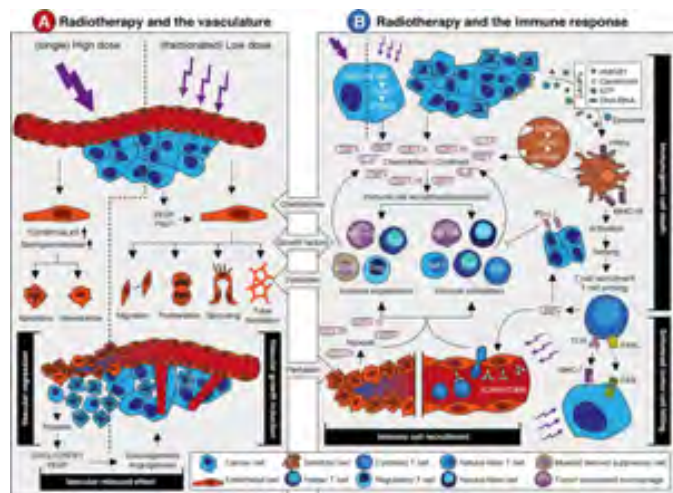Font size (10 pt + 14 pt)
Font style (regular)

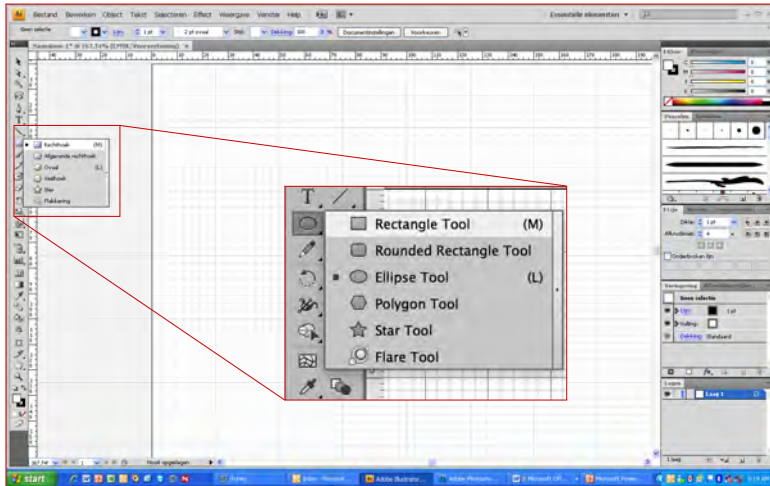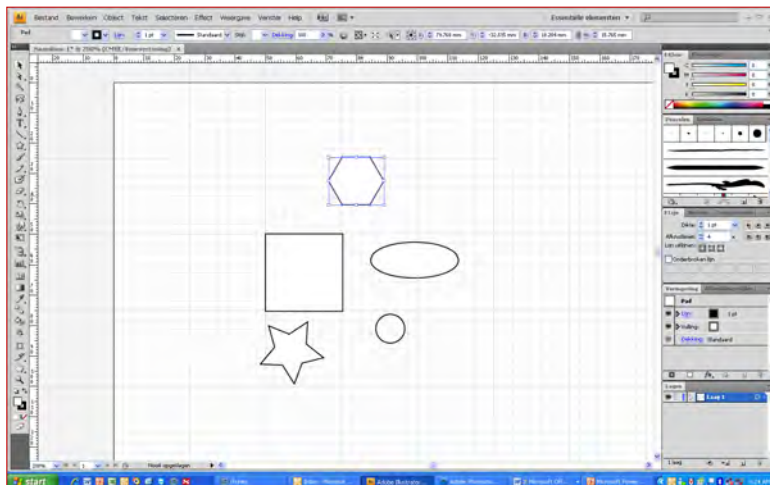35

