

The main aim of the figures is to complement and follow the narrative of the article. We would encourage you to think about the display items in terms of what will be of most use and interest to readers. Figures can be produced using any drawing software, PowerPoint or in some cases hand-sketched and should contain all the scientific details

so that they can be evaluated during peer review. Once the manuscript is accepted in principle, the Art Editor will redraw the figures according to our house style. We will work with you to develop the most effective way to convey the intended message. The following table provides some dos and don'ts to help to guide the design of your figures.

	<b>Do</b>	<b>Do not</b>
<b>Information flow</b>	Use a top–bottom/left–right, logical flow of information. If you are unsure of the best way to show something, explain the concepts to the Editor, and we will work on a solution.	Do not use circular layouts unless there is a recognizable design such as a spider diagram with a clear focal point or you want to show a circular process (such as a life cycle or a cell cycle). A viewer looks top left of a diagram first, so that is usually the best starting point for the flow of information.
<b>Brevity and clarity</b>	Cut out all unnecessary information or illustrations to make the important points of the figure stand out. On previously published material, please highlight elements that can be removed. Do avoid overcrowded figures – the message will be clearer.	Do not repeat information unnecessarily or have too many panels – a full-page figure should probably comprise no more than six panels.
<b>Labels and annotations</b>	Provide thorough and clear labelling of figure elements and, if necessary, clear guidance for our Art Editors.	Do not use too many abbreviations as these can hamper readability. Do not use italic or font size for emphasis or hierarchy – house style is bold for headings and all text 8 pt.
<b>Colours</b>	Use colours for grouping or showing relationships. If you colour something a certain way for an important reason, flag it to the Editor or make a note so we know it is important.	Do not use too many colours in your figures as these will be updated to the Reviews palette. Figure elements do not all have to be coloured differently and will be changed.
<b>Consistency and agreement</b>	Be consistent (colours, shapes, orientation, ordering) within each figure and between figures, because elements that are aesthetically in agreement will be perceived as related.	
<b>Itemization</b>	Long lists are difficult to remember. Organize the information into smaller groups (five points per list is optimal).	
<b>Effective imagery</b>	Imagery can be used to provide context; for example, using the outer membrane and nucleus as 'landmarks' for showing the location of a biochemical process.	Do not use images as labels when words would be more effective, unambiguous and less space-consuming.
<b>Initial material</b>	You can use any drawing software or provide reference images from other sources (you can even hand-sketch a complex figures for reference). We will help you to get to the optimal final figure. NB! Any BioRender figures will be redrawn.	Do not be too concerned about providing beautiful-looking figures. What is important is that the figure conveys the information clearly and accessibly for the assessment process and subsequently for Art Editors to interpret.
<b>Photos, scans, etc.</b>	Ideally provide photographic images at high resolution and unlabelled. For print, TIFF images need to be 300 dpi at their final size.	Do not have labels flattened as part of the photo. Please keep labels on separate layers or provide unlabelled photos on submission.
<b>Figure permissions</b>	Although we prefer original figures, it may be possible to reproduce or adapt figures from previously published articles. In this case, keep records of the source material – after peer review, the Editor will ask for these details so as to obtain the necessary permissions from other publishers.	Do not request permission from publishers yourself because this permission cannot be used by the editorial office.

## Graphs

When preparing a graph, please ensure that axes are labelled properly (with units), and that a key to colours and symbols is provided. Avoid reproducing data from single studies, unless these are fundamental for the development of the narrative flow of the article. We do not publish original data, but for some article types, a collation of results to show a trend might be appropriate, at the discretion of the editor. Please avoid graphs that report trends in number of publications because, even if these might be interesting data, they do not provide any scientifically relevant information.

## Chemical structures

If possible, please provide chemical structures as ChemDraw files. When preparing the chemical structures please use the [Nature Research Chemical Structures Guide](#) and [ChemDraw template](#) to ensure that your chemical structures will require minimal changes by our Production team. Submit final files as .cdx files.

## Equations

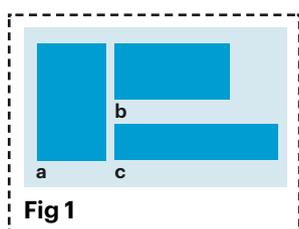
Please ensure that variables are italic, constants are roman and vectors are bold.

Once your manuscript is accepted, the art team at *Nature Reviews* will require high-resolution, editable figure files. This guide applies to images, graphs or illustrations that you have prepared, as well as those from third-party authors. Our in-house art team will re-draw elements of your figures (after peer review) and lay out the final version.

