



Fundamentals of Statistics for Life Sciences

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ABSTRACT: A major source of knowledge is “Inductive Inference”, the process of drawing conclusions from a finite set of “data” We can never be 100% sure of such conclusions, but using Statistical methods, We can specify a certain level of certainty (such as 95% or 99%) if we take due care in collecting the data. For example, there are three major principles of designing a scientific experiment: ‘Randomization’, ‘Replication’ and ‘Local Control’ [Hence the phrase “controlled experiment”]. Or, The concept of a “random sample” While Conducting a survey. “Classical” statistical methods are based on the philosophy: “Let the data speak. Do not get influenced by other (prejudices or) Pries knowledge of the experimenter. “Bayesian” methods on the other hand use the prior knowledge. “Meta-analysis goes much further, Trying to combine the conclusions drown from different experiment (conducted perhaps at different times under different protocols by different experimenters). Statistical methods are divided into two categories, depending on whether the observed variables are “qualitative” or “quantitative”. Scientific experiments usually involve “estimation problems”, or “testing of hypotheses”, or “model fitting / validation”. Biology is a difficult field (compared to physics, day) because almost all definition have exceptions. For example, just the proper definition of life has taken a few thousand years. Try to define “Junk DNA” Therefore; although the statistical analysis may yield a “statistical” conclusion, The interpretation of such conclusions into biological terms (or common language) is not easy. This is especially true of “probabilities”, eg., the probability of a ‘mutation’ in a certain gene, or, the probability that a hip replacement will ‘succeed’. © 2014 iGlobal Research and Publishing Foundation. All rights reserved.

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