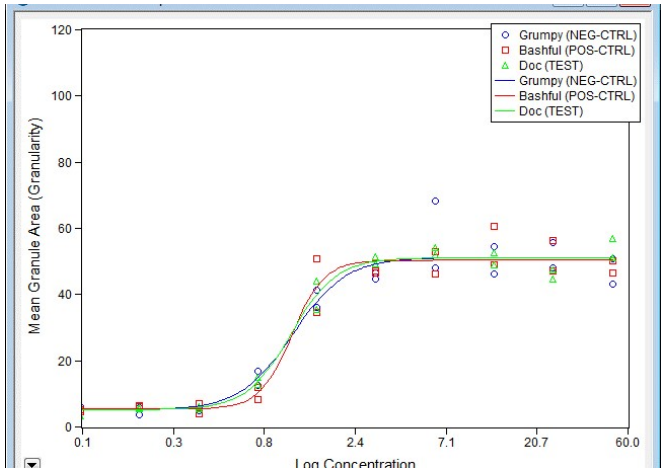
MetaXpress® 6.5 Software Guide

Curve Fitting

Date Revised 4/18/2018 Version A

MOLECULAR DEVICES
UNLEASH YOUR BRILLIANCE™

Chapter Purpose



The purpose of this chapter is to introduce the user to the new curve fit feature added in MetaXpress 6.5

This feature requires purchase of the following part:

5058772	**CURVE FITTING APPLICATION MODULE. Includes Peak Pro Analysis.**

Review Plate Data

1. Open **Review Plata Data**

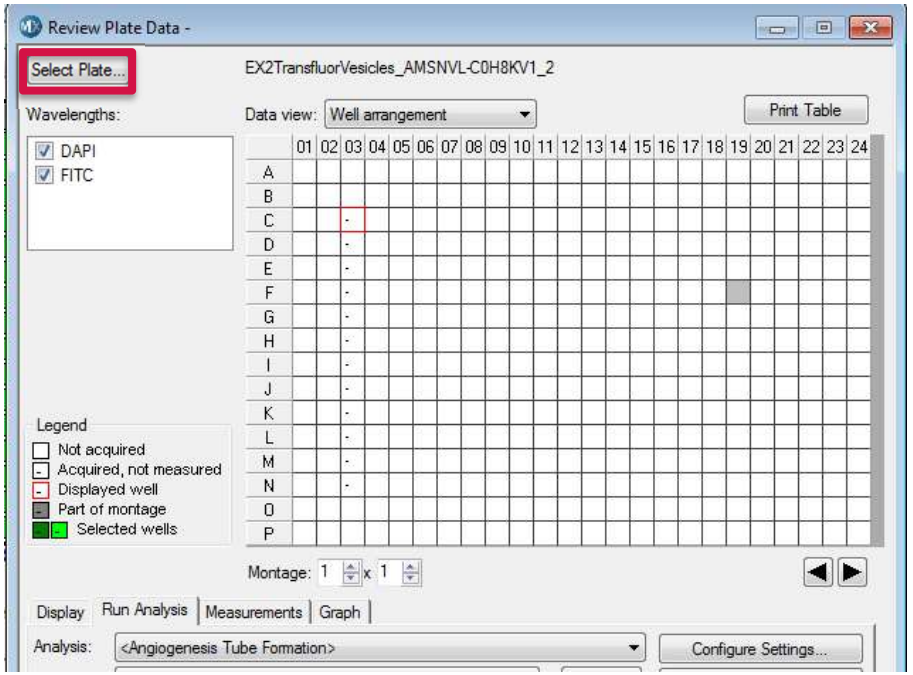
   - In the main toolbar click on

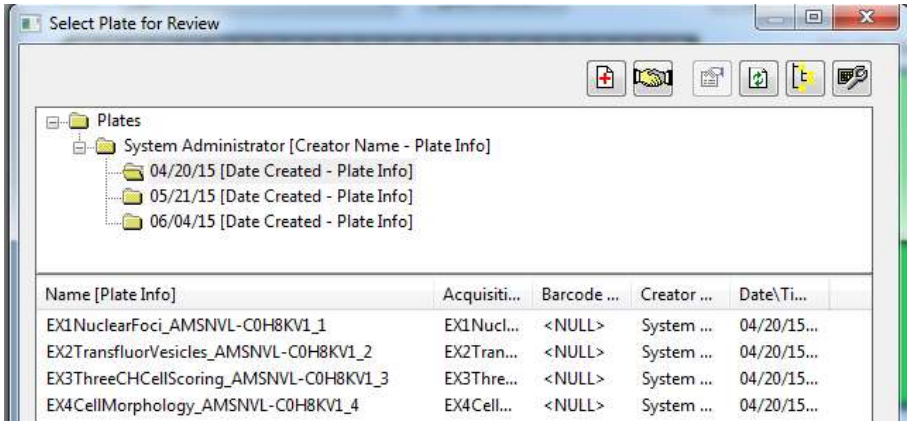
OR

   - Under the **Screening** menu, select **Review Plate Data**

2. Click on the **Select Plate** button

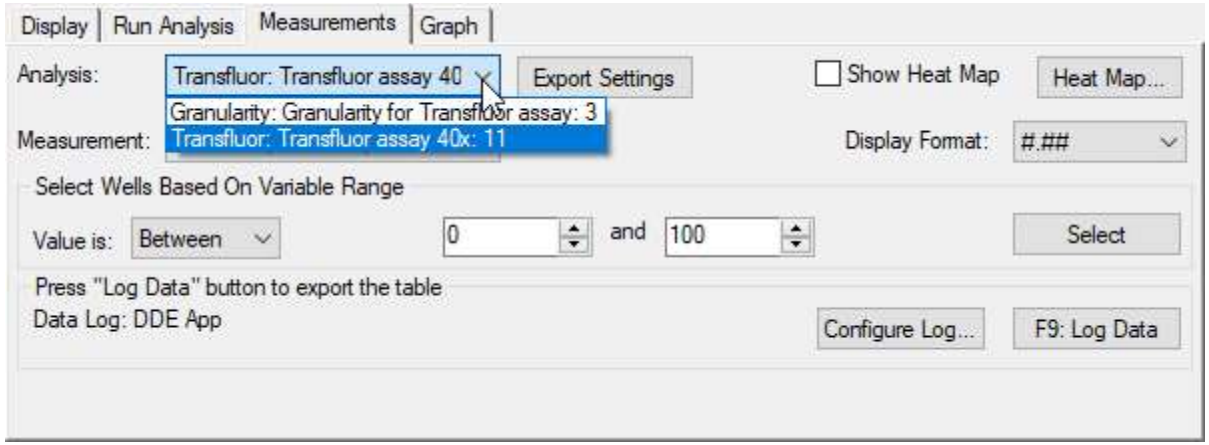
3. Browse through the folders to open the plate of interest