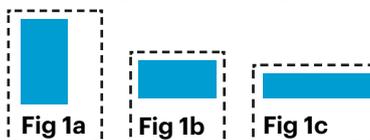
These specifications are in place so that we are able to create your figures in the highest quality. We want to ensure that any data-focussed figures or images we are reproducing are clear, attractive, and that information is represented consistently across multiple panels.

Please complete these two important steps after peer review, when requested by the editor:

**1** Please send each whole figure with all of the panels included and arranged in the intended layout (e.g. Fig 1.pdf)



**2** Please send each individual figure panel as a separate file, saved directly from the original program that it was created in (e.g. Fig 1a.pdf, Fig 1b.pdf). We have found that when figure panels are combined into the final layout the editability and quality can deteriorate. If we have the individual figure panels we can rebuild the figure using these files, using the whole figure as a reference.



## Saving individual figure panels

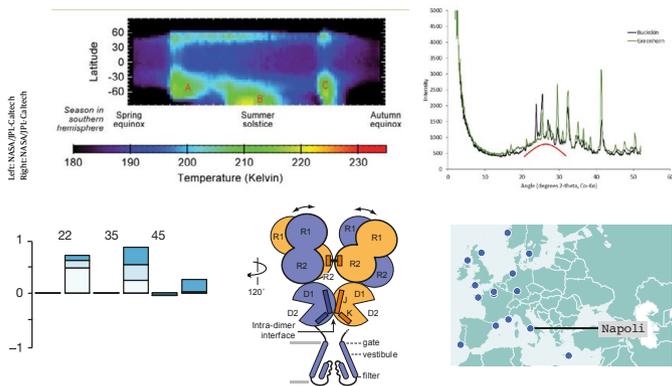
**Vector:** AI, EPS, PDF

**Important.** Save data-focussed figures such as graphs and charts as vector files: AI, EPS, PDF.

All data-focussed figures such as graphs should be saved/exported directly from the original application and file in which they were created as AI, EPS or PDF.

- To create vector files, open the original figure file in the application that it was created in. The text, data, lines and colours in this file should be editable. Directly save/export the file as one of these file formats: AI, EPS or PDF. We cannot use bitmapped file types such as BMP, GIF, GIMP, JPG, PNG, Tex or TIFF for vector art.

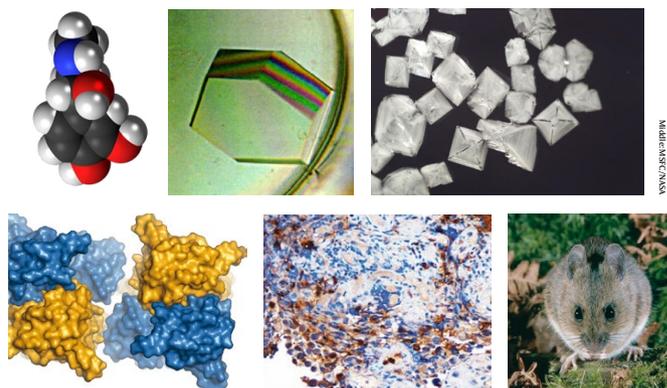
Examples of figure types that should be supplied in vector/editable format



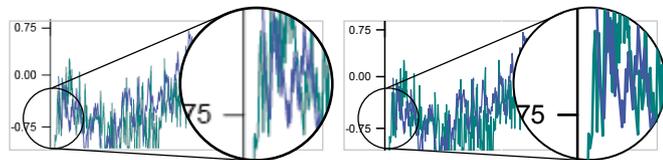
**Bitmap:** BMP, GIF, GIMP, JPG, PNG, Tex, TIFF

- All photos and complex technical illustrations, e.g. 3D-rendered graphics, should be directly saved/scanned in *at least* 300 dpi resolution at the maximum size that you have available.
- Do not artificially increase the resolution of images in graphics applications such as Photoshop as this does not improve quality. Images should retain the best available resolution of the source files.

Examples of figure types that should be supplied as high-resolution bitmaps



## Difference between bitmap and vector



Bitmap

Vector

The pixelation becomes more apparent on bitmapped images the closer the reader zooms in.

## Difference between high- and low-resolution images

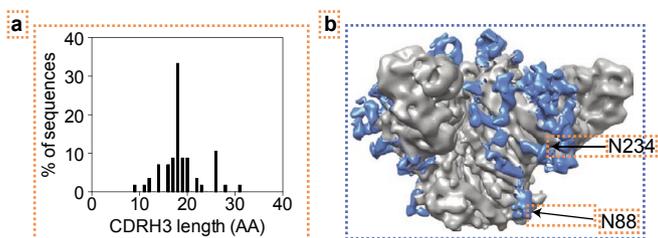


The pixelation becomes more apparent on low-resolution images the closer the reader zooms in.

