

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.

# Scientific illustration for commissioned content: Our guiding principles for conceptual figures

**Nature-branded journals use a specific set of guidelines and principles to create our award-winning scientific illustration.** This guide is a short summary created specifically to aid authors working with our editorial teams to create summary and explanatory figures for content like News & Views, Reviews and other expert-authored commissioned content, where draft figure suggestions are often redesigned and edited by in-house art teams, and consistent styling is applied. *This guide chiefly applies to conceptual figures (as opposed to data figures).*

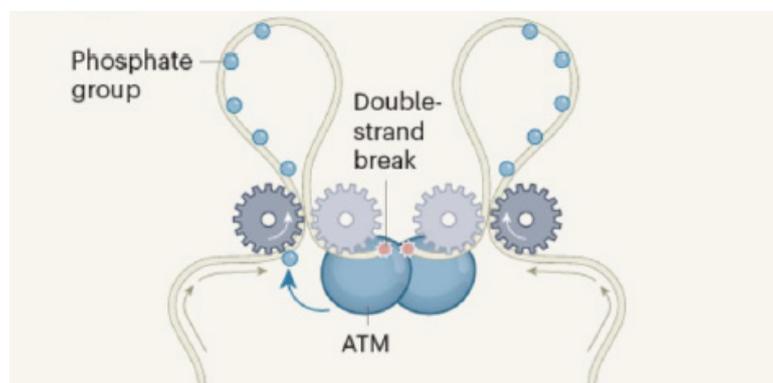
**Here we explain our basic principles of visual communication for scientific illustration:**

[Hierarchy](#)  
[Visual editing](#)  
[Clarity](#)  
[Accessibility](#)

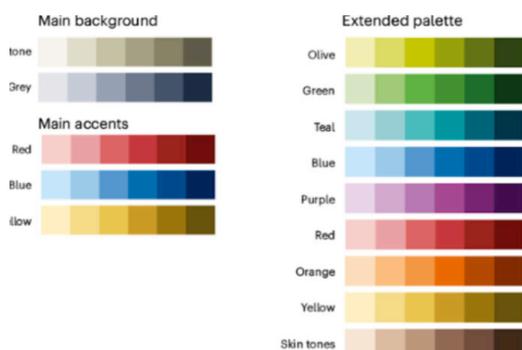
As well as: [How to avoid common mistakes](#)

## Hierarchy

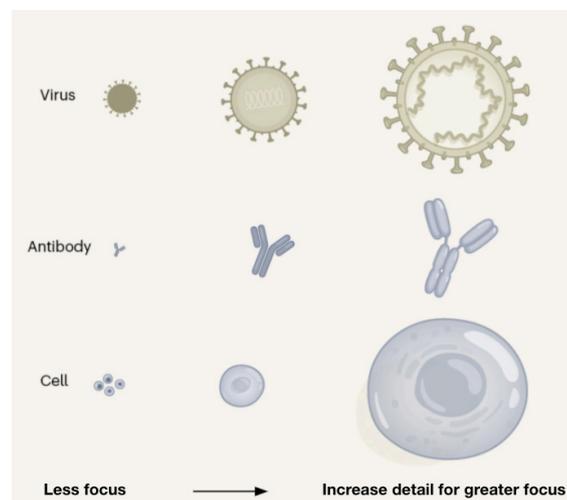
Scientific diagrams by their nature contain layers of complex information. Our job as visual communicators is to guide the eye to the most important information first, creating a visual hierarchy that reflects the information hierarchy of the figure. There are a few key techniques that can be used to create visual hierarchy, such as use of colour and drawing for focus.



**Colour.** The most important elements of a figure should be the most saturated - weighted by significance - with background elements in a more neutral tone. We use a consistent colour palette for areas of focus within each figure or set of figures.



**Our Nature-branded colour palette** is designed with hierarchy in mind - with background colour for contextual elements, and accents for the main action.



