International Journal of Drug Research and Technology

Available online at http://www.ijdrt.com

Mini Review

COMBINING MICROTITRE TECHNOLOGY AND MICROFLUIDICS FOR FASTER DRUG DISCOVERY

Yimin Cui*

Department of Clinical Pharmacology, Peking University First Hospital, Beijing, China

ABSTRACT

Improved in vitro determinations of drug efficacy and cellular response to administered drugs will be possible by detecting multiple components from a single RBC sample using a flow-based system in less than 20 minutes. By incorporating multiple cell types into a single device, this is an example of an improved in vitro measurement involving iloprost, a drug that is said to increase blood flow. An 18-well microfluidic array that serves as a precursor to a 96-well micro titre plate device can be addressed by fluid flow using this method. The ability of the microfluidic array presented here to better mimic the *in vivo* circulation by incorporating the flow of blood components, as well as simultaneous detection and laboratory automation for micro titre plates, suggest that improved mechanistic drug research studies will be possible. The micro fluidic array can also be used to measure the concentrations of various metabolites in the RBC using fluorescence microscopy. Here, we discuss the current progress made toward using this device for personalized medicine. Together, the advantages of micro fluidic technologies and automation of micro titre plates may make it possible for biotechnology advancements involving better replicas of *in vivo* processes. For instance, the properties of absorption, distribution, metabolism, excretion, and toxicity (ADMET) of drug candidates will be able to be examined during drug research on a platform that is more realistic if a flow-based and multicellular system can be integrated with the technology that is already available for microtitre plates.

Keywords: Biotechnology; Micro titre; Metabolism

INTRODUCTION

According to a report from the Center for Drug Evaluation and Research of the Food and Drug Administration, it takes anywhere from 0.8 to 1.7 billion dollars for a single drug candidate to reach the clinical trial phase, also known as phase III of the process for getting a drug approved. Additionally, it was determined that problems with ADMET's properties cause 92% of drug candidates entering phase I to fail before going on the market. Before the drug candidate enters the clinical trial phase of development, many aspects of the drug discovery process, such as the mechanism of action of certain drugs, the solubility of the drug candidate, and toxicity studies involving the candidate, could be examined in a multicellular system with actual blood flow. Researchers would be able to find any unanticipated problems earlier in the drug development

process, reducing the number of drugs that fail clinical trials and increasing the cost of testing drug candidates that fail. The incorporation of commercial HTS automation capabilities is a benefit of the current drug development methods that make use of microtitre plate technology. Automated instruments can be used for a variety of tasks, including complex biological sample preparation, the simultaneous introduction of multiple sample volumes, and the integration of various instrumentation for sample separation, identification, and quantification. Numerous instruments have been developed on this scale as a result of the acceptance of a standard microtitre plate dimension, which has led to numerous advancements in the technology's automation and detection methods [1,2].

DISCUSSION

According to a report from the Center for Drug Evaluation and Research of the Food and Drug Administration, it takes anywhere from 0.8 to 1.7 billion dollars for a single drug candidate to reach the clinical trial phase, also known as phase III of the process for getting a drug approved. Additionally, it was determined that problems with ADMET's properties cause 92% of drug candidates entering phase I to fail before going on the market. Before the drug candidate enters the clinical trial phase of development, many aspects of the drug discovery process, such as the mechanism of action of certain drugs, the solubility of the drug candidate, and toxicity studies involving the candidate, could be examined in a multicellular system with actual blood flow. Researchers would be able to find any unanticipated problems earlier in the drug development process, reducing the number of drugs that fail clinical trials and increasing the cost of testing drug candidates that fail. The incorporation of commercial HTS automation capabilities is a benefit of the current drug development methods that make use of microtitre plate technology [3]. Automated instruments can be used for a variety of tasks, including complex biological sample preparation, the simultaneous introduction of multiple sample volumes, and the integration of various instrumentation for sample separation, identification, and quantification. Numerous instruments have been developed on this scale as a result of the acceptance of a standard microtitre plate dimension, which has led to numerous advancements in the technology's automation and detection methods [4-6].

CONCLUSION

This will ultimately lead to smooth muscle relaxation and vasodilation. The majority of drug discovery methods in vitro, if not all of them, do not take blood flow into account. Drug efficacy that is dependent on shear-induced deformation, such as Trental, can now be accurately analyzed using a controlled platform by integrating flow into a HT and automated platform. As framed in, the mix of highlights found in microfluidic advancements and microtitre-based estimations are utilized with the microfluidic cluster that is depicted in this work. The ability to perform on-chip cell culture, sample injection and separation, and incorporate gaseous interfaces and valving techniques are among the advantages of microfluidic devices. This allows for the integration of a more lab-on-a-chip approach onto a single device. This microfluidic array will be able to handle simultaneous and variable sample volumes while maintaining micro titre plate dimensions thanks to automation and other technologies already in use. By combining the benefits of each system, the microfluidic array offers excellent opportunities for HT and automated clinical testing and research.

REFERENCES

1. Preston, J., Stones, S. R., Davies, H., Preston, J., & Phillips, B. (2019). How to involve children and young people in what is, after all, their research. ***Arch Dis Child*** 104: 494-500.
2. Davies, H. T., Phillips, B., Preston, J., & Stones, S. R. (2019). Making research central to good paediatric practice. ***Arch Dis Child*** 104: 385-388.
3. Carleer, J., & Karres, J. (2011). Juvenile animal studies and pediatric drug development: a European regulatory perspective. ***Birth Defects Res B Dev Reprod Toxicol*** 92: 254-260.
4. Maagdenberg, H., Vijverberg, S. J., Bierings, M. B., Carleton, B. C., Arets, H. G, et al. (2016). Pharmacogenomics in pediatric patients: Towards personalized medicine. ***Paediatr Drugs*** 18: 251-260.
5. Van den Anker, J., Reed, M. D., Allegaert, K., & Kearns, G. L. (2018). Developmental changes in pharmacokinetics and pharmacodynamics. ***J Clin Pharmacol*** 58: S10-S25.
6. Ruggieri, L., Bonifazi, D., Landi, A., Bonifazi, F., Bartoloni, F, et al. (2020). Survey by TEDDY European Network of Excellence for Paediatric Clinical Research demonstrates potential for Europe-wide trials. ***Acta Paediatr*** 109: 607-612.

Correspondence Author:

Yimin Cui*

Department of Clinical Pharmacology, Peking University First Hospital, Beijing, China
E-mail: cuiymzy@126.com

Received: 2-August-2022, Manuscript No. IJDRT-22-84141; **Editor assigned:** 4-August-2022, Pre QC No. P-84141; **Reviewed:** 17-August-2022, QC No. Q-84141; **Revised:** 23-August-2022, Manuscript No. R-84141; **Published:** 31- August -2022, DOI: 10.37421/2277-1506.2022.11.366

Cite This Article: Cui Y (2022).Combining Microtitre Technology and Microfluidics for Faster Drug Discovery. ***International Journal of Drug Research and Technology*** Vol. 11(8) 1-3.