## Combining panels into the whole figure

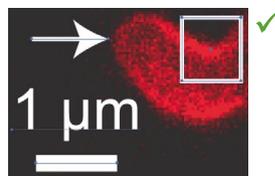
- When arranging your figure panels into one file for the intended layout of the whole figure, use a vector-based application such as Adobe Illustrator or Microsoft PowerPoint, as these retain the resolution and editability of the source files. Save as: AI, EPS, PDF or PPT
- Please also save the individual panels using the instructions outlined above and send them separately to us.
- Do not use applications that do not support vector format. Unless the whole figure is a clean image or a schematic that will be redrawn entirely, we do not accept: BMP, GIF, GIMP, JPG, PNG, Tex, TIFF.
- Microsoft Word and Adobe Photoshop: We do not recommend using these because images can lose editability and resolution can be degraded.
- Place all bitmapped images into the layout application at least 300dpi (500dpi is recommended) or at the native resolution if captured at less than the optimal 300dpi.
- All text, annotation and scale bars should be in editable format and laid over the bitmapped images.

## Examples of text, annotation and scale bars that should remain separate and editable

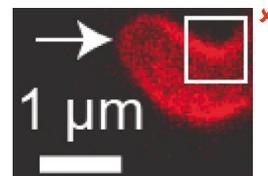


a Vector parts that should be separate and editable.

b Bitmapped parts that should be separate and at least 300dpi resolution.



All overlaid elements are separate and editable



All elements have been flattened and are not editable

## Figure sizes

- Figures are published in portrait orientation.
- Maximum figure size: 180mm (w) x 215 mm (h).

## Text

- Use 8pt when preparing your figures. This is the font size that will be used.
- Use italic text for single-letter variables; multi-letter variables are upright.
- Use bold for vectors.
- Units should be given using superscript numbers (e.g.  $\text{kJ mol}^{-1}$  rather than  $\text{kJ/mol}$ ).

## Colour

- Figures should be supplied in CMYK colour mode.

## Chemical structures

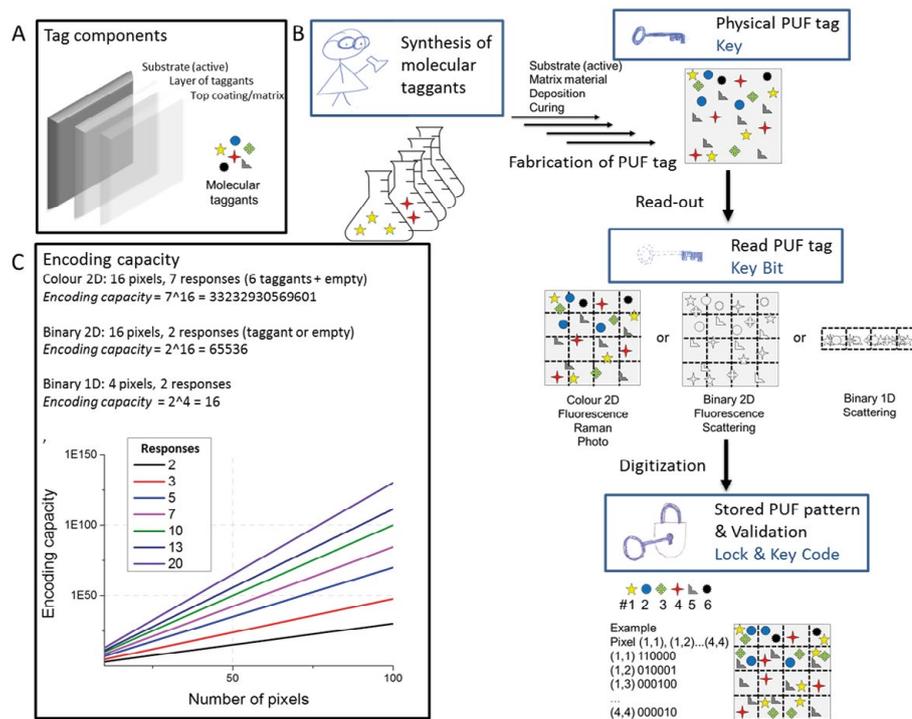
- If you are supplying a composite figure in a format other than .cdx but it contains ChemDraw structures, please also supply the ChemDraw elements in a separate .cdx file following the style guidelines. Please refer to the [Chemical Structure Guide](#) and use the [downloadable template](#) to format your structures. If including

the structure in your favoured layout requires it to use a font smaller than 5 or 6 point Arial font, please reconsider either the layout or the inclusion of the structure.

