

## “Personalized Medicine” versus a “State-based Diagnosis and Treatment”

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In Ransohoff’s discussion of the term “validation set”, he emphasized that it was very important to construct a consistent meaning of terms used in the construction and application of classifiers [Ran-04]. Similar discussions should occur for a term such as “personalized medicine” [Cal-05, Esp-05, Pet-05, Gul-06, Wul-06]. This term relates to using a multitude of markers in a single [fingerprint-based classifier](#) to determine whether or not an individual has a specific disease, and this usage is incorrect. Given that a 10-feature [MCA classifier](#) generates on the order of  $10^{10}$  cells, it would be possible to create such a classifier that distinguishes a single individual from everyone else on the planet, but it would give no indication of whether or not this individual has a particular disease. The fact that two individuals have sufficiently similar proteomic fingerprints should never be used to conclude that they have the same disease. Though it is possible that a single disease category may be composed of multiple sub-groups, the identification of a particular sub-group, or disease State, should not depend upon a profile of an individual in that State. Instead it should depend upon the unique biochemical process underlying this particular State; associating all individuals with this biochemical process to this particular State. Identifying the particular State for a group of individuals may require a [battery of tests](#) as outlined by the decision tree below. The early tests may depend upon genetic or environmental markers, but the identification of the specific State should be determined by a biomarker specific to that State. All individuals within this genetic/environmental stratum who have this marker would therefore be assigned to this State. Therefore, “personalized medicine” should be replaced by “State-based diagnosis and treatment”.

