

Letter to the Editor

## Scientific illustration made easy: A primer for prospective authors

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**Quick Response Code:**



Sir,

'A picture is worth a thousand words' – the age-old English adage fits very well in context of use of illustrations and figures in scientific publications. Scientific illustrations help portray complex concepts in a lucid manner. A well-drawn diagram conveys the intended message clearly while conserving space in print and electronic media. In addition, a good illustration is likely to strike a chord with the readers and may contribute to increase visibility and citations of the article.<sup>[1]</sup> In this light, now many scientific journals accept and encourage 'graphical abstracts' which provide a succinct overview and apprise the reader about the paper.<sup>[2]</sup>

However, authors often struggle with depiction of their ideas in the form of good illustrations. This problem stems from the multiple reasons. Majority of researchers often do not receive any formal training in illustration and graphic design. The professionally available software suites are often sophisticated and have a steep learning curve. A busy researcher may not be able to devote the 'extra' hours required to gain required proficiency in such tools. Another solution may be drawing illustrations manually, using pen and paper. However, diagrams drawn manually may not match the quality required for publication on most scientific forums. To this end, professional illustration services are offered by many publishing houses as a paid service. Unfortunately, the pricing involved may not be tenable for researcher/s working in resource-limited settings. Hence, most of us settle for commercially available software suites which have limited repertoire of tools for scientific illustration. Microsoft PowerPoint™ (Microsoft Corporation, Redmond, USA) is a popular programme employed for medical illustrations.<sup>[3,4]</sup> However, the capabilities of the programme may be limiting for depiction of complex processes and pathways.

To find a solution to above-mentioned problem, we explored for potential solutions and prepared a list of tools available. We have included ready-made solutions as well as resources requiring some tinkering to achieve end results. The readers may choose the appropriate solution depending on the time available at their disposal. The resources are broadly characterised into two categories:

- Repository of ready to use images
- Online tools for complex illustrations

### REPOSITORY OF READY TO USE IMAGES

These resources provide collection of images that are free to use under 'Creative commons' or other similar license. These images are individual entities that can be downloaded by researchers

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and then need to be collated to make a complete diagram using other tools such as Microsoft PowerPoint™ and other illustration programmes.

### SciDraw™

SciDraw™ is an initiative supported by the Sainsbury Wellcome Centre, United Kingdom. The website consists of a large collection of illustrations available under the Creative Commons license, implying that the images are free to use, even for commercial purposes, provided due attribution is provided to the creator. The individual illustrations contain a digital object identifier that needs to be included with the illustration at the time of use. The forum also allows users to upload their creations under the Creative Commons 4.0 license (CC-BY). The resource is available at [www.scidraw.io](http://www.scidraw.io). The key advantage of this resource is availability of all the content for free under the CC-BY license, even for commercial use.<sup>[5]</sup>

### Smart Servier™

Smart Servier™ (available at <https://smart.servier.com/>) is another free repository on online images available under the CC-BY 3.0 license that enables the user to use the images free of charge, even for commercial purposes, provided due attribution is provided and other conditions of the license are followed. The website contains about 3000 images from varied disciplines such as anatomy, cellular biology, medical specialities and general items.<sup>[6]</sup> The online resource is published by 'Les Laboratoires Servier, SAS', a French enterprise.

## ONLINE TOOLS FOR COMPLEX ILLUSTRATIONS

These resources help design illustrations online by compiling different elements of the diagram individually. These elements can be collated using 'drag and drop' feature of the tools. They can be resized and often depicted in different colours hence enhancing the visual quality of the illustration.

### BioRender™

BioRender™ is an online platform that contains an exhaustive collection of readymade icons and templates for numerous streams such as neuroscience, microbiology and immunology. The platform was started by Shiz Akoi, Katya Shteyn and Ryan Marien in 2017.<sup>[7,8]</sup> The forum requires the user to sign up and create an account. Free and subscription-based accounts are available. Free accounts enable the user to use the images for educational and non-commercial purposes. Illustrations created using the paid account can be used for commercial purposes including publications. The forum also provides an opportunity for collaboration for team of researchers.<sup>[8]</sup> An average researcher can design intricate and

professional illustrations using this tool. The tool is available at [www.biorender.com](http://www.biorender.com). The resource is particularly useful for depiction of complex molecular biology, microbiology and biochemical pathways; however, we would like to emphasise that the applications of this resource extend well beyond these disciplines.

### Mind the Graph™

Mind the Graph™ is an online resource available at <https://mindthegraph.com/>. The free version allows the user to create up to four scientific illustrations, but the illustrations carry the company watermark. In addition, users in the 'free tier' need to cite the resource when using the illustrations in scientific communications. Paid tiers are available for junior researchers, senior researchers and institutions that allow larger number of images to be created and even request for professional illustrations. A large collection of readymade templates is available for topics pertaining to life science and medical disciplines.

### Chemix.org

Chemix.org, as the name suggests, is an online tool primarily designed for chemists. The resource comprises tools available in the chemical laboratory such as test tubes, beakers and flasks. Additional facilities such as images of additional equipment, high-quality image export and cloud storage are available as a part of a subscription-based programme offered at the website. The resource is available at [www.chemix.org](http://www.chemix.org).<sup>[9]</sup> This resource may be useful for researchers looking to depict biochemical laboratory procedures in their manuscripts.

In addition to aforementioned tools, we would like to add that the emergence of digital tablets with styluses has empowered researchers to draw their own illustrations. Such styluses provide tactile feel akin to drawing on a paper and thus have wide acceptability. Free apps are available that offer a gamut of tools for scientific artwork. The same may also be utilised by the authors for the preparation of illustrations.

We believe that the given list will empower researchers to prepare illustrations for publications. The list is not exhaustive and many additional resources are also available. The same may be looked into by fellow researchers for artwork and illustration.

### Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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### Conflicts of interest

There are no conflicts of interest.

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