## Permissions

- Clarify the source of images that you do not own in the figure captions.
- Please complete the [Third-party rights table](#) when you are writing your manuscript. You will be asked to send it to us when final figures are requested. We will use the information in the table to request permission on your behalf. Please do not request permissions for published images. We are unable to use permissions retrieved by authors.
- Please note that we cannot publish figures for which permissions cannot be obtained.
- Wikimedia and Flickr: These public sites should be avoided as the information of who holds copyright is often absent or unreliable.
- We cannot publish images downloaded from the internet unless they are released under the correct Public Domain licence.
- If you want to use an image obtained from a photo library, do not purchase it. Instead, supply us with the library catalogue number and a low-resolution placeholder. We will secure publication rights and obtain the final version on your behalf.

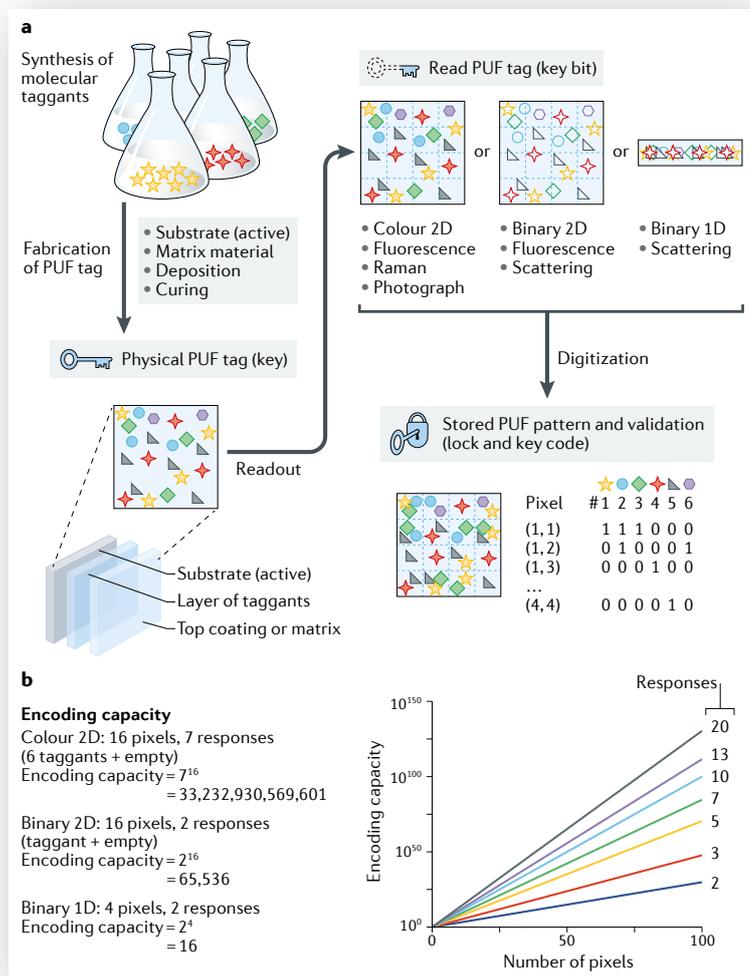
## Submitted figure



Example of a good starting point as it includes all the relevant ideas and necessary elements. The Editor will check for scientific correctness and consistency and the Art Editor will then provide effective graphical solutions and redraw the figure into house style.

Submitted figure courtesy of Riikka Arppe & Thomas Just Sørensen.

## Published figure



During the development of the final figure the following changes were made:

- Part A of the submitted figure was moved to connect with the pathway as an expanded view to explain the finer structure of the system, but importantly it allowed for the start of the flow diagram to be top left.
- Extraneous imagery was removed at the start of part B of the submitted figure, and the flasks were enhanced and made to agree with other figure elements – there are six taggants.
- Economic use of space, simplified flow of arrows, and simplified taggant shapes.
- The binary readout at the end of part B was made clearer by laying it out as a matrix aligned with the molecular taggants.
- In part C of the submitted figure, the various notations for exponents were replaced with superscript numbers.
- The graph axes were expanded to include zero, and the key was replaced with direct labelling of lines for simplification and immediacy.