Creating line art/cartoons.
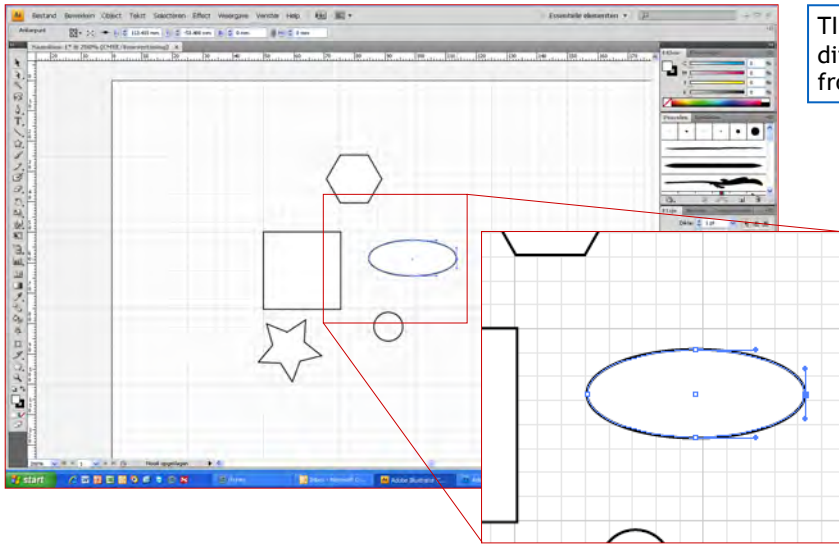
From   to

36

Making drawings: Standard shapes.
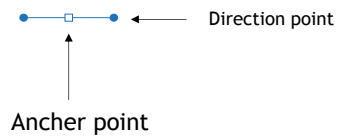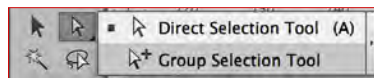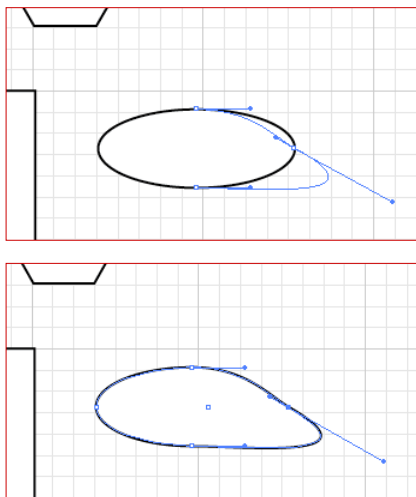

37

Making drawings: Standard shapes.

38

Making drawings: Standard shapes.

TIP: You can copy more different standard shapes from Powerpoint.

39

Making drawings: Change standard shapes.
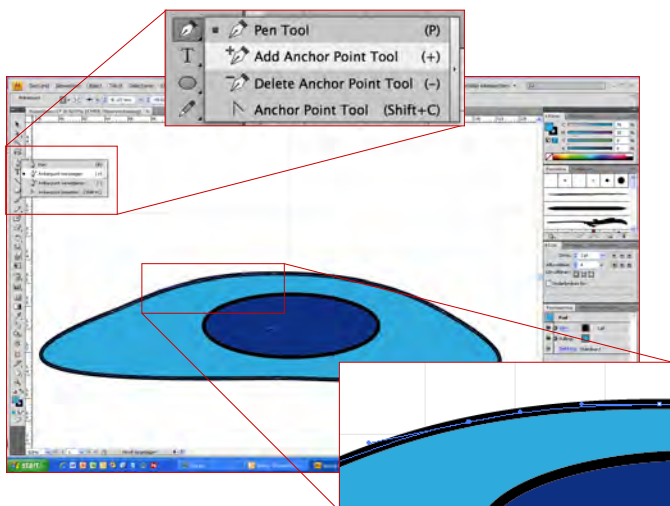

Direct Selection Tool (A)
Group Selection Tool

Direction point

Ancher point

40

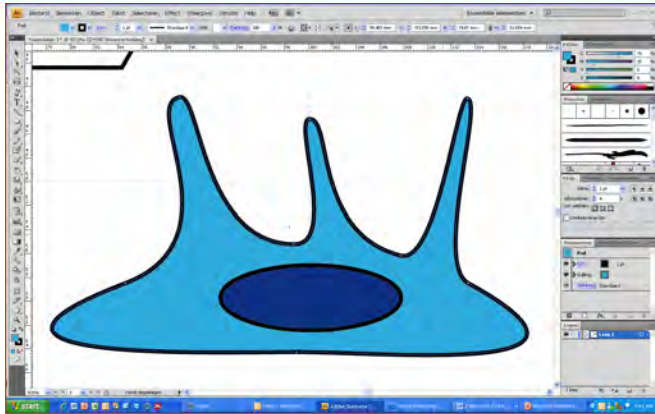## Making drawings: Change standard shapes.
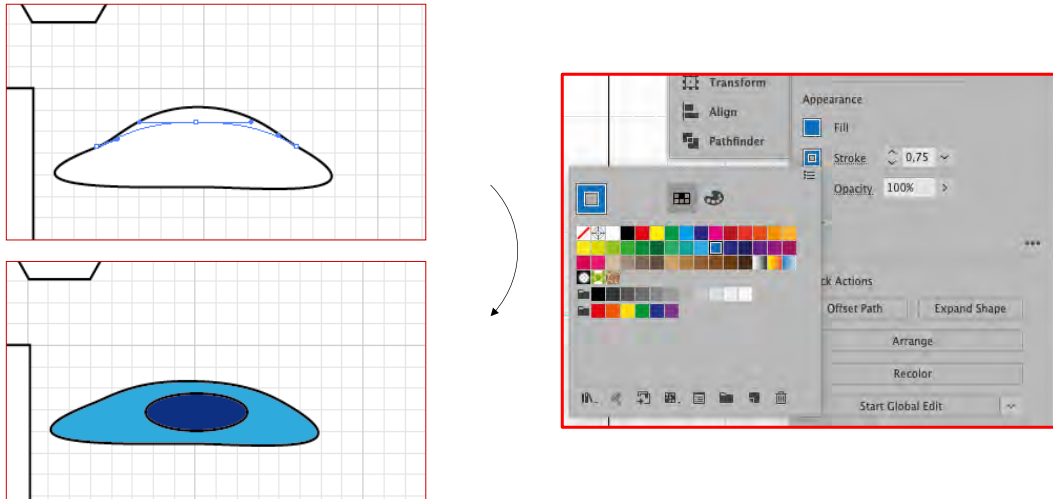
41

