Scatter Plot and MA Plot

Scatter Plot

A scatter plot is a simple way to visualize differentially expressed genes. We can plot a scatter plot with gene expression values for two samples at one time. While most probe(sets)/genes fall on a 45° line, up- or down-regulated genes are positioned above or below the line.

To draw a scatter plot, you first need to transpose the original intensities spreadsheet so that the samples are on columns and probe(sets)/genes are on rows.

- Select the main spreadsheet
- Select **Transform** from the main toolbar
- Select **Create Transposed Spreadsheet...**
- Select the column with sample IDs from the drop-down menu
- Select **OK**

A new temporary spreadsheet will be created with probe(sets)/genes on rows and samples on columns.

- Select the two sample columns you would like to compare
- Select **View** from the main toolbar
- Select **Scatter Plot** (Figure 1)

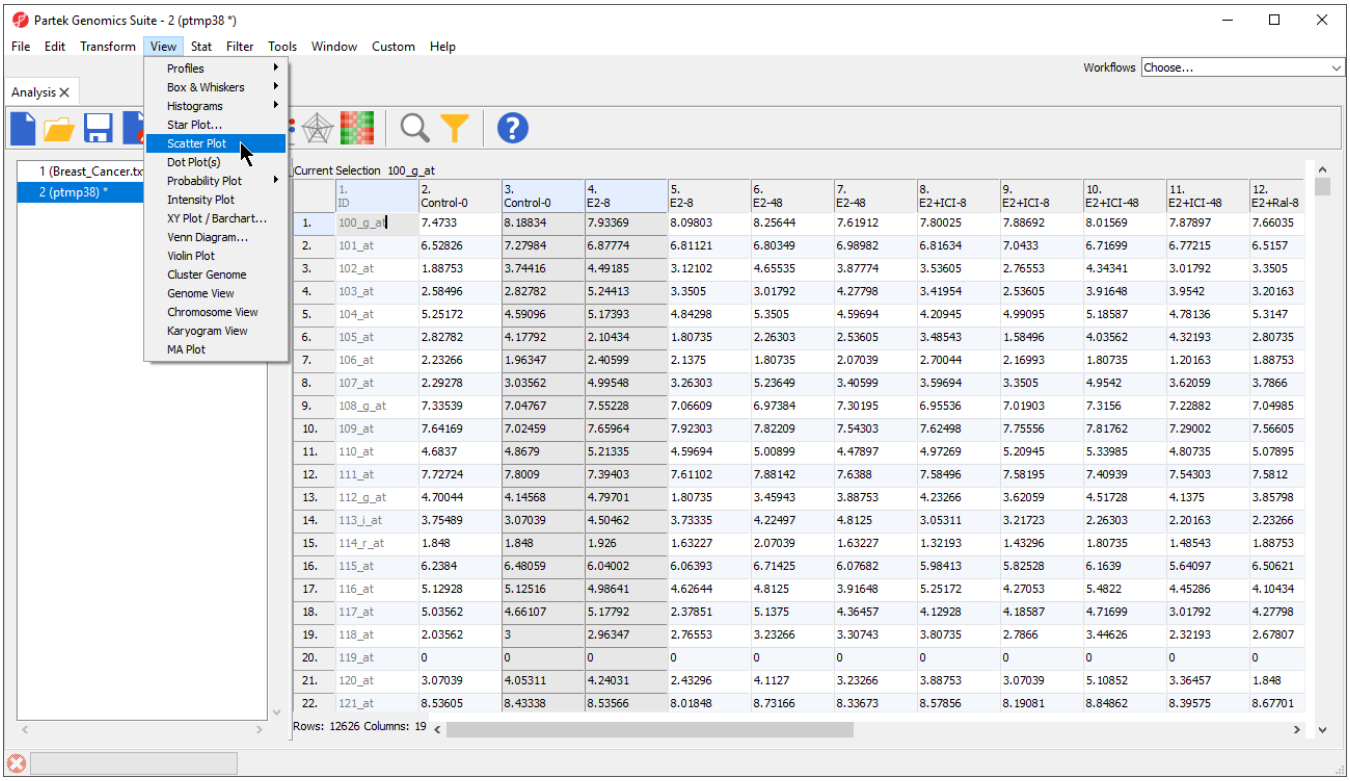

Figure 5. Invoking a scatter plot from a spreadsheet with probe(sets)/genes on rows and samples on columns

- Select **Yes** when asked if you want to only use the selected columns
- Select **Yes** when asked if you are sure you would like to draw the scatter plot

The scatter plot will open in a new tab. We can add a regression line to the plot.