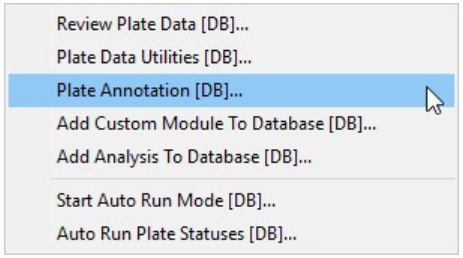
Select Measurement Set

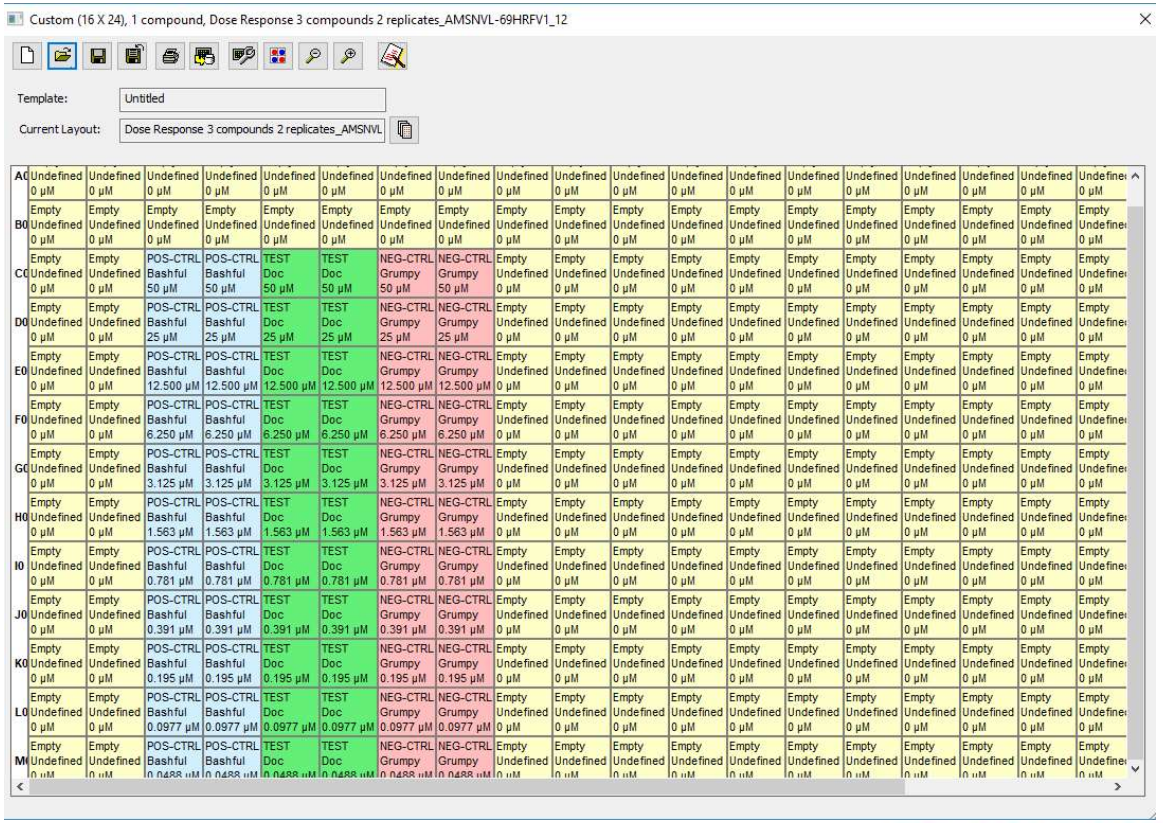
- Go to **Review Plate Data > Measurements tab** to select the analysis results of interest



Annotate Plates

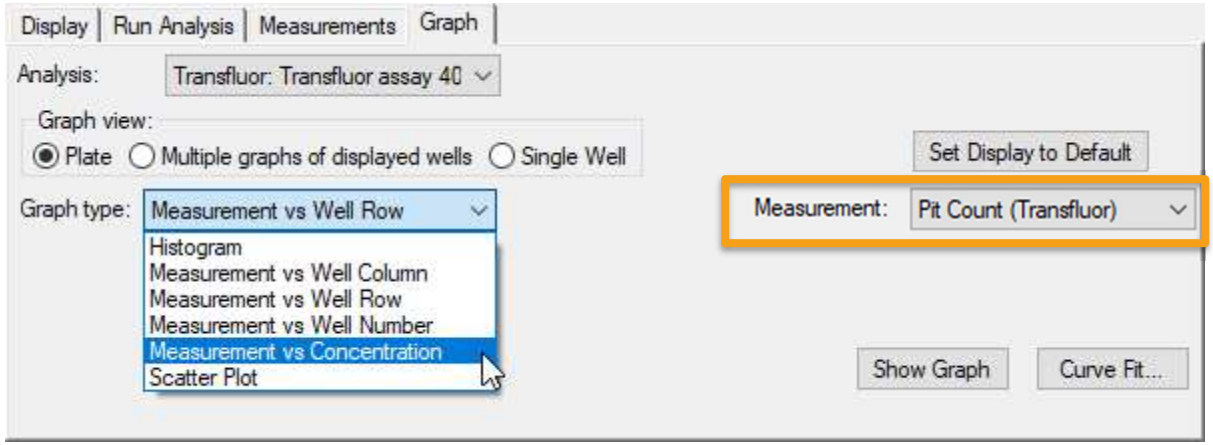
- The plate must be annotated for meaningful curve fitting
- If the plate is not already annotated, go to **Screening > Plate Annotation** and add compound and concentration information
- See separate guide on **Plate Annotation in MX or AX** for details

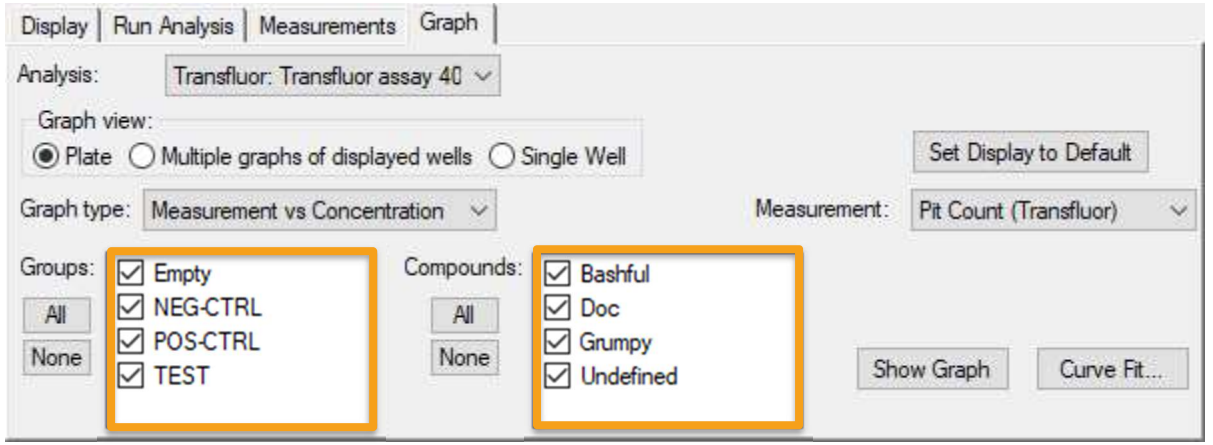




Show Graph

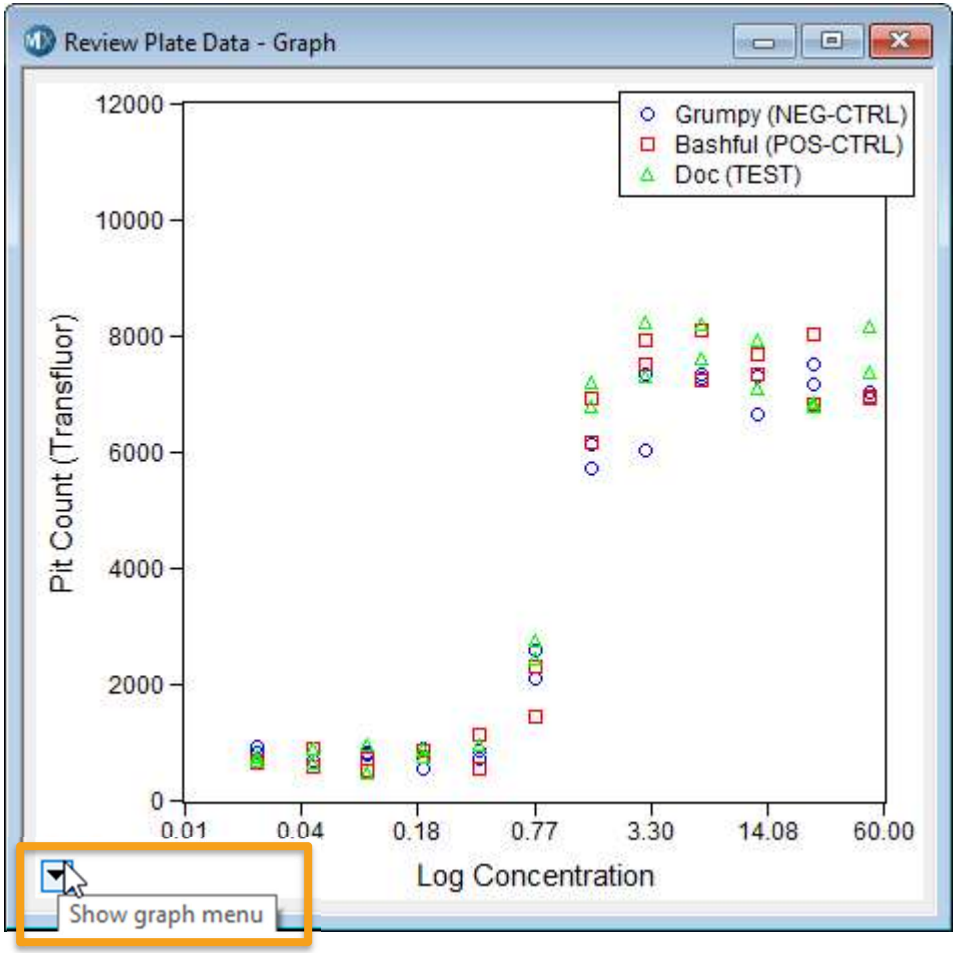
- Select **Measurement vs Concentration**
- Select **Measurement** of interest
- Enable or disable specific groups and/or compounds to display
- Click **Show Graph**





