# APPLICATION NOTE

02.07.18

## Application Note 161   Automated Tissue Bath Data Analyses

Overview

This application note will demonstrate how to perform an automated analyses of tissue bath data. This will yield the responses to the collected data. The MP unit (MP160/150/36/36R) can be used to record and analyze tissue bath and isolated organ experiments. A force transducer connected to the MP unit is easily calibrated by using two known weights (see Application Notes 127 and 132). Having calibrated the transducer, data can be recorded. Using Acq*Knowledge* or BSL *PRO*'s Append mode disk space can be preserved by pausing the recording during wash cycles. While recording, you can review and analyze earlier responses by using the Autoplot feature in the MP menu. This procedure is made even easier by using Acq*Knowledge* or BSL *PRO's* event marking system to jump directly to dosages or important events. It is also possible to mark events remotely by using our TSD116 series (Acq*Knowledge*) or SS10L (BSL) switches. The measurements of Max, Min, and Mean can be taken and automatically entered into the Journal. At the end of the experiment, the Journal file can be exported to a statistical package for presentation of results.

First, duplicate the waveform. This option is found under the Edit menu. Next, take the derivative of the duplicated waveform. To do this, select Derivative from the Transform menu and click OK. The derivative will yield a waveform with defined peaks. These peaks are used to find the response of your original data by using the Find peaks option. This will resemble the data below.
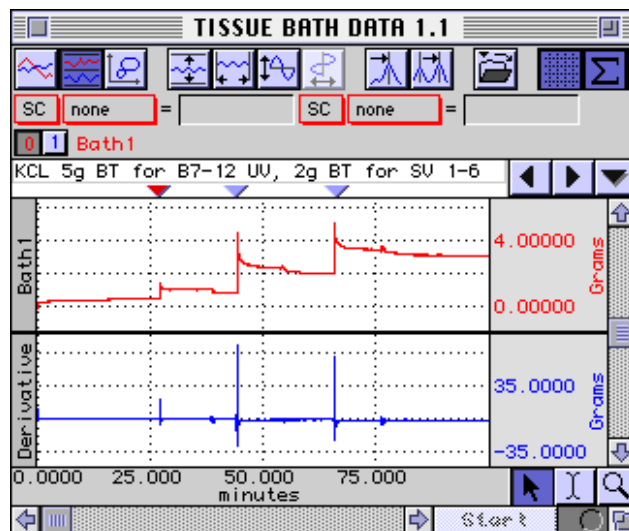
This next step is optional and it removes any baseline offset. This will save you time in the long run. Duplicate the original waveform and set a measurement box to mean on channel 0. This should be from the original waveform. Find the mean of the first section of the data, as shown below.
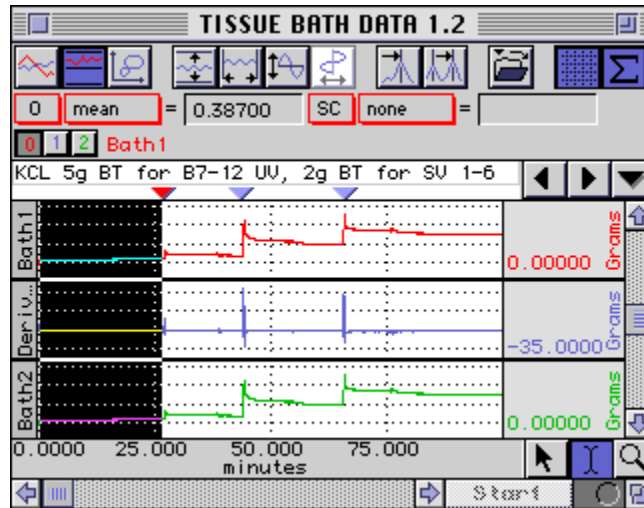

