ASM journals appreciate the need to conserve space and improve figure layout, but applying certain techniques toward this end can raise image manipulation concerns among readers. In the examples below, simplifying the labeling by having only one label for the data between the gels may be desirable, but splicing your gels together without properly identifying why this technique has been applied may lead readers to question the data’s authenticity.

Example 1B shows the same figure as Example 1A with “tooling”, a thin line between the spliced figure panels, applied. Tooling the image can also be accompanied by a simple explanation in the legend stating, “…gels spliced for labeling purposes” to ensure it is clear to the reader that the data has not been manipulated, and the tooling is strictly related to the presentation of the image.
Even in situations where images are clearly labeled, and it may seem obvious to you that the figure is comprised of multiple images, it may not be clear to the reader. A few tool lines to show the boundaries of the individual images used to create the figure, as in Example 2B, can make your figure much easier for the reader to understand that multiple images have been compiled into a single figure.

ASM journals also suggest that tooling be applied when inconsequential background data has been removed from an image, even if the removal has been done solely for aesthetic purposes (see Example 3B).
In addition to unacknowledged splicing, ASM considers enhancing portions of images either by adjusting specific regions of an image, or through adding or removing image elements, to be image manipulation. All images and data should be presented in your figures exactly as viewed when conducting your research. If adjustments are critical to view the data in your image, then they should be applied to the entire image.

Comparing the original image from example 4A with example 4B you will notice the bands in the data column have been enhanced. Additionally, in the control column of 4B some of the bands are lighter than the bands in the same column in 4A and, in 4C, the control data gel is lighter at the top. While these alterations may allow the bands to be more visible to readers, they are not acceptable forms of image enhancement.

As noted previously, if adjustments must be made to ensure readers can view the necessary data, then those adjustments must be made to the entire image, as well as acknowledged in your figure legends.
Adding or removing elements within images should never occur. Below are examples where bands have either been added or removed from images, which ASM considers to be manipulation. In example 5B you will notice that the band from lane 1 has been removed or obscured from the file shown in Example 5A.

Example 5A

Example 5B

Example 6A

Example 6B

Example 6B shows a new band introduced (control data image on the left, lane 5) that is not visible in example 6A. In addition, the control gel in example 6B is missing a band from lane 9 (on right) that is evident in example 6A. Attempts to “clean up” images in this fashion should always be avoided, as they are likely to raise image manipulation concerns with readers.