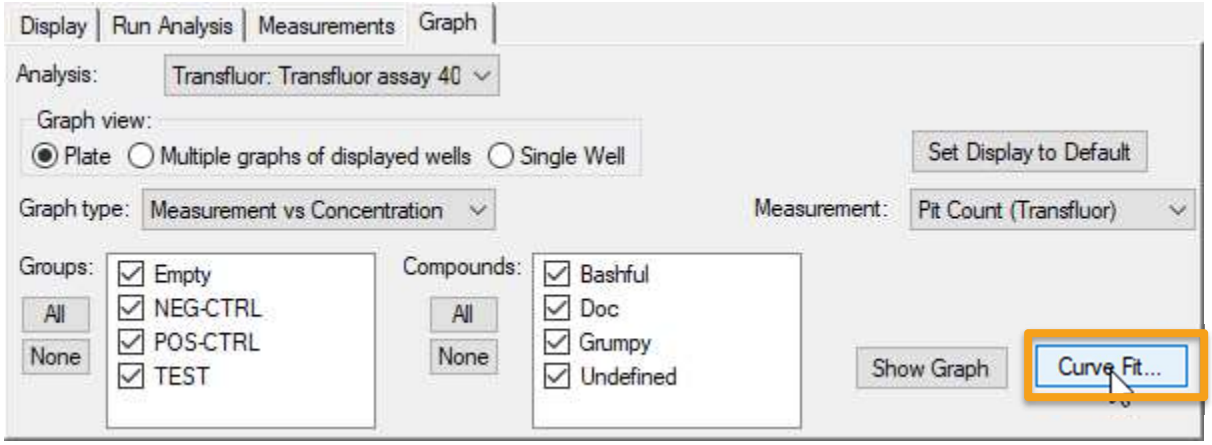
Show Graph

- The graph is displayed without any curve fit
- Click on the arrow icon at the lower left to change graph settings, as desired



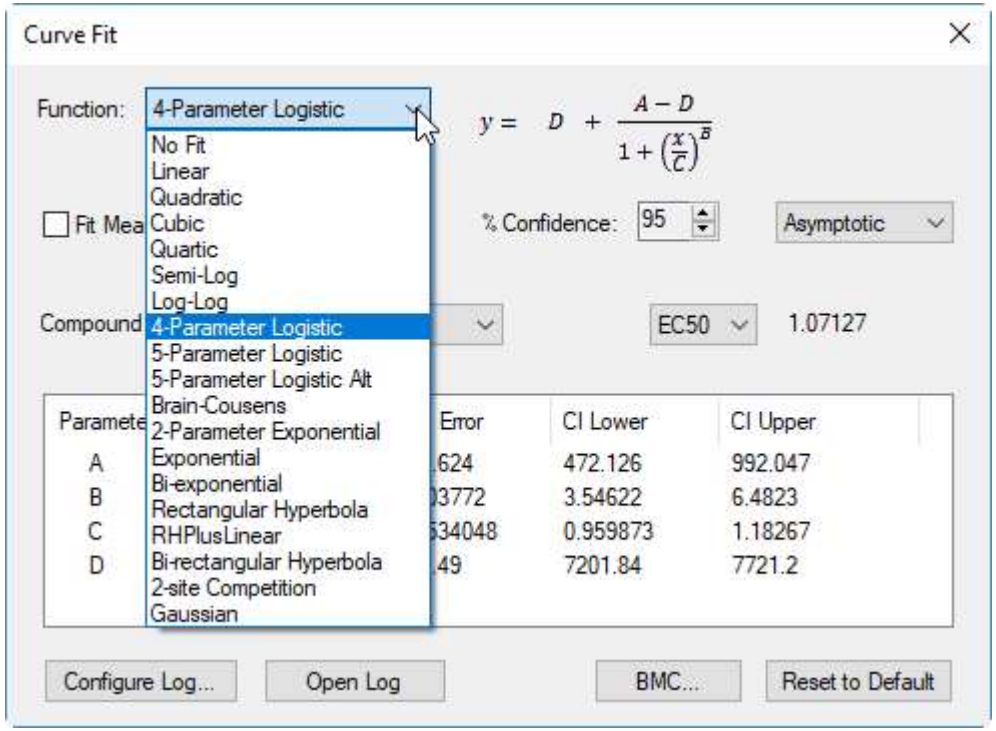
Curve Fit

- In **Review Plate Data > Graph tab**, click **Curve Fit**



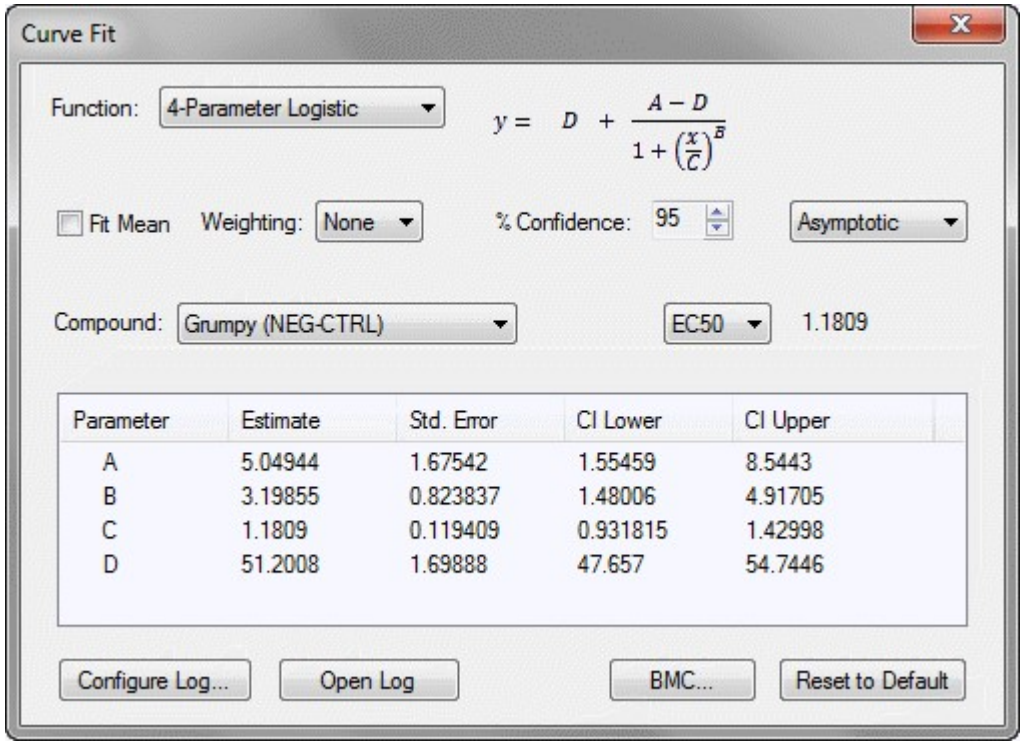
Curve Fit Options

- Select **Function**
- **4-Parameter Logistic** is recommended for most dose-response curves
- Select the **Fit Mean** box if you want to use the mean of replicates in the calculation, instead of each individual replicate data point
- Other dose-response options include **5-Parameter Logistic** and **5-Parameter Logistic Alt**