The mean value will be used as the constant value in the waveform math calculation. First, select the duplicated waveform (CH 2 on the previous page), then select Waveform math from the Transform menu and set it up as shown below.
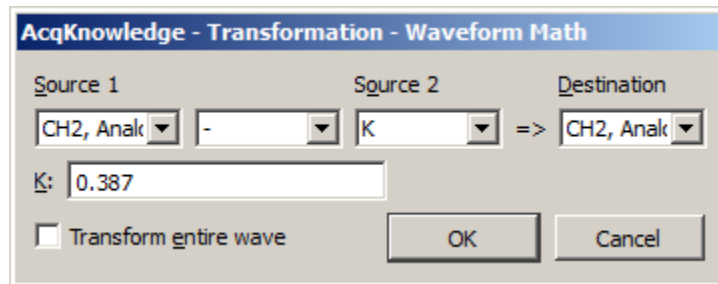

This will remove the baseline offset seen in the beginning section of the original data. The graph below shows the tissue bath data with the baseline offset (Bath 1) and with this baseline offset removed (Bath 2). The measurements should be taken from the data with the baseline offset removed. The original data can be removed by clicking on the correct channel and selecting Remove waveform from the Edit menu. This application note takes the measurements from both and this is done to show the difference between the two.
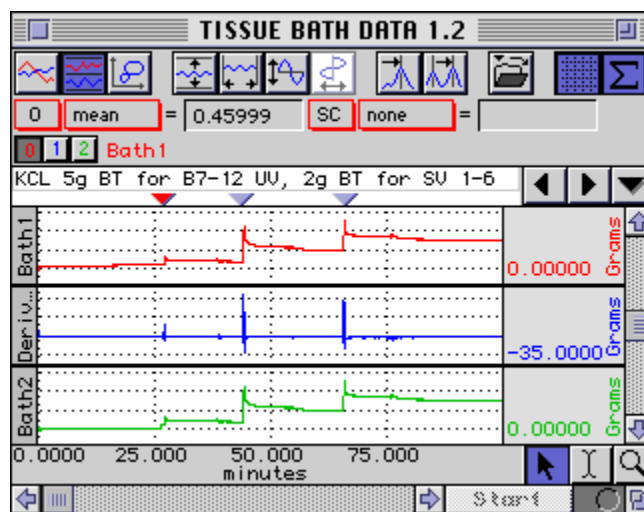
We will now take the mean, maximum response from each of the doses. The mean value is taken from a user defined region of the maximum response. This will overcome the influence of sudden spikes in the response. Alternatively, you can select the maximum value. Select mean (or max) for two measurement boxes and put them on channel 0 and 2, respectively. To find the actual mean responses, highlight the first peak of the derivative waveform data.