Making drawings: Add anchor points to shapes.
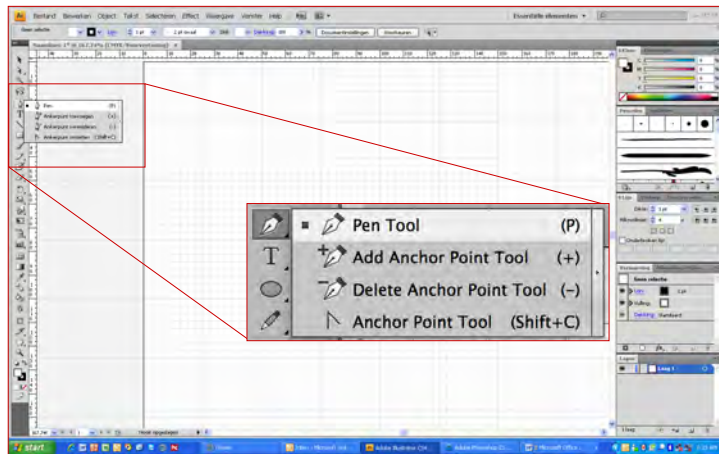

42

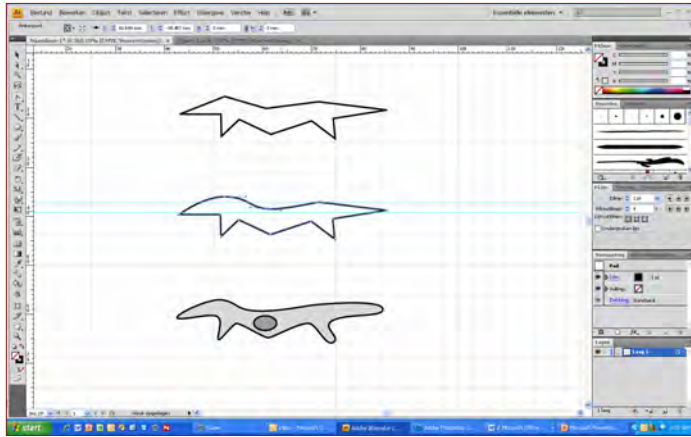## 🌷 Making drawings: Move/adjust new anchor points.

43

🌷 Making drawings: Drawing with Pen Tool.
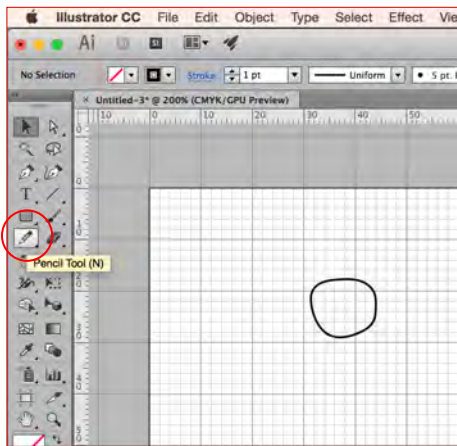

44

🌷 Making drawings: Drawing with Pen Tool.

45

🌷 Making drawings: Drawing with Pencil Tool.

46

🌷 Making drawings: Drawing with Pencil Tool.
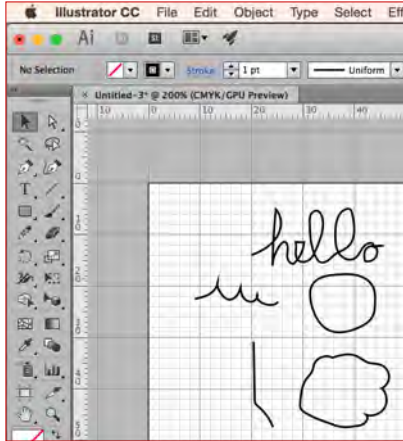
47

🌷 Color and gradients.

Fill color   Line color
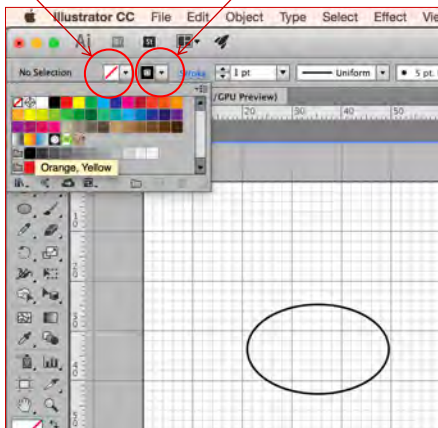
48

🌷 Color and gradients.

