Geneus Lab and Data Management for Illumina Sequencing

Geneus software provides a comprehensive data management solution for the Illumina Genome Analyzer. Integrated tracking, analysis, and reporting functions keep pace with growing volumes of sequence data.

Introduction

The Genome Analyzer generates tens of billions of bases of sequence per week. The massive output of Illumina sequencing technology enables even small labs to have sequencing capabilities matching that of the largest genome centers just years ago. With the fastest and least labor intensive workflow of any next-generation sequencing technology, the Genome Analyzer can quickly generate highly accurate results for discoveries in genomics, epigenomics, gene expression analysis, and protein-nucleic acid interactions. However, this new analytical power can bring new lab and data management challenges.

To address these challenges, GenoLogics provides end-to-end lab and data management capabilities for the Genome Analyzer sequencing system (Figure 1). The combination of the Genome Analyzer with the GenoLogics Geneus lab and genomic data management system reliably manages next-generation sequencing data from sample submission to scientific results.

Project Management and Sample Submission

Geneus provides sophisticated users with a powerful tool to manage multiple next-generation sequencing projects. An intuitive web interface allows collaborators to enter project and sample data. