Definitions of accuracy, precision and specificity in microarrays

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Accuracy: can be defined as the degree of conformity of the measured quantity to its actual (true) value. Usually, measurements are affected by a bias, which makes the mean depart from the actual value. Given a set of measurements, the accuracy of the instrument or technique is usually measured by comparing some measure of central tendency of the measurements (e.g. mean and median) to the actual value. An ideally accurate technique would have the mean exactly equal to the actual value.Precision: (also called reproducibility or repeatability) is the degree to which repeated measurements of the same quantity will show the same or similar results. Usually,measurements are affected by an error that makes repeated measurements differ from each other. Given a set of measurements, the precision is usually measured by comparing some measure of dispersion (e.g. variance or standard deviation) with zero. An ideally precise technique would have all measurements exactly equal (zero variance).
Accuracy and precision are completely independent. A technique can be accurate but not precise (the mean of several measurements is close to the actual value but the individual measurements vary considerably), precise but not accurate (the individual measurements are close to each other but their mean is far from the actual value) neither or both. If a result is both accurate and precise, it is valid.Specificity: in the context of DNA microarrays, refers to the ability of a probe to bind to a unique target sequence. A specific probe will provide a signal that is proportional to the amount of the target sequence only. A non-specific probe will provide a signal that is influenced by the presence of other molecules. The specificity of a probe can be diminished by cross-hybridization, a phenomenon in which sequences that are not strictly complementary according to the Watson–Crick rules bind to each other. Crosshybridization is also called non-specific hybridization.1. Draghici, S., et al., Reliability and reproducibility issues in DNA microarray measurements. Trends Genet, 2006. 22(2): p. 101-9.