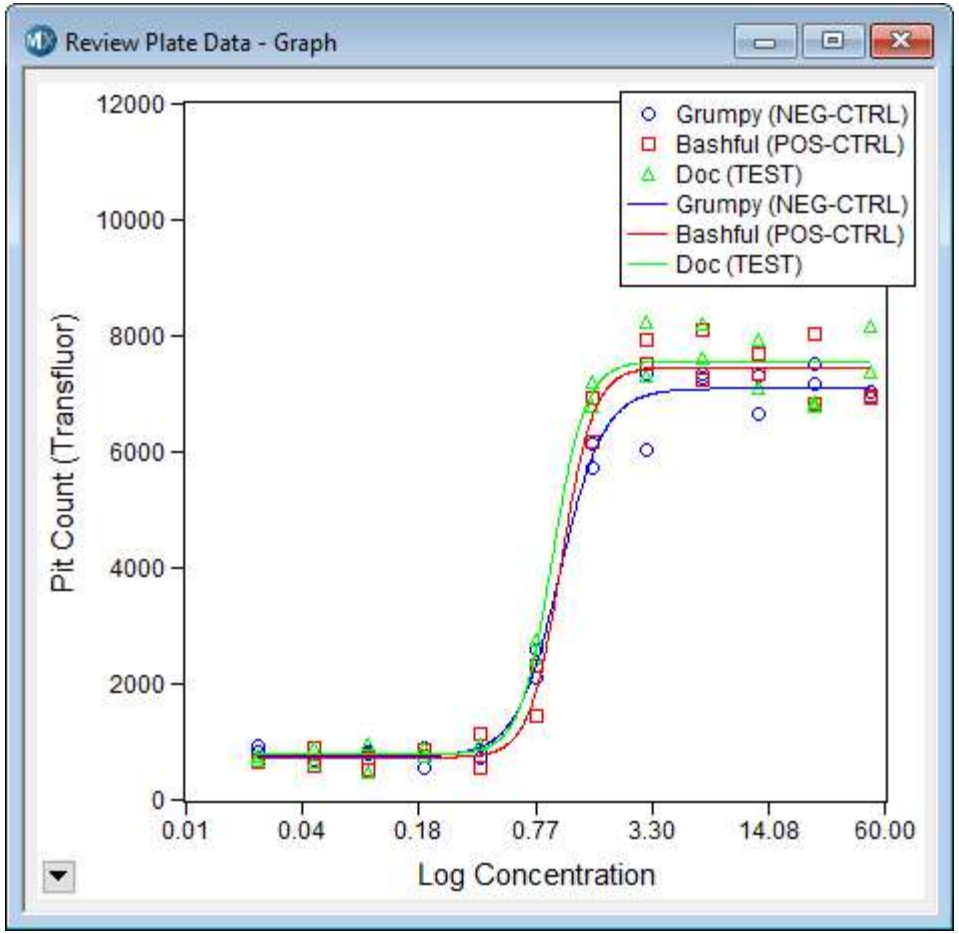
Curve Fit Results

- For **Compound**, select a specific compound to view its curve fit parameters in the table
- If a suitable function is selected, then the **EC50** is displayed for the selected compound.
- Other values such as **EC90** are also available by selecting the appropriate option



Curve Fit on Graph

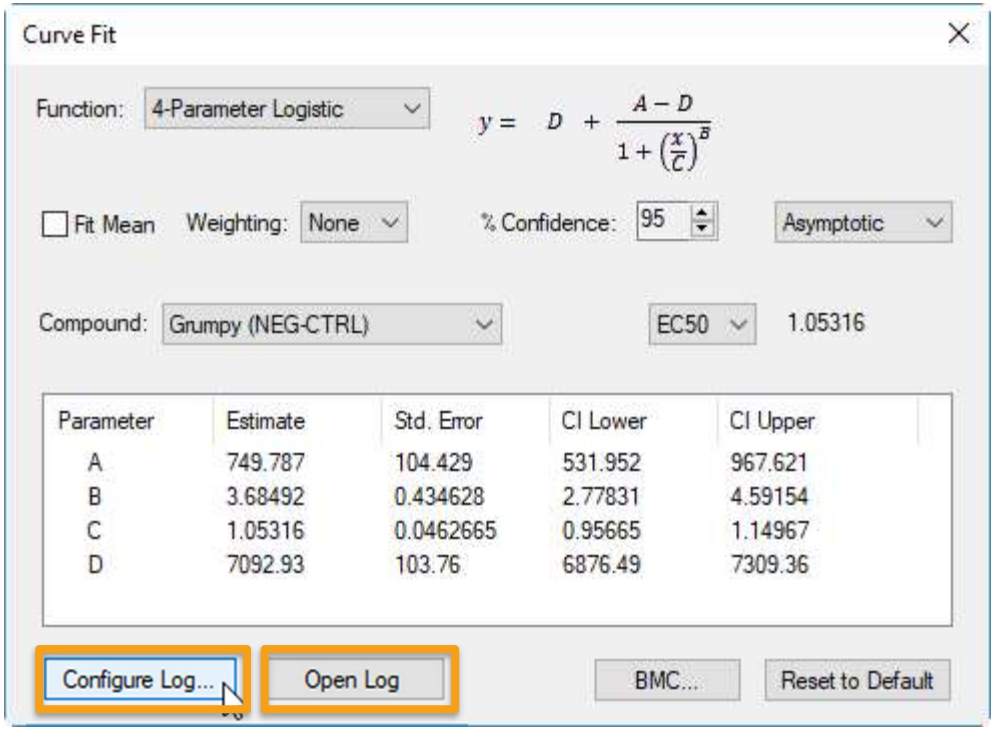
- The selected curve fit is automatically displayed on the graph
- The traces remain on the graph after the Curve Fit window is closed

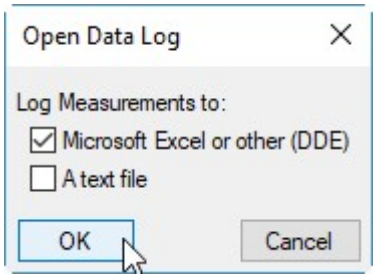


Log Curve Fit Data

- Click **Configure Log** to select output

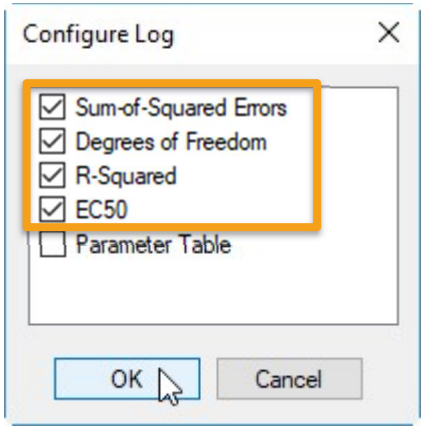
- Click **Open Log** to open connection to Excel or a text file (comma-separated format)



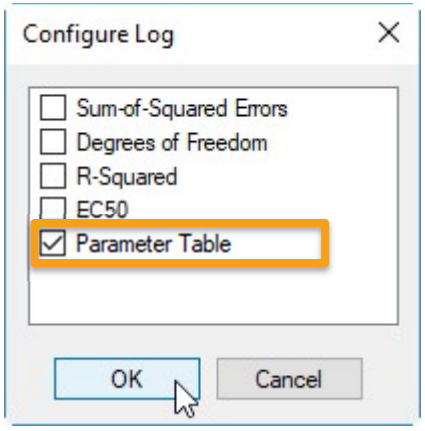


Curve Fit output

- It is recommended to either select **Parameter Table** by itself, or select the other outputs without the Parameter Table



Dose Response 3 compounds 2 replicates_AMSNVL-69HRFV1_12	Pit Count (Transfluor)	4-Parameter Logistic	Weighting: None	Using Replicates	Asymptotic 95% Confidence Intervals
Data Set	Sum-of-Squared Errors	Degrees of Freedom	R-Squared	EC50	
Grumpy (NEG-CTRL)	1976473.682	20	0.9906876	1.053160693	
Bashful (POS-CTRL)	3008443.174	20	0.9879941	1.071273317	
Doc (TEST)	3078562.186	20	0.987772225	0.958279803	