### Drawing for focus.

Hierarchy can be achieved through drawing technique. For areas of focus, add depth and detail; for areas of less focus, simplify.

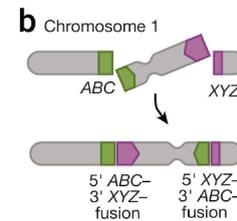
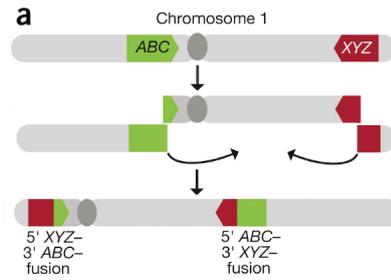
## Visual editing

Just like good prose, the more intuitively and clearly a figure reads, the more refinement it probably took to get there. There can be a misconception that art editors simply 're-draw' proposed figures to make them 'look pretty'. In truth, we more often 'redesign' them to make them understandable. Just like text editing, visual editing takes time and expertise.

As art editors working on the world's best scientific content, we use principles of visual editing when approaching each figure.

### We ask ourselves:

- What are the essential elements?
- Is anything missing?
- What can we remove and still clearly communicate?
- Is there unnecessary repetition?
- Is there unnecessary decoration?



**Visual editing.** The top figure (a) features redundant elements and ambiguous arrows. By merging steps and refining the action with a single arrow, the process shown is more clearly and intuitively (b).

## Clarity

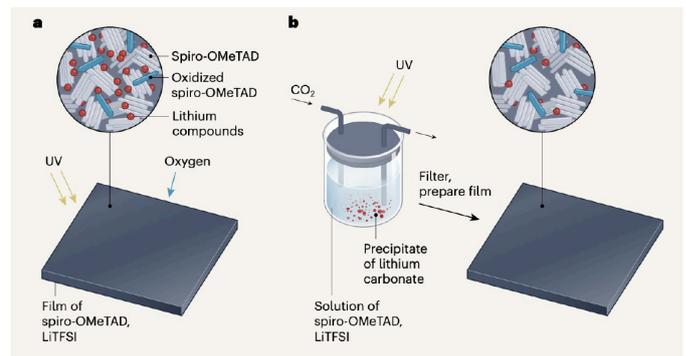
Scientific diagrams often visualise complexity. Therefore, it is essential to ensure that every element is defined. There should be no ambiguity.

### We aim to:

- Explain all elements in labels or the legend.
- Label the first instance of every object.
- Use figure parts (a,b, etc) and subheadings to give the figure hierarchy and structure.
- Remove unnecessary elements.

### X We try to avoid:

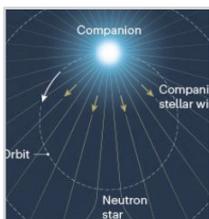
- Using icons for the sake of decoration. Only use icons to aid understanding and context.
- Relying solely on colour for definition. Try to label where possible.
- Using multiple arrow weights and styles when their meaning is not clear.



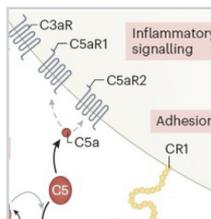
**DO** clearly define all elements in a figure.

## Accessibility

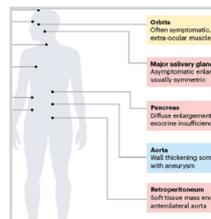
We aim to create illustrations that are as accessible as possible to those with disabilities, such as colour blindness or other visual impairments. **We do this by:**



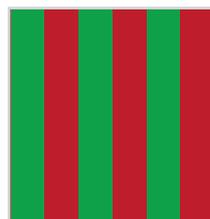
Using our colour palette properly, to **ensure adequate contrast**.



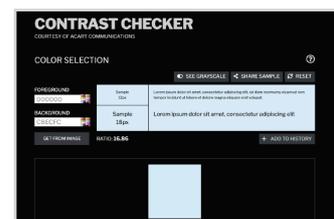
Using primarily **black type** rather than coloured.



