

Quality-by-Design A Perspective from the Office of Biotechnology Products (OBP)

Knowledge gained during the pharmaceutical development program is critical for enhanced understanding of product quality and provides a basis for risk management and increased regulatory flexibility. The “quality by design” initiative attempts to provide guidance on pharmaceutical development to facilitate design of products and processes that maximizes the product’s efficacy and safety profile while enhancing product manufacturability. This presentation will focus on this concept as applied to products regulated in the Office of Biotechnology Products. Fundamental to this approach is an understanding of the relationship between the quality attributes of the product (physicochemical and biological properties) and their impact on the safety and efficacy. This requires knowledge of the relationship between structure and biological functions. Biological characterization in conjunction with biochemical characterization, preclinical and clinical data can facilitate development of structure-function knowledge.

OBP will discuss the current state of the Biotech industry in the implementation of these principles for designing proteins and defining their acceptable heterogeneities (product space). We will also describe how incorporation of knowledge of the product’s characteristics over a range of process inputs and parameters (process space) can be used in the design and control of manufacturing processes to ensure a product with the expected quality attributes is consistently produced. Finally, we will describe OBP’s future directions for increased utilization of these concepts to both the Biotech industry and to FDA reviewers including reviewer training initiatives, potential application of Process Analytical Technologies and formal experimental designs, and new approaches for establishing specifications and manufacturing controls. The potential impact of these initiatives will be a flexible regulatory process that allows timely manufacturing process improvements while mitigating risk.