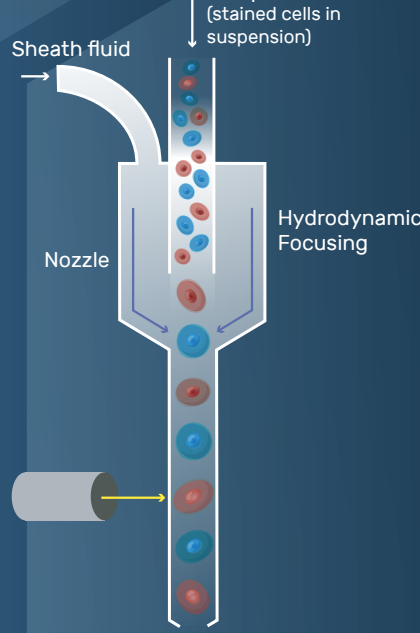


Exploring the benefits of flow cytometry for cell and gene therapy development

Why choose flow cytometry?

Traditional flow cytometry possesses the ability to rapidly analyze single cells as they flow past lasers whilst suspended in a buffer solution. As a powerful tool with applications throughout different stages of gene-mediated cell therapy development, what makes it stand out from other technologies?



Target/lead discovery and validation

Target and lead candidate discovery can be costly and time-consuming due to the need for a series of expensive processes and technologies. Flow cytometry offers an attractive option for target discovery due to its ability to analyze heterogeneous cell populations with high throughput when optimized. To support lead screening assays flow cytometry provides the ability to screen large libraries of candidates in an automated manner.

Measurements are taken in a flow-based system which mimics a physiological environment. Surface protein expressions can be monitored using antibodies and reporter molecules. Molecular features can be tagged within cells with probes and structural features can be assessed to allow the analysis of the integrity of the cell membrane.



Flow cytometry can also be utilized as a complementary method of target discovery, including:

ELISA western blot

IHC

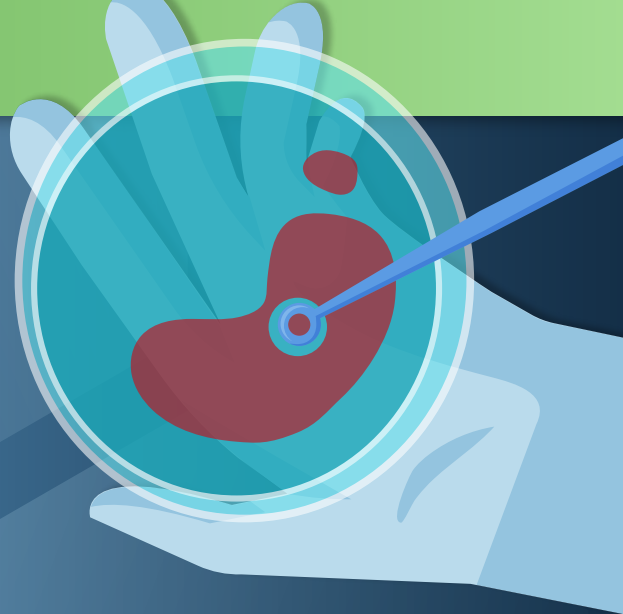
Multiple cytokine assays
(bead-based)

Ab and non-Ab staining

BLI/SPR

Preclinical studies

In preclinical studies, flow cytometry can be utilized to assess the physiological effects of a potential treatment with high resolution and across multiple parameters. During the preclinical stage of therapeutic development, samples are in short supply – flow systems only utilize a small volume.



Benefits of flow cytometry during this stage include:

Sample preservation

Simultaneous qualitative and quantitative analysis

High sensitivity to changes in cell populations

Multiple outcome assessment

Off-target effect monitoring

Clinical studies

Flow cytometry can be utilized in clinical studies to validate a drug or therapeutic, its mechanism of action and any off-target effects. High-throughput analysis allows for a large patient population size. A large amount of data can be obtained from small sample amounts, which can be revisited over time. Longitudinal studies are common and can be done with ease utilizing flow cytometry.

Benefits of flow cytometry during this stage include:

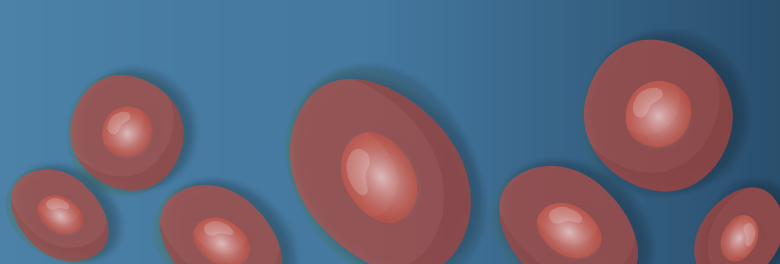
✓ High level of detail obtained from low sample input requirements

✓ SOP development ease

✓ Protocols allow for rapid analysis

Conclusion

Throughout the different stages of therapeutic development, flow cytometry remains a mainstay of the bioanalytical laboratory for gene-mediated cell therapy development. Flow fits comfortably within the field of bioanalytical assays, offering the bioanalyst a range of benefits when choosing an analytical method for their assays.



This infographic has been created as part of a Bioanalysis Zone feature in association with Bio-Rad.