49

🌷 Color and gradients. (Menu > Window > Gradient)

- Click and move/delete to change gradient.
- Double click to edit color

50

🌷 Color and gradients. (Menu > Window > Gradient)
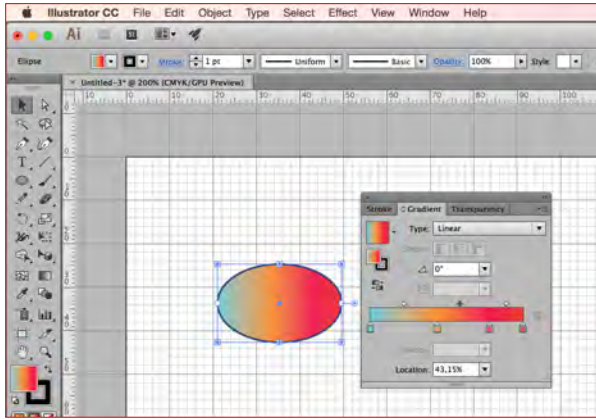
51

🌷 Tips and tricks.

Lock & Unlock parts within your figure: Menu > Object > (Un)Lock > Selection.
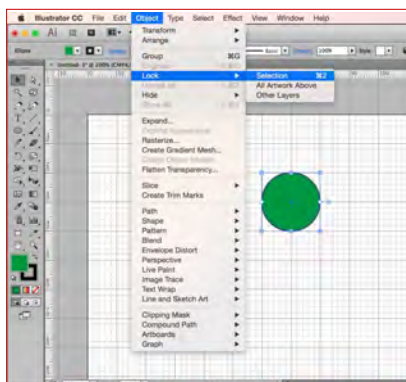
52

🌷 Tips and tricks.
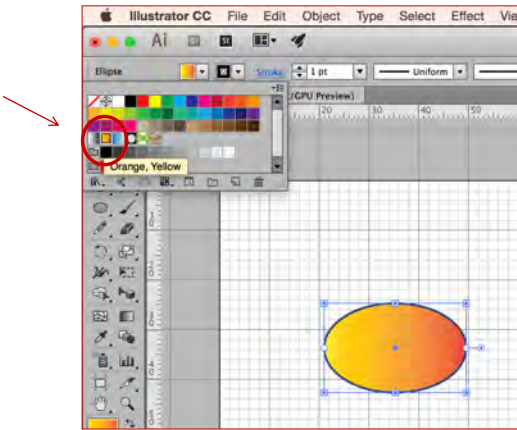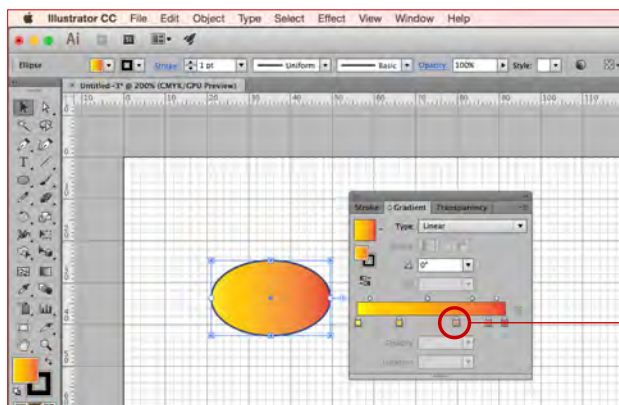
Select similar components, e.g. all text boxes, similar shape/color.
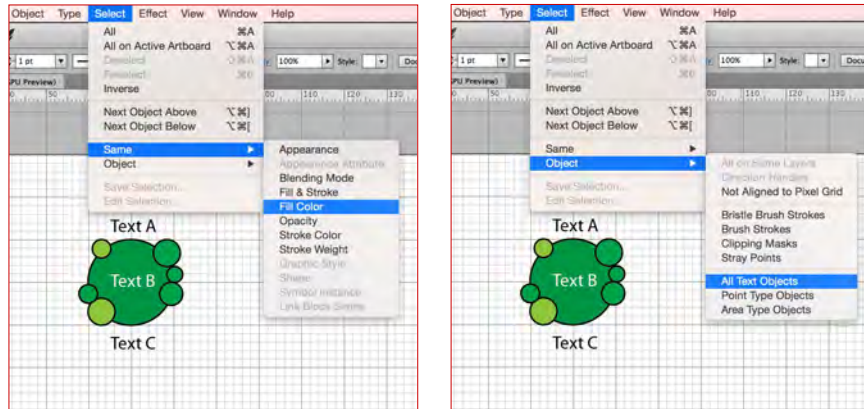
53

🌷 Tips and tricks.

