Concepts and Terminology for Multi-Component Biomarkers
One-pager description

Biomarker science is an ever-evolving domain. As the field advances, interest continues to increase in the development and use of biomarkers composed of multiple components to improve performance as an indicator of normal biological processes, pathogenic processes, or biological responses to an exposure or intervention. The scientific approach to biomarker development and validation, and consequently the use of language in this domain, is generally consistent with other disciplines. However, there is an emerging need for standardized language to describe a multi-component biomarker conceptually at a high level and in more specific terms to allow for harmonized discussion, their application to decision-making, and guidance development. This public meeting will focus on identifying the concepts helpful for creating standardized high-level terminology, addressing its potential hierarchy, and including specific language to describe the range of multi-component biomarkers (alternatively referred to as composite, multi-variate, or multi-modal biomarkers) and their application to decision-making.

As the use of multi-component biomarkers expands, so does the need for clarity regarding related concepts and terminology. A biomarker may be comprised of multiple components of the same type or different types of independent measurements appropriate for a breadth of biomarker types, such as molecular, histologic, radiographic, and physiologic characteristics. Multi-component (multi-variate) biomarkers include features based on two or more measurements, potentially including clinical characteristics such as patient demographics, that may be used independently and/ or in combination through an algorithm as a defined characteristic(s) indicating normal biological processes, pathogenic processes, or responses to an exposure or intervention, including therapeutic interventions and environmental exposures. Development of a multi-component biomarker may include elements such as transformative operations, machine learning algorithms, model-based prediction, or additional inputs into the final biomarker. In the face of these technical/methodological complexities, this workshop is intended to promote the effective use of biomarkers in qualification review or regulatory review by highlighting commonalities and shared challenges through an agency-wide discussion of multi-component biomarker concepts and terminology.

The symposium has two central goals related to the use of multi-component biomarkers: 1) to obtain feedback on the terminology needed for effective communication, and 2) to identify common issues and discuss the diversity of decision models encountered across FDA Centers (i.e., how specific biomarker outputs are interpreted in different regulatory settings)

The focus of the workshop will be on biomarkers comprised of more than a single element. The presentations will identify multi-component biomarker concepts for which terminology needs to be further developed. The workshop will include a keynote addressing the topic of multi-component biomarkers and a presentation on BEST (Biomarkers, EndpointS, and other Tools) terminology and terminology gaps as they relate to multi-component biomarkers. A series of case studies will highlight FDA-wide and external experience regarding the use of multi-component biomarkers, with emphasis on context of use, measurements, outputs, transformation/modeling of outputs, and how the output is ultimately used in decision making. The case studies will provide context for panel discussions of commonalities, challenges, and preferred terminology.