

LungMAP Image Annotation Tool Guidelines

Contents

Aesthetics & Appearance	2
1. Colors.....	2
2. Annotation symbols (dot, arrow, polygon)	2
3. Density of annotations	3
4. Annotation instances.....	3
5. Notes	3
6. Annotating multiple images in an experiment.....	4
7. Annotating multiple experiments	4
8. Collaboration	4
Annotation Etiquette.....	4
9. Annotating or editing another center's images	4
10. Comments or questions about an annotation	Error! Bookmark not defined.

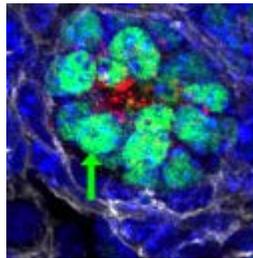
PURPOSE

The purpose of this guideline is to provide LungMAP annotators with general direction for manual annotation of LungMAP 2D images. The guideline is intended to provide some level of visual consistency, without hindering creativity or progress. Currently, manual annotation is limited to individuals with the scientific expertise to identify specific components of an image. The expectation is that the group will produce high-quality annotations that are both instructive (educational) and potentially provocative (hypothesis-driven) based upon observation and knowledge. Annotations can also facilitate searches within the BREATH database since terms from the ontology used for labeling are also used to label other types of data. Annotations should be considered a public face to LungMAP, displaying a level of quality appropriate for conference or journal presentation.

Aesthetics & Appearance

1. Colors

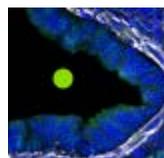
Annotation involves choice of both a shape and color to create the symbol placed on the image (dot, arrow, polygon). Colors should stand out so the annotation is highly visible (e.g., using black or dark colors in ISH images, and bright colors on confocals). A good mix of colors, depending on the number of features, can help people to locate the notation more easily in the image.



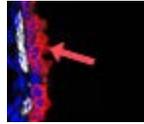
2. Annotation symbols (dot, arrow, polygon)

In general, a good mix of symbols provide a balanced view for the image. However certain symbols are better suited to highlight specific structures. Below are types of structures and examples that demonstrate strengths of certain symbols. The annotator should try a couple of options if in question and choose the one that suits best with the image, the level of magnification and the types of structures to annotate.

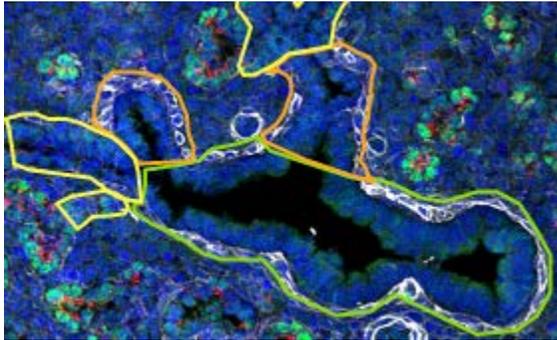
- Dot: useful when placed within the center of an open space. Examples include the alveolar duct lumen, or bronchiolar lumen.



- Arrows: useful to point to specific areas (e.g., a cell comprising a structure, e.g. bronchiolar epithelium, club cell).



- Polygon: useful to highlight (encircle) whole structures or regions that can be seen within the given magnification. Examples include bronchiole, terminal bronchiole, proximal ascinar tubule.



3. Density of annotations

Images that are over-annotated (i.e., too many annotations overwhelming to the viewer) may defeat the purpose of manual annotation. Focus on the most important areas that are related to the development of lungs, and any data you may want integrated with the image (e.g., links to cells in RNAseq data). There are plans to provide representative images of structures that are more common across all images. Providing a single or few representative annotations of the same structure in the same image may be sufficient. If there are visual distinctions (e.g., different staining patterns or dimensionality based upon the angle of the 2D slice) it is best to include a representative from each, particularly to the novice eye.

4. Annotation instances

The use of annotation “instances” (same term and note represented multiple times on the image) is particularly helpful to avoid too long of a list in the feature panel. Only create multiple listings of the same term if needed (if using 2 different symbols or if a note is needed in one case but not the other).

5. Notes

The tool allows the annotator to make notes at 2 levels: for the chosen ontological term or for the entire image. Notes should be reviewed carefully before being made visible to the public. Notes are important to highlight any scientific finding or observation relevant to the annotation, even if only an observation by the annotator. The annotator can use the image note (for the entire image) to explain why they selected the image, why it is particularly interesting (based upon the probe and magnification) or whether it provides new information or information that counters existing interpretations. Notes should be succinct, use proper grammar, correct spelling, and, if including links, ensure that they are working.

The notes are not intended to be a dialogue between annotators, but intended to specifically

provide information about the image or experiment. If you want to communicate about an annotation, you can email the annotator via the contact button in the tool.

6. Annotating multiple images in an experiment

It is not necessary to annotate all images in an experiment. However, structures may be more apparent at different levels of magnification and thus, annotating images of more than one magnification level may be the best way of conveying information about the experiment. The tool highlights images that are annotated by outlining in a colored frame, making it easy to find them, especially if you are switching from one to the other in the process of annotating.

7. Annotating multiple experiments

While it may be helpful to annotate images in all experiments, it is not practical or expected. Focus on experiments that are representative of particular stages of development and probes of importance that give the highest quality and most diversity within the database.

8. Collaboration

Collaboration is encouraged across the centers and scientists, including those creating the images and investigators generating different data types. For this reason, the Image Annotation tool provides the ability for annotators to see the annotator (when logged in) or email the annotator (if not logged into the system, as well as any user of the website). In addition, annotators can collaborate to annotate the images for an experiment. However, at this time, the system does **not allow saving more than one annotation of an image**. Please be in routine contact with your collaborator throughout the annotation process. You should not be working in the same image at the same time. Also be aware that when people are collaborating on an image, each has the ability to work over or publish annotations from others.

Annotation Etiquette

9. Annotating or editing another center's images

Even as a collaborator, it is advisable to obtain permission from the annotator prior to making any changes to the annotation. This includes promoting the annotation to the public, removing the annotation from public view or providing notes that are viewed by the public. As an annotator, you have the permission level to do perform these functions on any image. A collaboration should be established (see 8 above) to provide productive exchanges of ideas and effort.

10. Comments or questions about an annotation

If you have questions or concerns, contact the current annotator rather than adding a note to the image or image annotation as there is no notification with notes. An easy email link is available to use for you to correspond with the annotator. Refrain from making any notes public that may question another individual's work. Future endeavors with the tool will address the more "commentary" type aspects, intended for the entire scientific community.