Transfer settings from one shape or text to another with the eye-dropper tool. This can also be used to select colors from a specific image.

- Select the text that you want to change
- Select the 'eye dropper' tool
- Click with the 'pipet' on a text with the proper settings

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Export / Save your work.

Common saving formats
 .AI (Adobe Illustrator)
 .EPS (Encapsulated postscript)
 .PDF (Portable Document Format)

Export formats
 .PSD (Photoshop Document)
 .TIFF (tagged image file format)
 .JPEG (joint photographic experts group)

TIP: While editing, save your file as .AI. Once the figure is ready it can be 'saved as' .JPEG or .PDF to support portability.

55

The do's and don'ts of Photoshop.
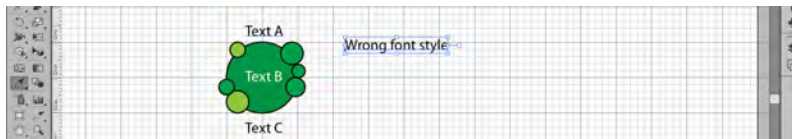
The 5 steps to Photoshop salvation:

1. Open image.

2. Save as.

3. Adjust image properties.
   - Color mode
   - Size/Resolution

4. Image editing.
   - Brightness/contrast
   - Color adjustments
   - Crop
   - Transform (rotate/scale/etc)
   - Layers

5. Save image.

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Image properties: Color mode. (Menu: Image > Mode or Adjustments)

RGB: An additive color model (for black background, e.g. monitor)
  • White is generated by combining all colors
  • Black is generated by absence of colors in black background

CYMK: An subtractive color model (for white background, e.g. paper)
  • White is generated by absence of colors in white background
  • Black is generated by combining all colors

Grayscale: Any color can be converted to its most approximate level of gray.
  • Different build-in equations in photoshop for different 'gray effects'.
  • Menu: Image > Adjustments > Black&White.

Red
Green
Blue

Cyan
Magenta
Yellow
Key (black)

TIP: Artwork is usually transformed to CMYK by the publisher so check your figures in CMYK mode.

NOTE: Transformation from RGB to CMYK introduces and additional color channel which will influence the information in the color channels when going back to RGB.

57

Image properties: Size and resolution.

• An image does not have dpi, it only has pixels.

  e.g a 24 megapixel camera with a 3:2 ratio takes images of 6000 x 4000 pixels.

• DPI becomes relevant/apparent when an image is printed or shown on a screen.

  e.g. when printing the above images on a 15x10 cm format (= 5.9x3.9 inch) the max. dpi would be ±1015 dpi.
  e.g. The maximal size to print the above image at 200 dpi would thus be 30.0 x 10 inch (= 76.2 x 25.4 cm)

• In general:
  • line art/monochrome: 1200 dpi
  • **halftone: 300 dpi**
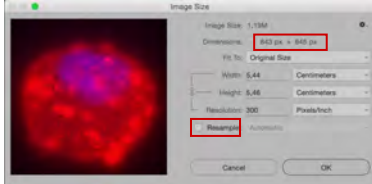 • combination halftone: 600 dpi

  TIP: Check resolution requirements and figure size dimensions of specific journal

line art

cell   nucleus

large vesicles

halftone

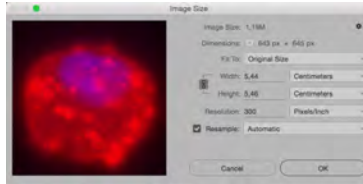combination halftone

cell   nucleus

large vesicles
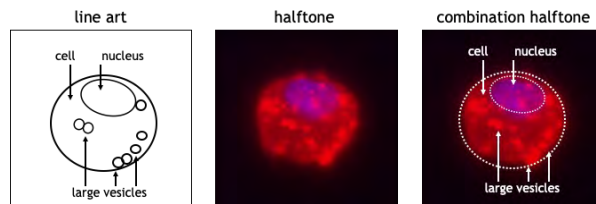
58

🌷 Image properties: Adjust image size. (Menu: Image > Image size)

Without resampling (preferred)

Increase width/height will cause a
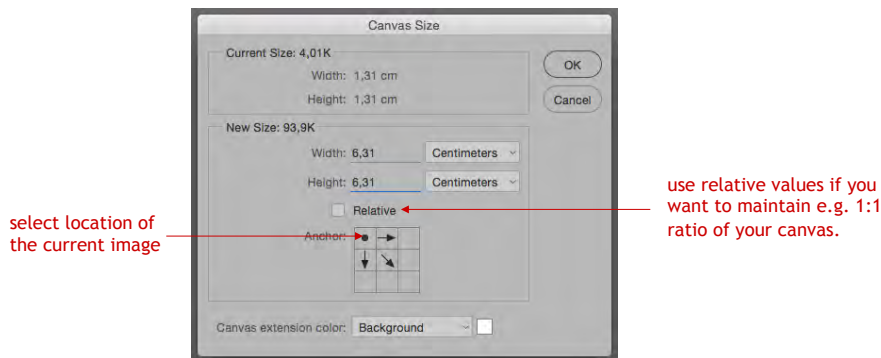decrease in dpi and vice versa.

