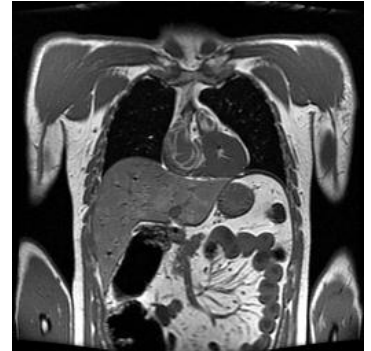


Segmentation

L37

Goal: To introduce segmentation... duh.

Segmentation is the process of classifying pixels into groups that correspond to the same tissue type. A good example is classifying pixels as "liver" or "non-liver" in this T1-weighted MRI. Or "lung" vs. "non-lung" pixels.



Segmentation has many uses:

1. measure volume of an organ
2. render a 3D view of an organ
3. surface-based registration

Thresholding

The simplest method for classifying pixels is based solely on their **intensity values**. In thresholding, you choose an upper and lower bound, and select pixels with intensities in that range.

Example: Segment the bone in this CT scan.
Bone is usually the brightest thing in a CT image.



ImageJ has a thresholding dialog

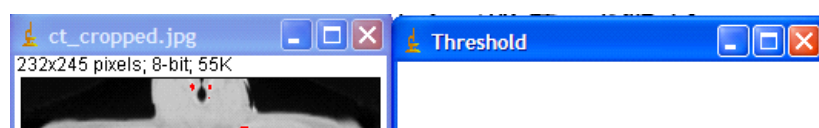


image has a thresholding dialog that shows you the histogram. The red pixels are the ones between the thresholds.

oops

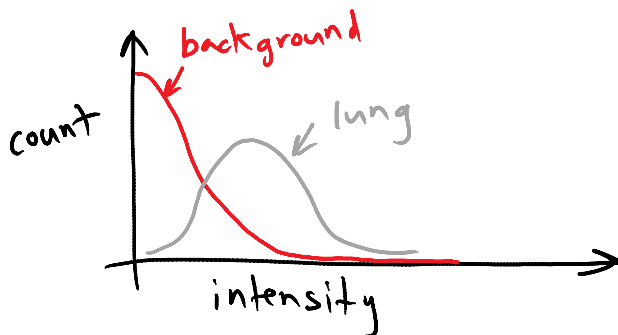


How about the lungs?



No matter which thresholds we choose, some non-lung pixels get included.

Consider the histogram of an image that contains both lung and background.



There is **no intensity** that separates lung from background.

The problem is that thresholding does not take any **spatial information** into account... each pixel is evaluated individually no matter where it is.

Clearly, we have to be able to build additional constraints into the segmentation process.