

## ◆ Images in the Scientific Article: Decisions in Visual Communication

Speakers:

**Cassio Lynn**

*Journal of the American Medical Association*

Chicago, Illinois

**Kathy Stern**

*New England Journal of Medicine*

Boston, Massachusetts

Reporter:

**Gabe Waggoner**

*American Society for Microbiology*

Washington, DC

*Journal of the American Medical Association* medical illustrator Cassio Lynn and *New England Journal of Medicine* graphic-arts director Kathy Stern advised attendees on the practical aspects and editorial objectives of images—that is, illustrations or figures, not data-driven items such as tables—in scientific articles.

The effective use of biomedical images in science articles requires thinking and planning. Lynn emphasized that visual communicators must “develop a critical eye” to “maintain scientific integrity and standards of publication excellence”. The ultimate goal of the image is to convey knowledge and to reveal that knowledge by using clear signs. The current use of images in scientific communication continues a long tradition of harnessing visual power as a tool to convey new scientific ideas and information.

The practical aspects that visual communicators consider when creating scientific images are the audience, the availability of references and expert resources to verify information depicted in images, the time necessary for the production of suitable images, and how much space the image will occupy in the final product.

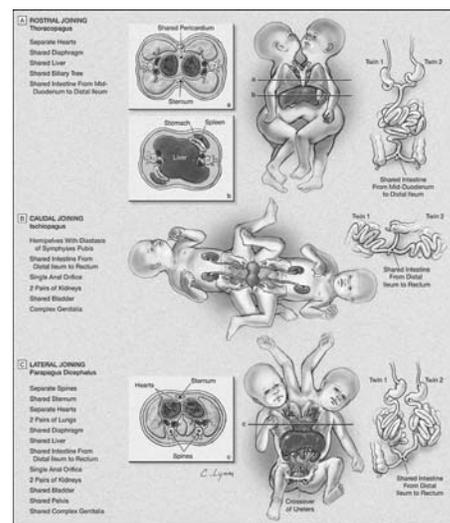
The editorial objectives of scientific images are to say something worth say-

ing, to make the images look good, and to ensure that images fundamentally make sense with respect to organization and order. Identifying the message of an image provides guidance in creating and selecting it and in assessing its communicative value. To identify the message, visual communicators can obtain the author’s version of the message, compare it with the content expressed in the figure, compare the figure with the text of the article, and consult publications in the field and expert content sources for verification. By ensuring that the data in the article, figures, and figure legends mesh, visual communicators maximize readers’ chances of receiving an undistorted message and comprehending the information.

Representation, economy, and aesthetics all factor into making a scientific image look good. These are important considerations because images and figures must not confuse readers but instead should deliver a message to them quickly and engage their imaginations. Elements used in an image must be identified clearly for readers. Visual communicators must, for the benefit of readers, identify the means of effectively communicating an image’s message and understand the implications of speculative content. Lynn cited examples in which combining illustrations with photographs resulted in a more versatile and effective figure than the original images provided by the author.

Finally, an image must be well ordered and organized so that it makes sense. These concepts are important in images because, to be effective, communication must be predictable. Effective communication can be achieved by several means. Making judicious use of positioning, viewpoint, and orientation helps to ensure the logical presentation of figure panels and the information therein.

Lynn and Stern noted that the use



of icons and symbols can improve the effectiveness of scientific images. Such didactic conventions—for example, scale bars on photomicrographs—also serve as signposts for readers. Style sheets, which can help to keep image conventions standard throughout an article or publication, can be useful. The use of color to correlate data can enhance image quality. By using standard biomedical color conventions in figures, graphic illustrators and editors can clearly identify for readers everything from arteries and veins to atoms and molecular compounds. Color can also convey informational parallelism, bringing to life such complexities as immunologic reactions, pharmacokinetic activity, and the details of steps in surgical procedures.

“Beautifully rendered doesn’t mean well communicated”, Lynn noted. As in all graphic arts, function determines form. Overzealous use of the tools of scientific image creation and editing can be self-defeating and lead to distortion of the message and confusion for the reader. Images in scientific articles are in most cases meant to support and elucidate the text—not to substitute for it. 