Dose Response 3 compounds 2 replicates_AMSNVL-69HRFV1_12	Pit Count (Transfluor)	4-Parameter Logistic	Weighting: None	Using Replicates	Asymptotic 95% Confidence Intervals
Data Set					
Grumpy (NEG-CTRL)					
Parameter	Estimate	Std. Error	CI Lower	CI Upper	
A	749.7868162	104.4287046	531.9523555	967.6212768	
B	3.684923411	0.434627766	2.778305778	4.591541045	
C	1.053160693	0.046266533	0.956650397	1.149670988	
D	7092.925238	103.759732	6876.48623	7309.364247	
Bashful (POS-CTRL)					
Parameter	Estimate	Std. Error	CI Lower	CI Upper	
A	732.0864975	124.6236111	472.1262002	992.0467948	
B	5.01425968	0.70377181	3.546217409	6.482301951	
C	1.071273317	0.053404793	0.959872871	1.182673763	
D	7461.52055	124.4897445	7201.839494	7721.201607	
Doc (TEST)					
Parameter	Estimate	Std. Error	CI Lower	CI Upper	
A	787.6036641	126.8357112	523.0290069	1052.178321	
B	4.909111636	0.881680205	3.069958956	6.748264316	
C	0.958279803	0.046476699	0.861331109	1.055228497	
D	7562.876421	125.7946	7300.473483	7825.279358	

Curve Fit Function Visual Guide

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit - default
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian

Linear

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
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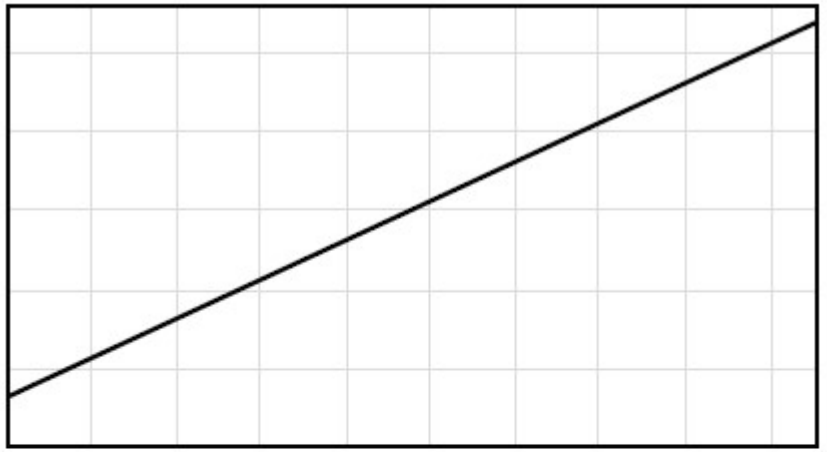
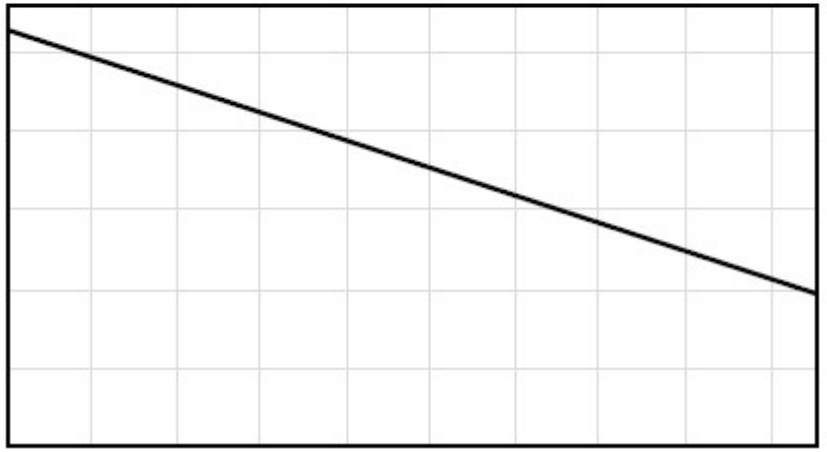
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian





Quadratic

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
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- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
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- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
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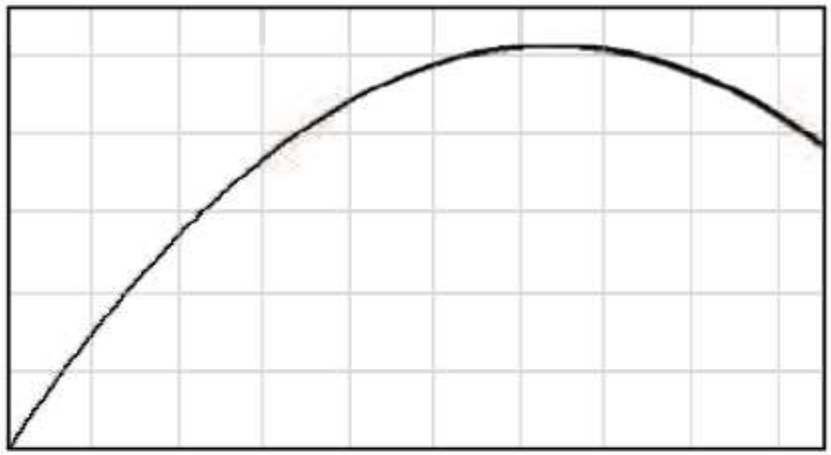
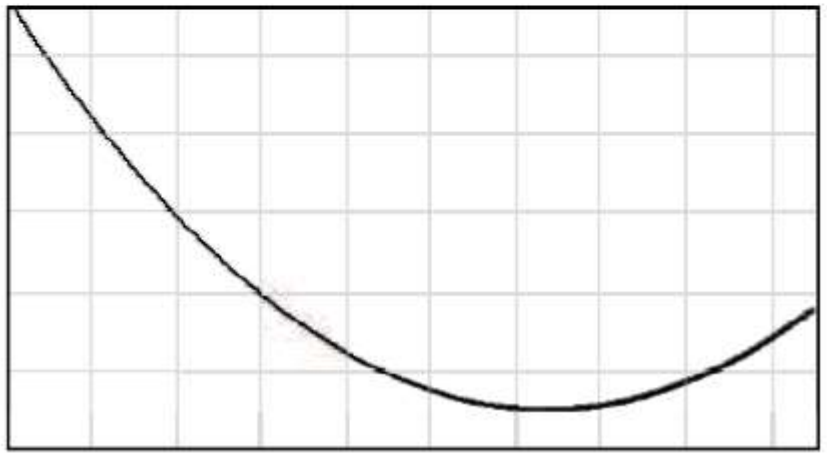
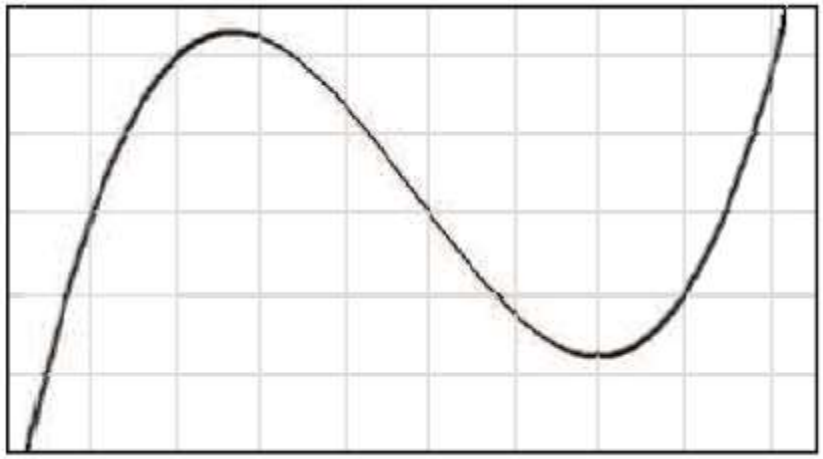




Cubic

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian



Quartic

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
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- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
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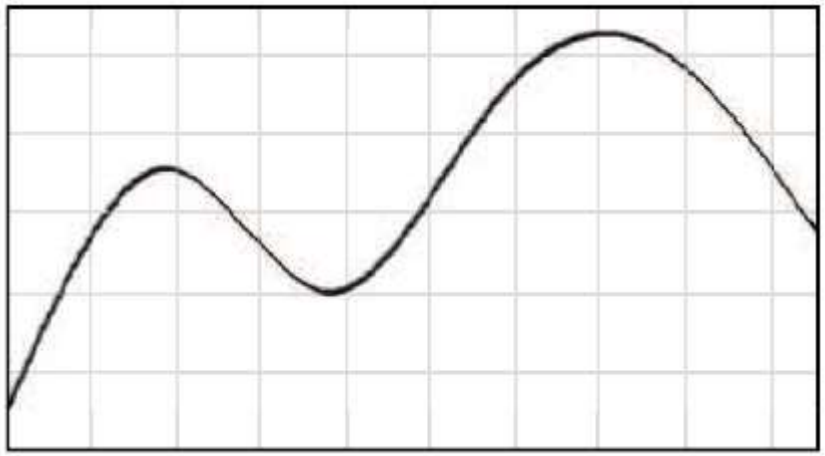
- Gaussian

