Volume Edit: Adipose Tissue Segmentation

In this exercise we will review the segmentation of visceral and subcutaneous adipose tissue to demonstrate key Volume Edit functionality including; Edge Strength, Region Growing, and Object Separation. However, this application is one approach used for the segmentation and separation of fat pads in mice.

1. Download the **CLS_MouseFat.avw** data set from **www.analyzedirect.com/data/CLS_MouseFat.zip**. Use **File > Load** to load the data into Analyze.
2. Use the **Process > Spatial Filters** module to apply a **3 x 3 x 3** median filter to the data set. See Exercise 27: **Spatial Filters** for instructions on applying a filter to a data set.
3. Next select the filtered data set (**CLS_MouseFat_Med**) and open **Segment > Volume Edit**.
4. Click the **Intensities** button and adjust the **Minimum** and **Maximum** intensity values to improve display of fat and abdominal wall.
5. From the **Edge Strength** tab check the '**Use Edge Strength**' option.
6. Set the **Edge Strength Threshold** to **63**. Note that the abdominal wall is shown in red (figure 1).
7. Next select the **Semi-Automatic** tab and choose the **Region Grow** option.
8. In the transverse orientation use the slider bar to move to slice **256**. Click intra-abdominal fat then set the **Threshold Minimum** to **2230** and the **Threshold Maximum** to **2540** (figure 2).
9. Click **Extract Object**.
10. Repeat to add any additional areas of adipose tissue.
11. In the **Objects** control panel rename **Object_2** to **VAT**

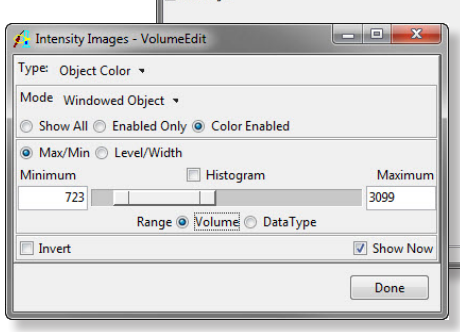

Figure 1

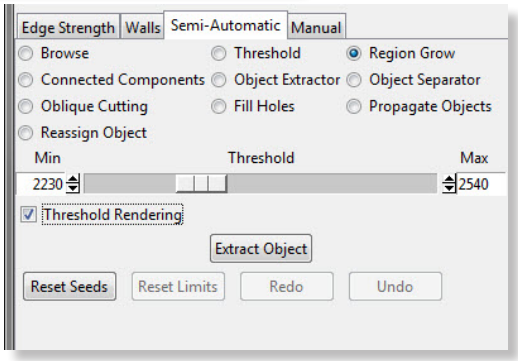

Figure 2

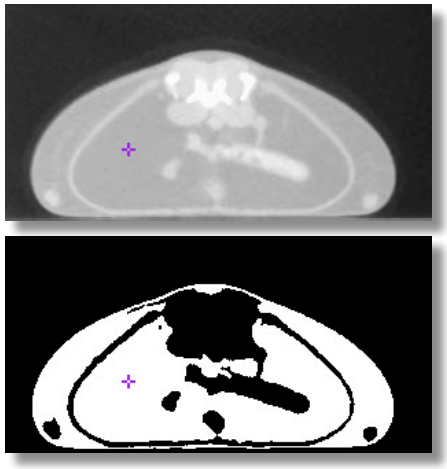

Figure 3

Volume Edit: Adipose Tissue Segmentation

(Visceral Adipose Tissue).

12. Click **Add Object**, change the name of the new object to **SubQ** (Subcutaneous Adipose Tissue)
13. Select **Object Separator**. Click to set a seed point in a region of subcutaneous adipose tissue. Then click to set a second seed point in a region of visceral adipose tissue (figure 4).
14. Click **Separate**. The two regions of adipose tissue will be broken into their respective sub-compartments (figure 5).
15. Save the object map by selecting **File > Save Object Map**.
16. Note that the VAT and SubQ volumes can be sampled using the **Measure > Region of Interest** module. For more information please refer to exercise 51: Region of Interest - Measuring Objects in Object Maps.
17. Exit the Volume Edit module.

Figure 4

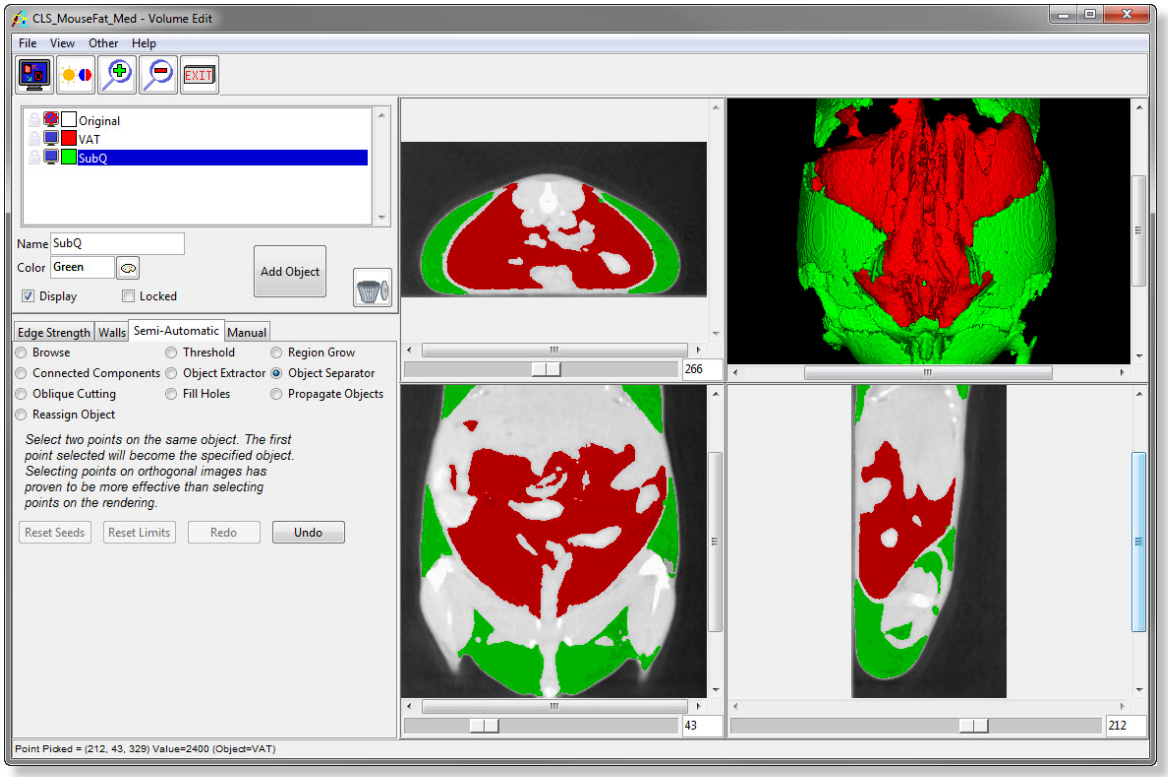

Figure 5