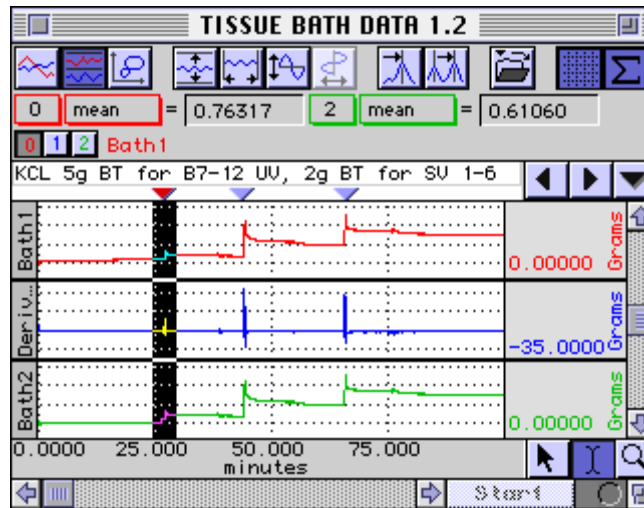
Select Find Cycle from the Analysis menu, set first cursor to peak + 1 min. and set second cursor to 4 min, as shown below. (Select "Paste measurements for each cycle into the Journal" in the Output tab.)
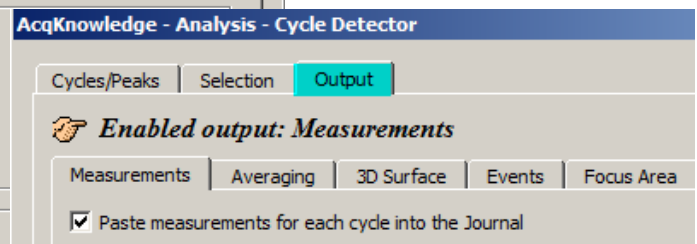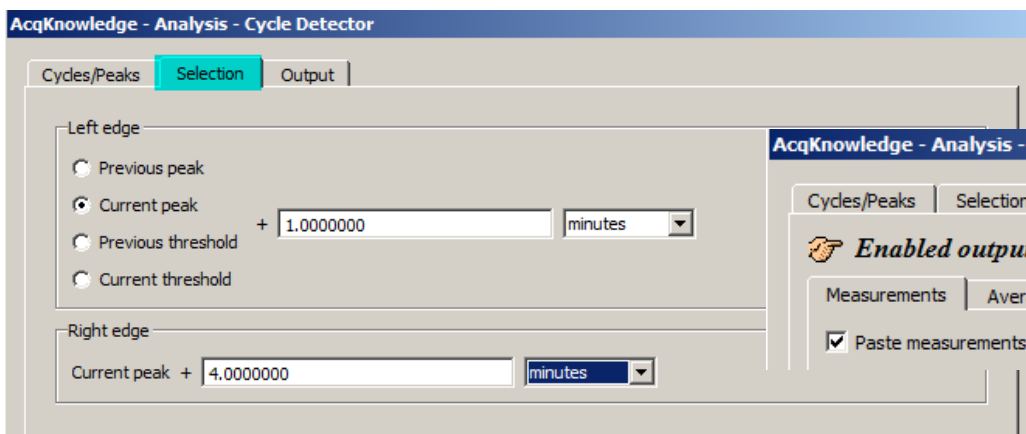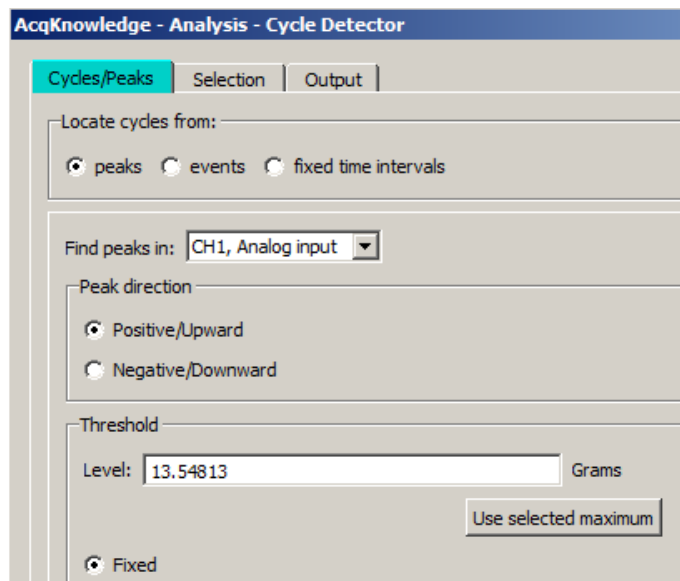
Once all parameters are set, click "Find All Cycles."

These numbers set the width of the mean response area on the original waveform (CH 0) and the baseline offset removed waveform (CH 2). These values can be altered in order to take the mean of a larger or smaller highlighted area. These measurements can be pasted into the Journal as shown in below example. These measurements can be labeled with measurement name, measurement units and channel number, by selecting Preferences from the File menu and marking the appropriate boxes. The analysis can be automated by selecting Find All Cycles, or scrolled through one at a time by selecting Analysis > "Find Next Cycle" (Ctrl + E). These steps will yield the mean responses in an automated fashion.