- Select ( ) from the plot command bar
- Select **Axes**
- Select **Set Regression Lines**
- Select **Regression line of y on x**
- Set *Line Width* to **5**
- Select **OK** (Figure 2)

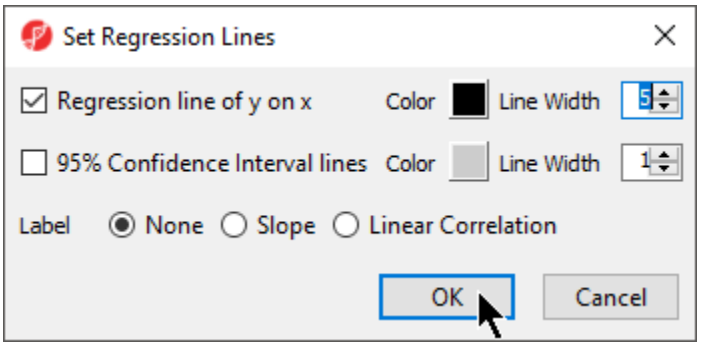

Figure 6. Configuring a regression line

- Select **OK** to close the *Plot Rendering Properties* dialog

The scatter plot now features a regression line dividing the probe(sets)/genes (Figure 3).

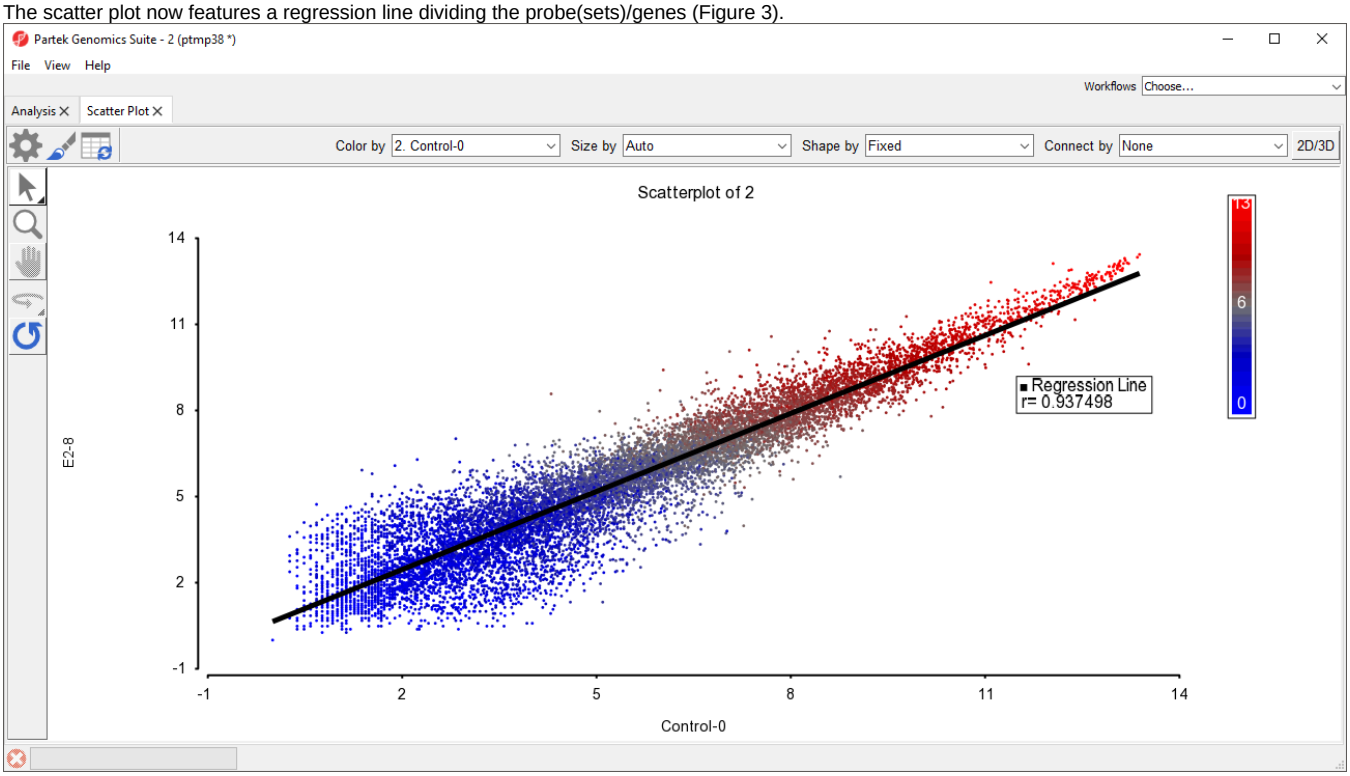

Figure 7. Each dot on the plot represents the intensity value of a probe(set)/gene

MA Plot

The MA plot can be used to display a difference in expression patterns between two samples. The horizontal axis (A) shows the average intensity while the vertical axis (M) shows the intensity ratio between the two samples for the same data point. In essence, an MA plot is a scatter plot tilted to the side so that the differentially expressed probe(sets)/genes are located above or below the 0 value of M. An MA plot is also useful to visualize the results of normalization where you would hope to see the median of the values follow a horizontal line.