Adhering to rules for **colour behind text**.



**X Avoiding red/green** colour combinations.

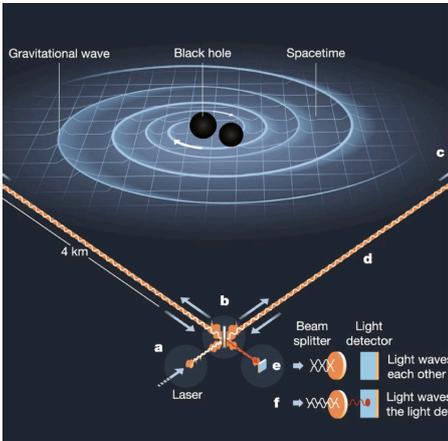


Using tools to check for **colour blindness** and contrast.



## Common mistakes

**Is it a figure?** We are occasionally presented with figures that would be better displayed as lists or tables. Usually these ‘faux figures’ are tables dressed up with unnecessary icons that do not aid communication or comprehension.



**A real figure generally shows some kind of process or phenomenon.** There is usually some kind of action.

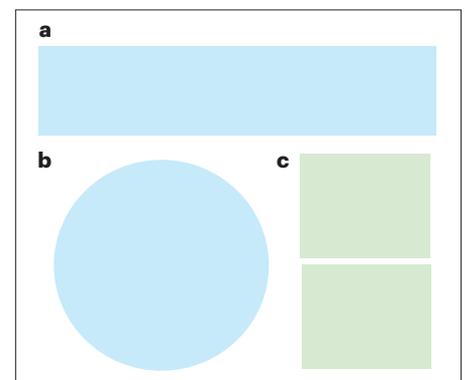
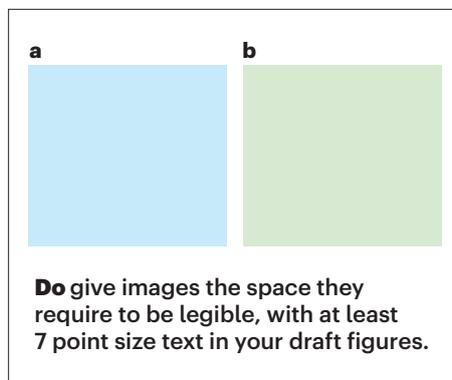
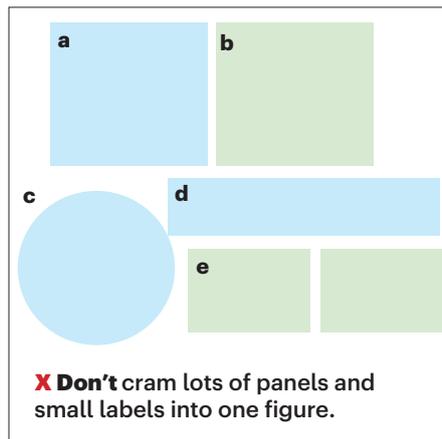
	Barriers	Possible Solutions
Social	Networking Shadowing Mentorship	Linking undergraduate institutions and research centers Mentoring Interactive sessions
Financial	Need to work Financial stress Loan repayments MCAT costs Application fees	Fee waivers Flexible scheduling Free tutoring
Cultural	Navigating academia Advising Encouragement	Identify bias Ask and listen Clear guidance

**X A ‘faux figure’ tends to categorise ideas and concepts, and does not show action, often including decorative icons.** A simple bulleted list or table is often better for comprehension in these cases.

### **X Overcrowded figures.**

Avoid trying to fit too much information into a small space. This causes cognitive overload and reduces comprehension. In addition, labels and images that are too small are not accessible or legible for those with visual impairments.

We have standards for minimum type size and will edit accordingly.



On behalf of the art teams at *Nature* and our portfolio of *Nature*-branded journals, we thank you and look forward to working with you to create beautiful and enlightening visual content.