With resampling

Increase width/height will not affect dpi
because pixels are 'added/removed'.

You cannot just switch back and forth between image sizes using resampling

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🌷 Image properties: Canvas size. (Menu: Image > Canvas size)

When combining multiple pictures in a single image, use 'canvas size' to
enlarge the image (Menu: Image > canvas size).

select location of
the current image

use relative values if you
want to maintain e.g. 1:1
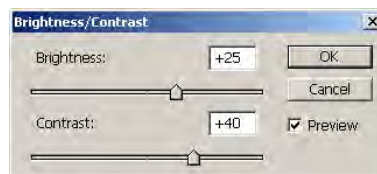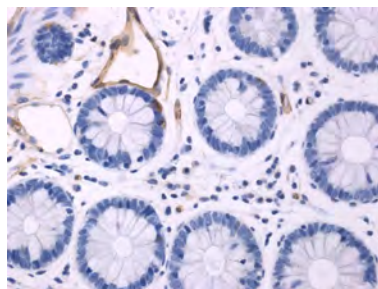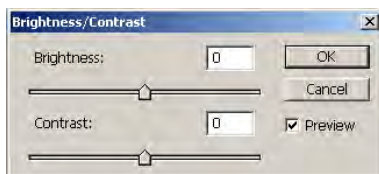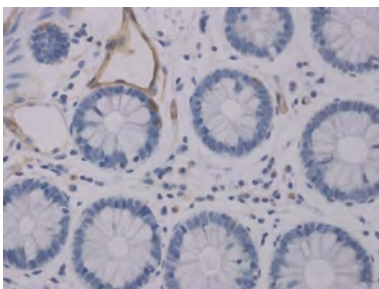ratio of your canvas.

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Image editing.

- Brightness/contrast
- Color adjustments
- Crop
- Transform (rotate/scale/etc)
- Layers

NOTE: apply image editing with caution and always to the entire image and not to a specific selection.
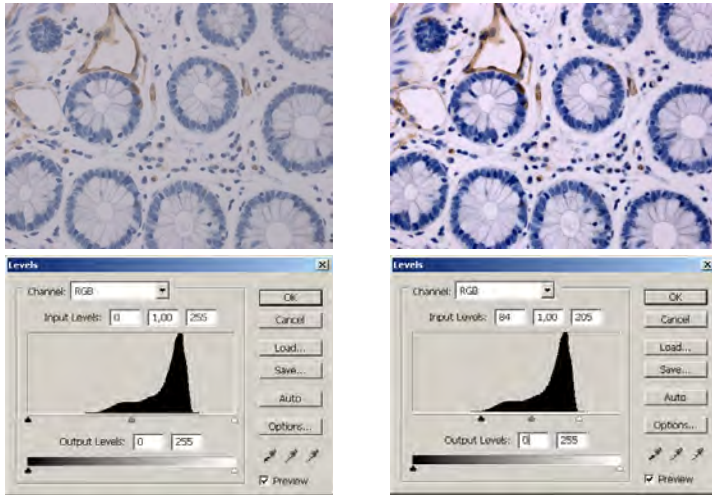
61

Brightness/Contrast. (Image > Adjustments > Brightness/Contrast)
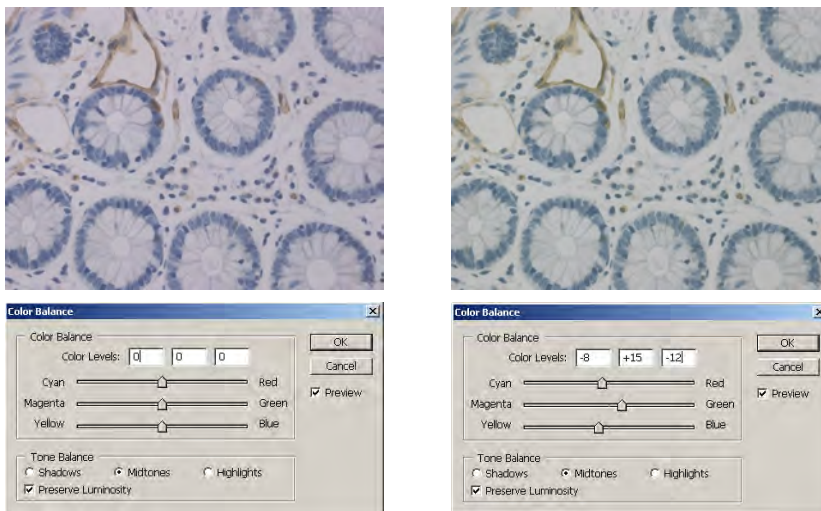Linear

