

Agricultural Genomics Solutions

Leveraging nanoscale microfluidics for scalable, versatile plant and animal applications



Today's agricultural scientists need to respond to yield and quality demands from a growing global population, while also adapting to environmental changes. This means having a quick, robust and cost-effective way to monitor genetic and phenotypic traits of the plants and animals we rely on to feed the world.

With our Juno™ and Biomark™ HD systems, Fluidigm offers flexible and scalable solutions for robust processing of samples in nanoscale reactions, enabling quick and reliable SNP genotyping by PCR, amplicon library preparation for genotyping by sequencing (GBS), gene expression and digital PCR. The platform allows flexibility in assay design, supporting a wide range of applications from marker-assisted breeding to pathogen detection and resistance.

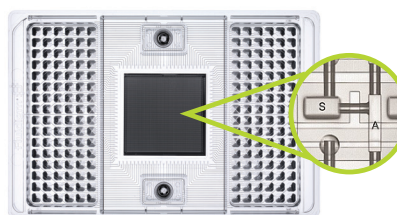
Multi-application workflows power your research



Figure 1. Genomics-based techniques generate data to inform several key applications in plant and animal agricultural research. Our microfluidics-based approach to genomic analysis offers highly flexible automated workflows, maximizing data and results while minimizing hands-on time and reagent consumption.

The power of Fluidigm microfluidics: integrated fluidic circuits

Our revolutionary integrated fluidic circuits (IFCs) empower agricultural research by automating molecular biology at nanoliter volumes. IFCs are designed with a size and shape similar to a standard 96-well plate. Load samples and assays into the IFC, where reagent mixing and chemistry proceed. IFC technology significantly minimizes pipetting steps, hands-on time and reagent consumption while maximizing efficiency and cost savings (Table 1). IFCs are offered in a variety of sample and assay throughput configurations, supporting numerous PCR-based and NGS library prep applications.



96.96 Dynamic Array IFC for Gene Expression

Figure 2. The 96.96 Dynamic Array™ IFC is one of the configurations available for use with the Biomark HD system. In the illustration above, **S** indicates a sample chamber and **A** indicates an assay chamber. The Juno system (or other IFC controller) is used to combine samples and assays within a network of microfluidic channels where subsequent chemistry is performed.

Save reagents. Save consumables. Save time.

Example Project	2X PCR Master Mix (mL)	Number of IFCs or Plates	Time to Data
96.96 IFC	2.4	11 IFCs	4 days
384-well plate	960*	250 plates	4.5 months**

Table 1. Comparison of consumables and reagents needed for a hypothetical genotyping project. In this scenario, 1,000 samples are interrogated by 96 SNPs for a total of 96,000 PCR reactions. Significant savings are realized using the Fluidigm microfluidics-based workflow.

*20 µL reactions, 10 µL of 2X master mix per reaction

**1 technician, 1 instrument, 3 runs per day, 5 days a week

Flexible platforms for agricultural genomics workflows

The Juno and Biomark HD systems are critical components of the genetic testing workflows used by many agricultural genomics laboratories focused on commercial, research and conservation efforts. Our microfluidics-based platforms save time and resources by minimizing numerous hands-on steps and reducing costly reagent consumption. We offer a number of IFC configurations, enabling you to scale your experiments easily.

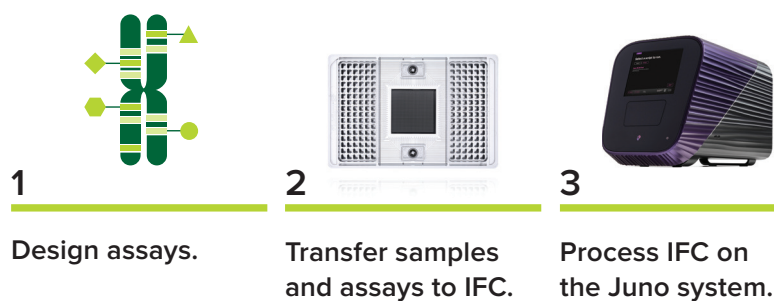


Figure 3. Examples of microfluidic workflows for PCR- and NGS-based applications using the Juno and Biomark HD platforms. The Juno system can be used for amplicon library preparation for GBS in NGS workflows, where data is collected on the Biomark HD.

Learn more at fluidigm.com

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Define. Design. Deliver. D3 assay design online tool

Whether your research focuses on genetic seed traceability, pathogen resistance studies or marker-assisted breeding, assay design is of paramount importance. With an intuitive user interface and powerful design pipeline, the D3™ assay design online tool enables you to easily define parameters to create precise custom panels for targeted next-generation sequencing (NGS), gene expression and genotyping assays. Easily move your existing assays to the Juno and Biomark HD to achieve immediate pipetting and cost efficiencies. Start designing today at d3.fluidigm.com.

SNP genotyping by PCR, dPCR and gene expression