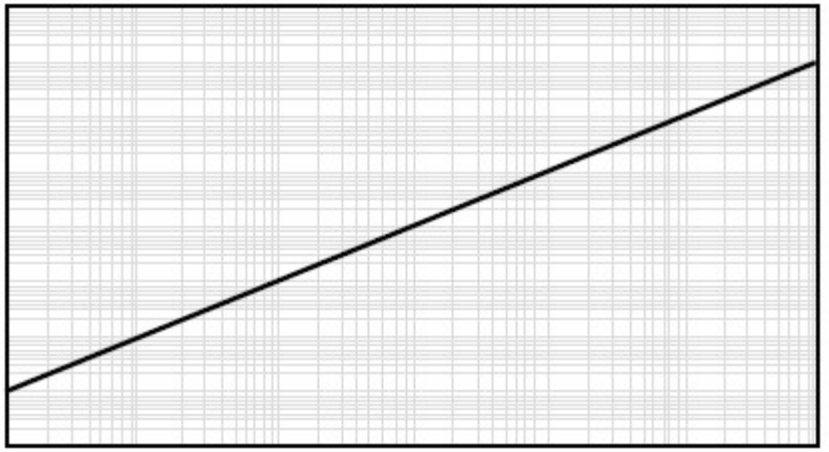


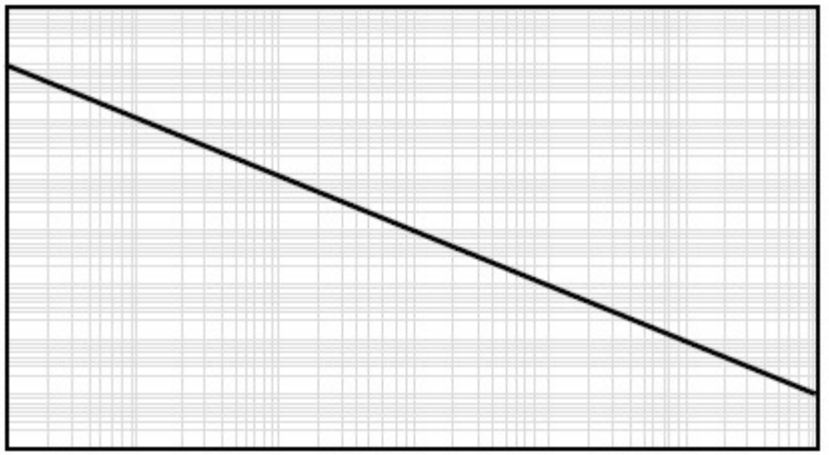
Semi-Log

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian

Log-Log

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian





2-Parameter Exponential

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
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- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
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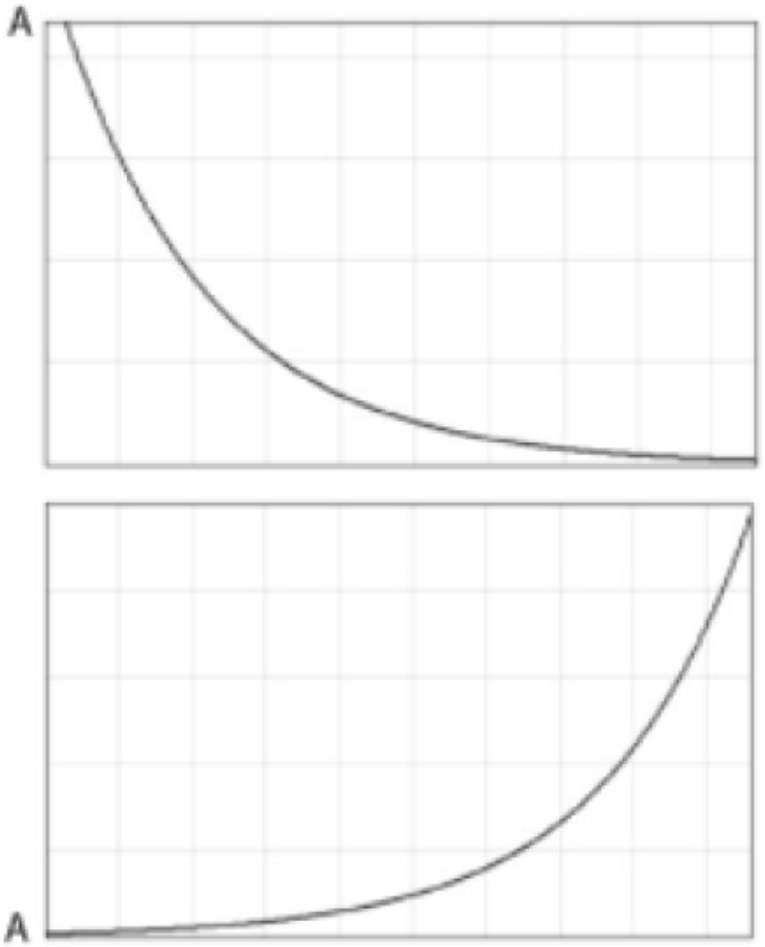

4-Parameter Logistic

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
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- Bi-rectangular Hyperbola
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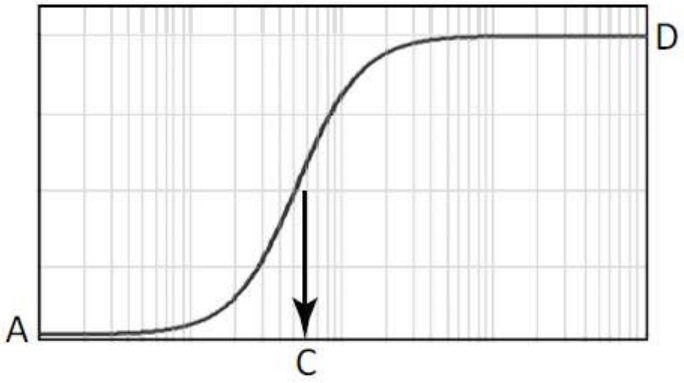

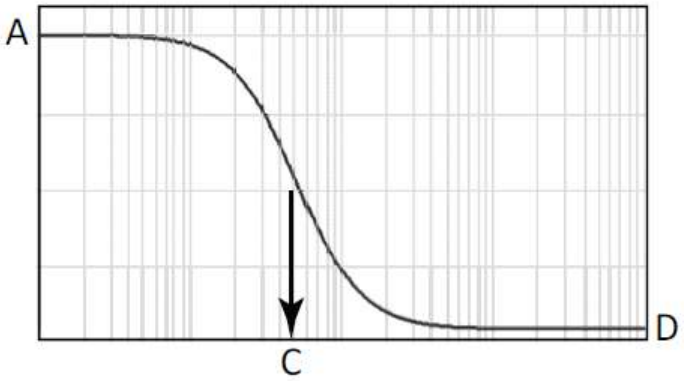

$$y = D + \frac{A - D}{1 + \left(\frac{x}{C}\right)^{B}}$$

5-Parameter Logistic

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
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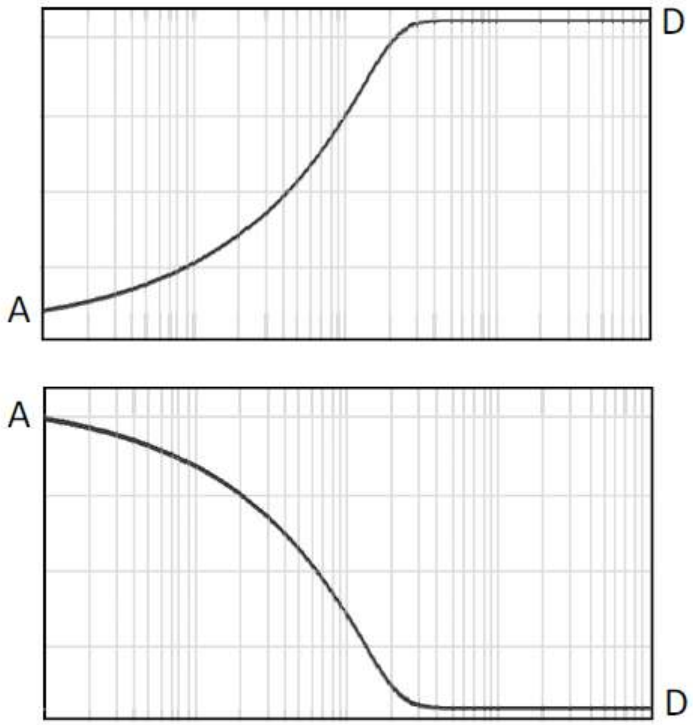