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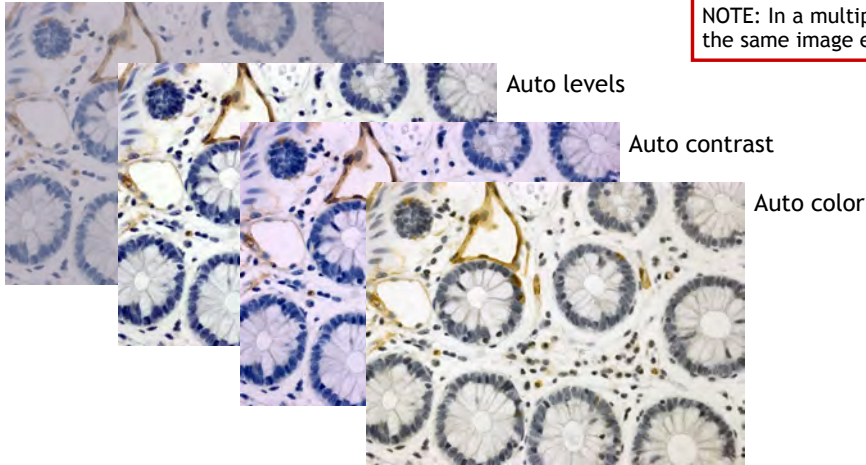**Color levels.** (Menu: Image > Adjustments > Levels).
Non-Linear

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Color balance. (Menu: Image > Adjustments > Color balance).
Non-Linear

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Auto-adjustments. (Menu: Image > Adjust > Auto....)

NOTE: In a multipanel figure, apply exactly the same image editing to all panels

Auto levels

Auto contrast

Auto color

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Crop. (Menu: Image > Crop)

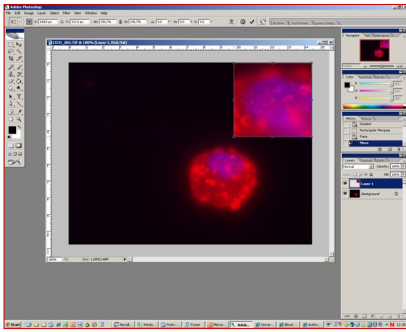Use 'crop' to select region of interest

Crop →

NOTE: The crop tool is not intentend to remove any unwanted data from your image.
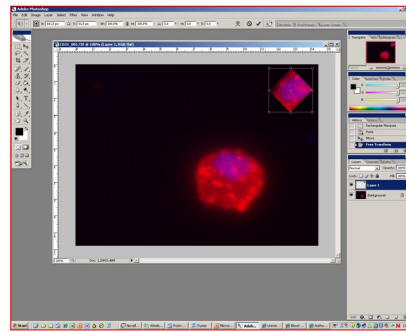
66

🌷 Transformation. (Menu: Edit > Transform)

The transformation tool can be used on a specific <u>selection</u>.

Scale (zoom in/our)   Rotate

TIP: There is limited value of an inset with a zoom less than 5-fold compared to the original image.
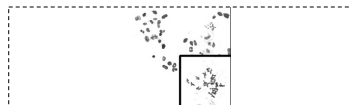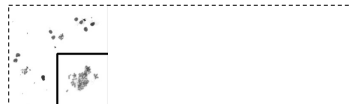
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🌷 Layers. (Menu: Window > Layers (F7))

Layers are like transparant sheets that contain different information.

Projected simultaneously, these layer 'sheets' make up an entire image.

Layers allow you to specifically add, remove or alter part of you image.
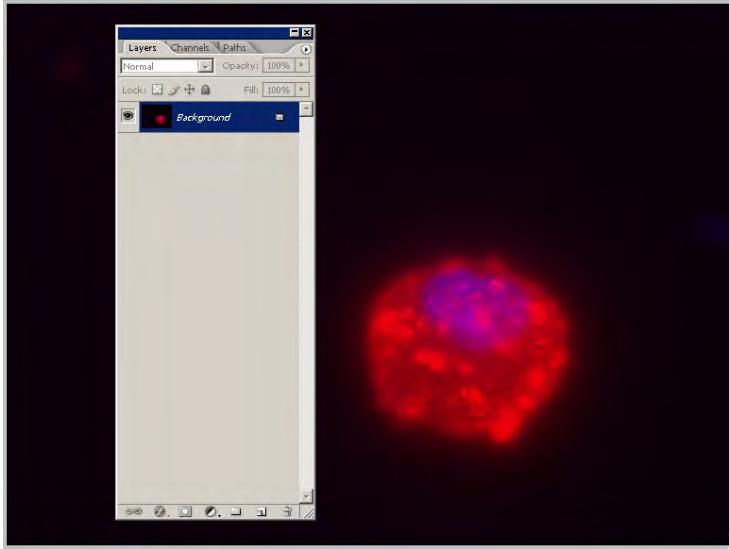

