



3D Cell-Based Biosensors in Drug Discovery Programs: Microtissue Engineering for High Throughput Screening

William S. Kisaalita

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Advances in genomics and combinatorial chemistry during the past two decades inspired innovative technologies and changes in the discovery and pre-clinical development paradigm with the goal of accelerating the process of bringing therapeutic drugs to market. Written by William Kisaalita, one of the foremost experts in this field, **3D Cell-Based Biosensors in Drug Discovery Programs: Microtissue Engineering for High Throughput Screening** provides the latest information — from theory to practice — on challenges and opportunities for incorporating 3D cell-based biosensors or assays in drug discovery programs.

The book supplies a historical perspective and defines the problem 3D cultures can solve. It also discusses how genomics and combinatorial chemistry have changed the way drug are discovered and presents data from the literature to underscore the less-than-desirable pharmaceutical industry performance under the new paradigm. The author uses results from his lab and those of other investigators to show how 3D micro environments create cell culture models that more closely reflect normal *in vivo*-like cell morphology and function. He makes a case for validated biomarkers for three-dimensionality *in vitro* and discusses the advantages and disadvantages of promising tools in the search of these biomarkers. The book concludes with case studies of drugs that were abandoned late in the discovery process, which would have been discarded early if tested with 3D cultures.

Dr. Kisaalita presents evidence in support of embracing 3D cell-based systems for widespread use in drug discovery programs. He goes to the root of the issue, establishing the 3D cell-based biosensor physiological relevance by comparing 2D and 3D culture from genomic to functional levels. He then assembles the bioengineering principles behind successful 3D cell-based biosensor systems. Kisaalita also addresses the challenges and opportunities for incorporating 3D cell-based biosensors or cultures in current discovery and pre-clinical development programs. This book makes the case for widespread adoption of 3D cell-based systems, rendering their 2D counterparts, in the words of Dr. Kisaalita "quaint, if not archaic" in the near future.

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