$$y = D + \frac{A - D}{\left\{1 + \left(\frac{X}{C}\right)^{B}\right\}^{G}}$$

5-Parameter Logistic Alternate

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
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- Bi-rectangular Hyperbola
- Two-Site Competition
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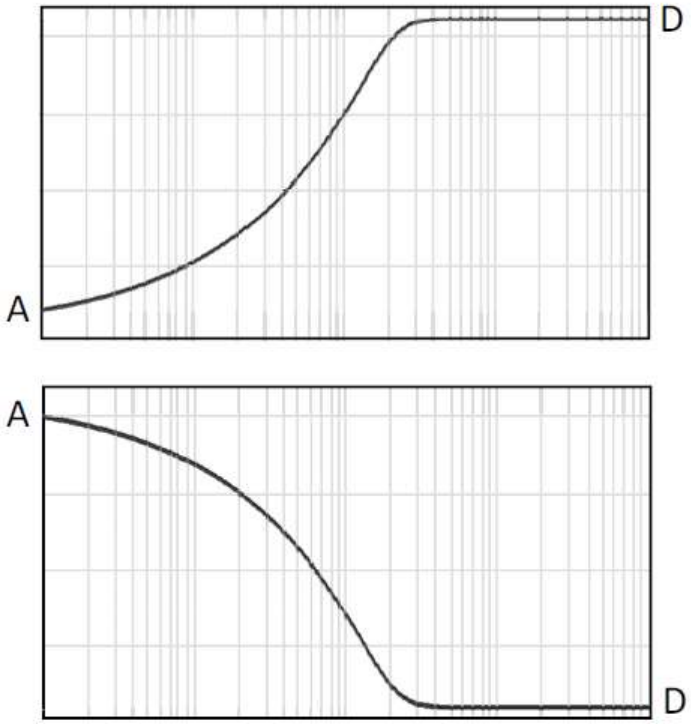

$$y = D + (A - D)\left\{1 + \left(2^{\frac{1}{G}} - 1\right)\left(\frac{X}{C}\right)^{B/2G\left(1 - 2^{-\frac{1}{C}}\right)}\right\}^{-G}$$

Brain Cousens

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- Quartic
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- 4-Parameter Logistic
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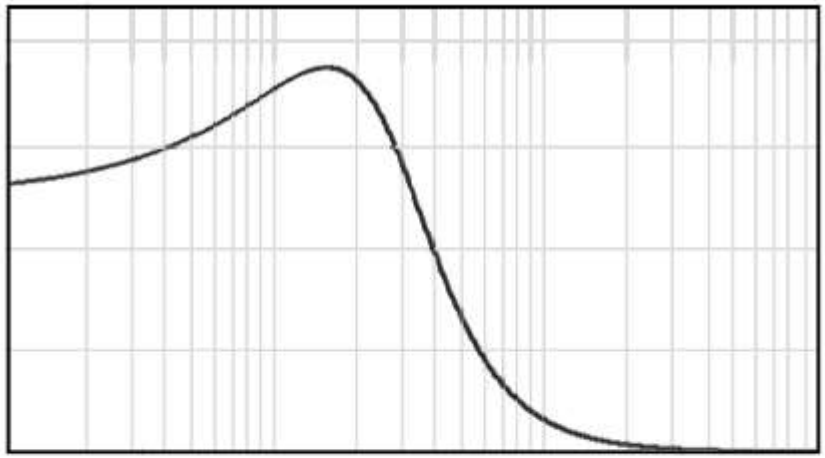

$$y = D + \frac{A - D + Gx}{1 + \left(1 + \frac{2CG}{A - D}\right)\left(\frac{x}{C}\right)^{B}}$$

Exponential

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
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- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
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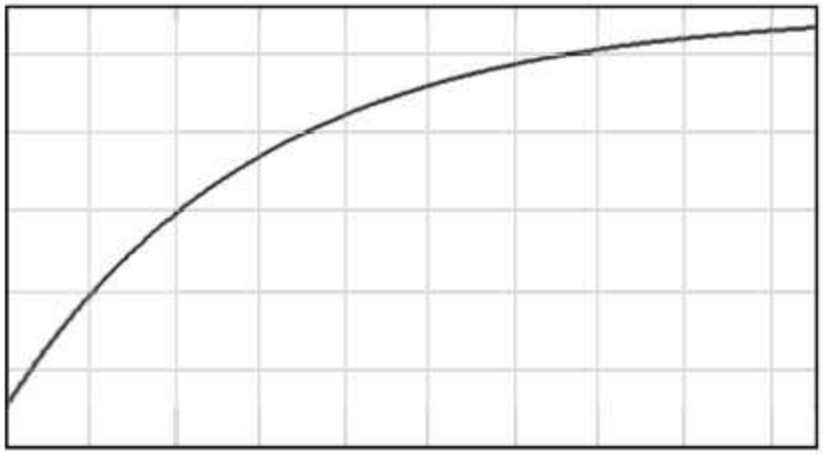
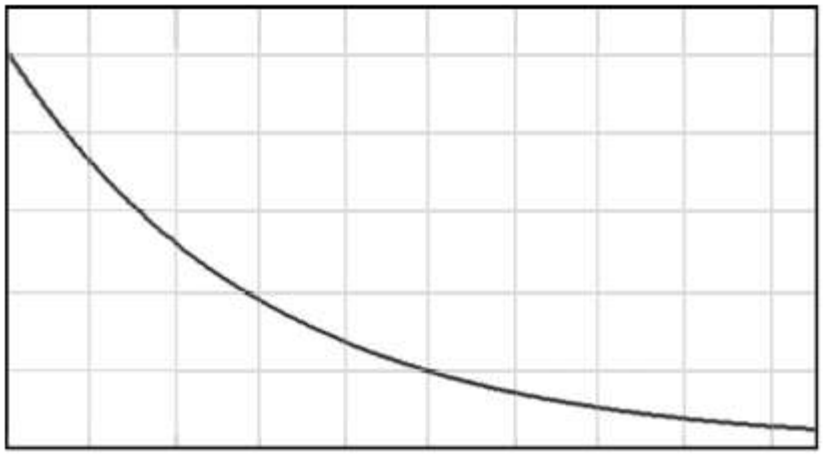
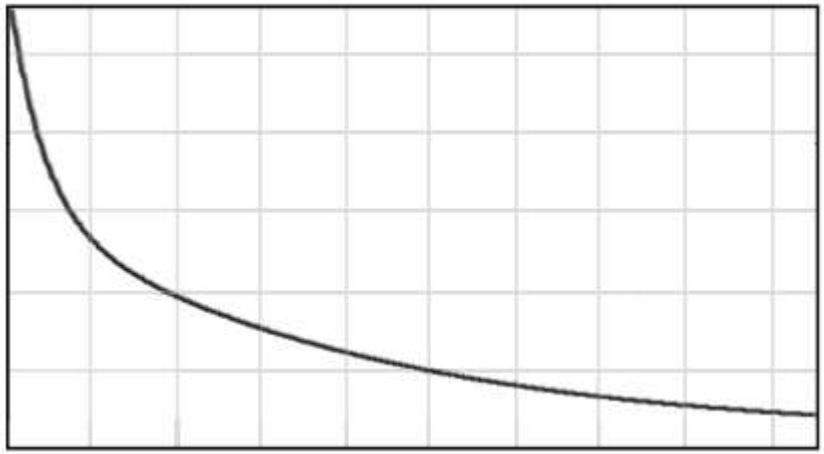




