Graphpad Prism for your research

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Today

• What is prism best for?
• Practical demonstration of Prism
  – Bar graphs
  – Line graphs
  – Survival curves
• Brief stats overview
• Layouts and prims for preping paper figures
What is Prism

- Graph drawing program designed by biochemists
- Combines scientific graphing, comprehensive curve fitting (nonlinear regression), understandable statistics, and data organization.
- Offers t tests, nonparametric comparisons, one- and two-way ANOVA, analysis of contingency tables, and survival analysis.
- Multi-graph layout and figure generation
- Great export options - TIFF, EPS, JPG, or PDF (and more)
- Mac and windows – Health has free licenses (100)
What Prism Isn’t

• It will not replace sophisticated stats programs like SSPS
• Statistical comparisons
  – Paired or unpaired t tests. Reports P values and confidence intervals.
  – Nonparametric Mann-Whitney test, including confidence interval of difference of medians.
  – Kolmogorov-Smirnov test.
  – Wilcoxon test with confidence interval of median.
  – Perform many t tests at once, using False Discover Rate to choose which comparisons are discoveries to study further.
  – Ordinary or repeated measures one-way ANOVA followed by the Tukey, Newman-Keuls, Dunnett, Bonferroni or Holm-Sidak multiple comparison tests, the post-test for trend, or Fisher’s Least Significant tests.
  – Many multiple comparisons test are accompanied by confidence intervals and multiplicity adjusted P values.
  – Greenhouse-Geisser correction so repeated measures one-way ANOVA does not have to assume sphericity. When this is chosen, multiple comparison tests also do not assume sphericity.
  – Kruskal-Wallis or Friedman nonparametric one-way ANOVA with Dunn's post test.
  – Fisher’s exact test or the chi-square test. Calculate the relative risk and odds ratio with confidence intervals.
  – Two-way ANOVA, even with missing values with some post tests.
  – Two-way ANOVA, with repeated measures in one or both factors. Tukey, Newman-Keuls, Dunnett, Bonferroni, Holm-Sidak, or Fishers LSD multiple comparisons testing main and simple effects.
  – Kaplan-Meier survival analysis. Compare curves with the log-rank test (including test for trend).

• Column statistics
  – Calculate min, max, quartiles, mean, SD, SEM, CI, CV,
  – Mean or geometric mean with confidence intervals.
  – Frequency distributions (bin to histogram), including cumulative histograms.
  – Normality testing by three methods.
  – One sample t test or Wilcoxon test to compare the column mean (or median) with a theoretical value.
  – Skewness and Kurtosis.
  – Identify outliers using Grubbs or ROUT method.

• Linear regression and correlation
  – Calculate slope and intercept with confidence intervals.
  – Force the regression line through a specified point.
  – Fit to replicate Y values or mean Y.
  – Test for departure from linearity with a runs test.
  – Calculate and graph residuals.
  – Compare slopes and intercepts of two or more regression lines.
  – Interpolate new points along the standard curve.
  – Pearson or Spearman (nonparametric) correlation.

• Nonlinear regression
  – Fit one of our 105 built-in equations, or enter your own.
  – Enter differential or implicit equations.
  – Enter different equations for different data sets.
  – Global nonlinear regression – share parameters between data sets.
  – Robust nonlinear regression.
  – Automatic outlier identification or elimination.
  – Compare models using extra sum-of-squares F test or AICc.
  – Compare parameters between data sets.
  – Apply constraints.
  – Differentially weight points by several methods.
  – Accept automatic initial estimated values or enter your own.
  – Automatically graph curve over specified range of X values.
  – Quantify precision of fits with SE or CI of parameters.
  – Quantify symmetry of inprecision with Hougaard’s skewness.
  – Plot confidence or prediction bands.
  – Test normality of residuals.
  – Runs or replicates test of adequacy of model.
  – Report the covariance matrix or set of dependencies.
  – Easily interpolate points from the best fit curve.

• Clinical (diagnostic) lab statistics
  – Bland-Altman plots.
  – Receiver operator characteristic (ROC) curves.
  – Deming regression (type II linear regression).
Let's do some examples

http://www.graphpad.com/scientific-software/prism/#learn

https://www.dropbox.com/s/pqeij3a7vd84pghr/test.pzf?dl=0

Graphpad for Generating Figure for your thesis or paper.