The MA plot is invoked on the original intensities spreadsheet with any need for transposition.

- Select **View** from the main toolbar
- Select **MA Plot**

The MA plot will launch in a new tab showing the first two rows as the comparison (Figure 4).

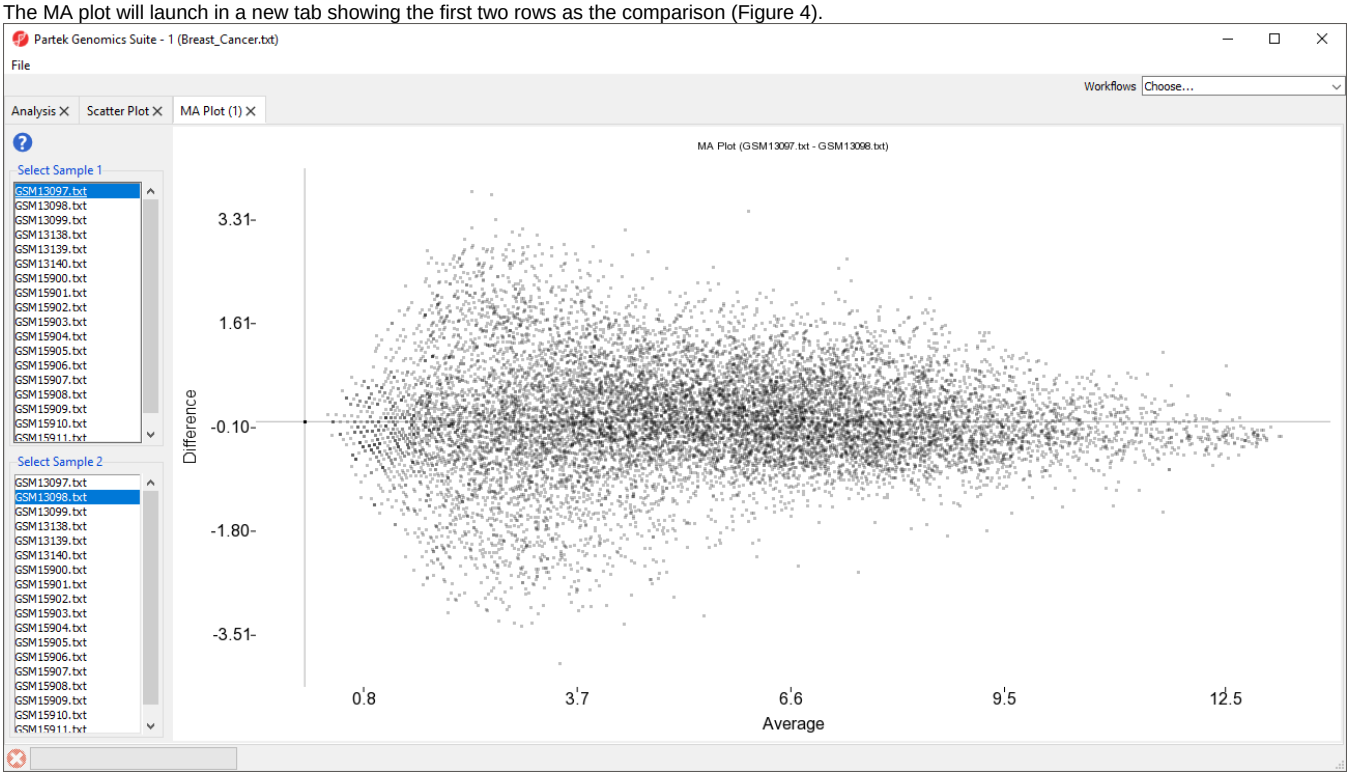

Figure 8. MA plot comparing the expression levels between two samples. Each dot on the plot represents a single genomic feature (gene or probe set). The average signal for each genomic feature is shown on the horizontal axis (A), while the ratio is shown on the vertical axis (M).

The samples displayed can be changed using the select sample menus on the left-hand side.

« Volcano Plot Sort Rows by Prototype »

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