Bi-Exponential

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian



Rectangular Hyperbola

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
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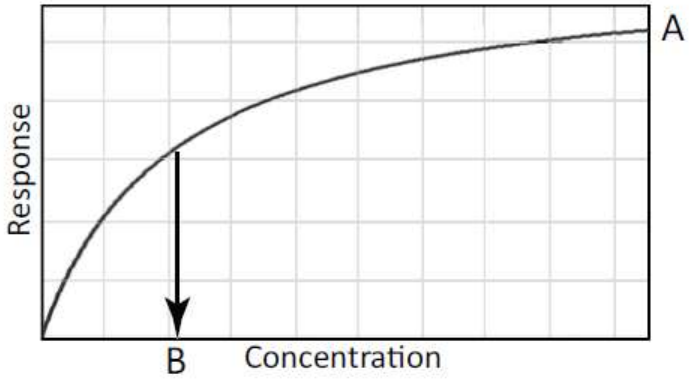
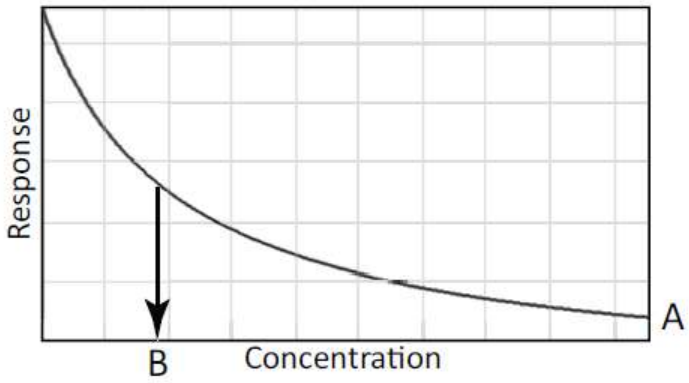
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian

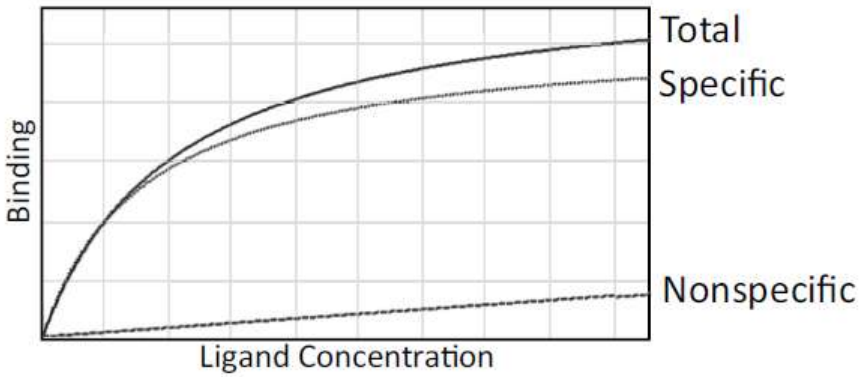




$$y = \frac{Ax}{x + B}$$

RHPlusLinear

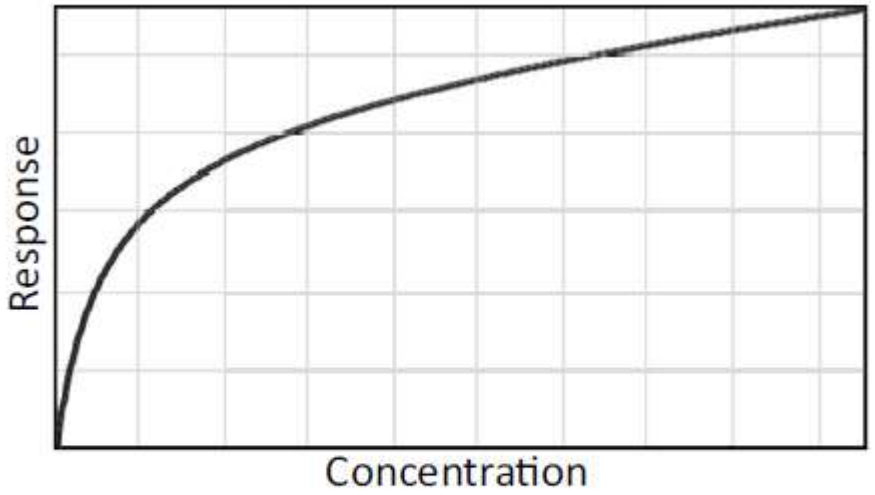
- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian



$$y = \frac{Ax}{x + B} + Cx$$

Bi-rectangular Hyperbola

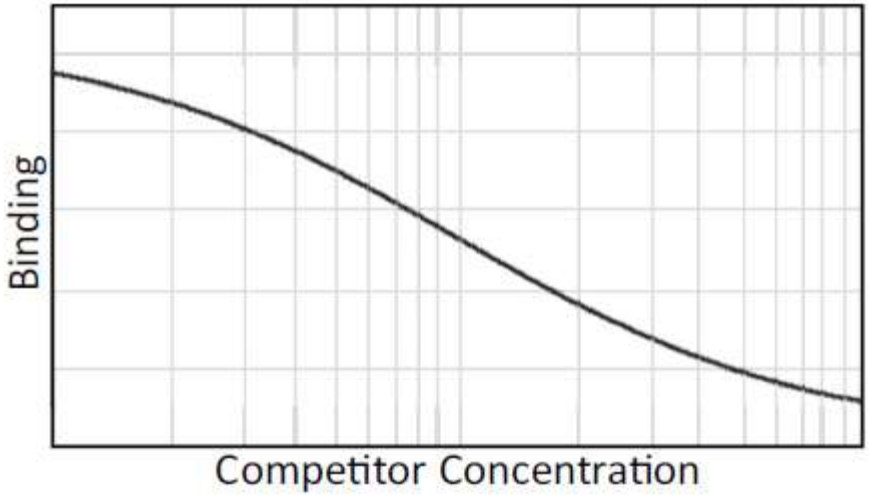
- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian



$$y = \frac{Ax}{x + B} + \frac{Cx}{x + D}$$

Two-Site Competition

- Press F1 to view details about each curve fit function in the MetaXpress Help file
- No Fit
- Linear
- Quadratic
- Cubic
- Quartic
- Semi-Log
- Log-Log
- 2-Parameter Exponential
- 4-Parameter Logistic
- 5-Parameter Logistic
- 5-Parameter Logistic Alternate
- Brain Cousens
- Exponential
- Bi-Exponential
- Rectangular Hyperbola
- RHPlusLinear
- Bi-rectangular Hyperbola
- Two-Site Competition
- Gaussian



$$y = D + (A - D)\left(\frac{B}{1 + \left(\frac{X}{C}\right)} + \frac{1 - B}{1 + \left(\frac{X}{G}\right)}\right)$$

Gaussian

- Press F1 to view details about each curve fit function in the MetaXpress Help file
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- Quadratic
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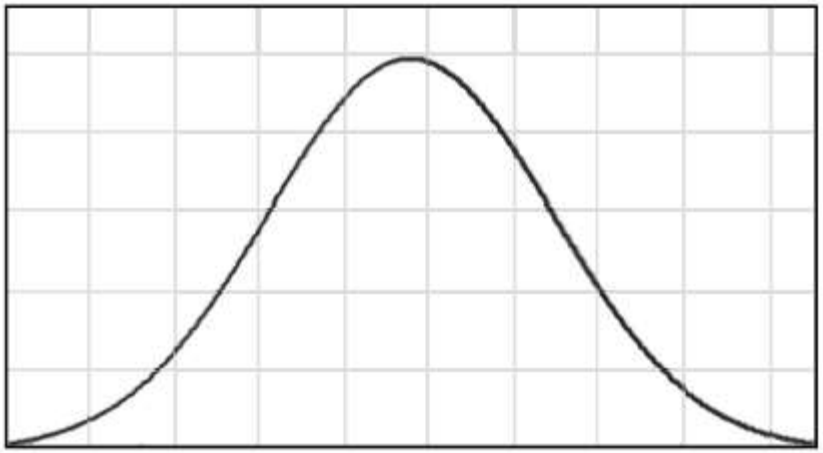

$$y = A * e^{-\left(\frac{x - B}{C}\right)^2} + D$$

Support Resources

- F1 / HELP within MetaXpress® Software
- Support and Knowledge Base: http://mdc.custhelp.com/
- User Forum: http://metamorph.moleculardevices.com/forum/
- Request Support: http://mdc.custhelp.com/app/ask
- Technical Support can also be reached by telephone:
  - 1 (800) 635-5577
  - Select options for Tech Support → Cellular Imaging Products → ImageXpress Instruments

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