NOTE: If you copy/paste something in an image it will appear in a separate layer

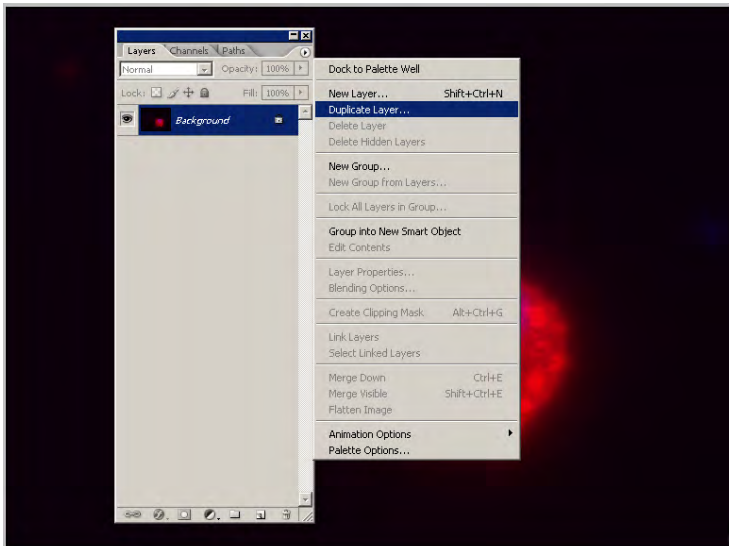TIP: Use layers until you are ready to submit your image.
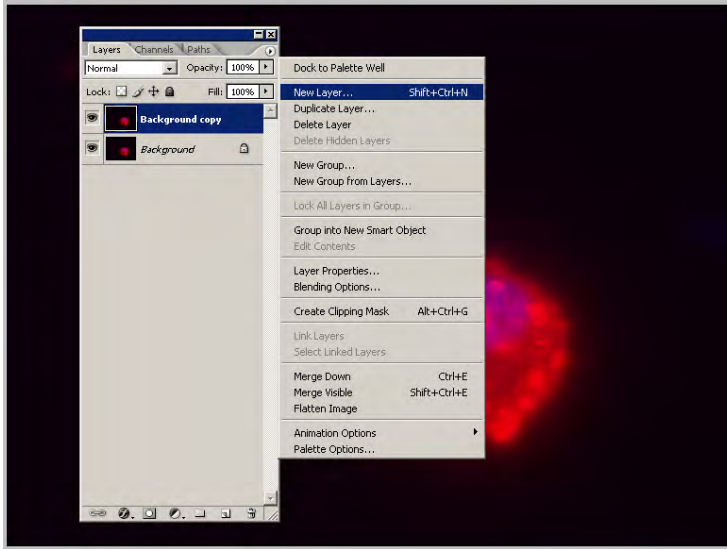
68

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Working with layers.
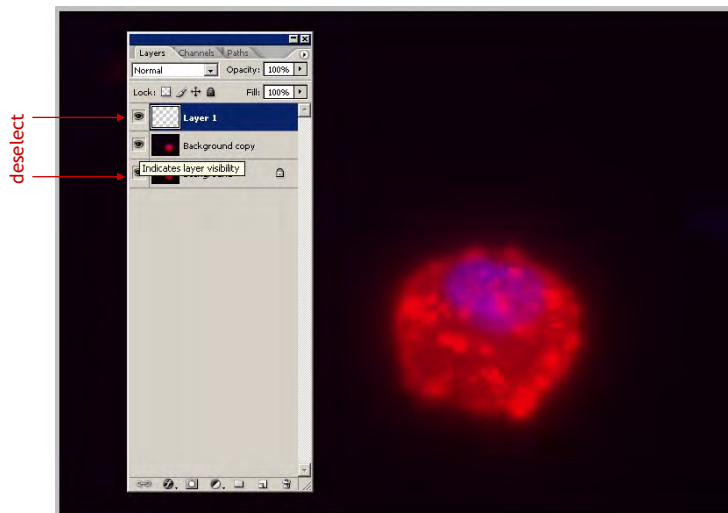

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Duplicate a layer.

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Add a layer.

71

View a specific layer.

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🌷 Save your image.

Most common formats
  .PSD (photoshop document)
    Layers are maintained.
    No compression.

  .TIFF (tagged image file format)
    Layers are maintained.
    Lossless (e.g. LZW) or Lossy (e.g. JPEG) compression

  .JPEG (joint photographic experts group)
    No seperate layers
    Repetitive Lossy compression > loss of information/quality when you save

Other formats
  .EPS (encapsulated postscript)
  .BMP (bitmap)
  .GIF (graphics interchange format)
  .WMF (window metafile)

TIP: While editing, save your file as .PSD or .TIFF to avoid loss of image quality. Once the image is ready it can be 'saved as' .JPEG to support portability.

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🌷 Learn by trial and error.

Use your creativity.

Use Google/YouTube for instruction video's.

Anything you can think of is possible.

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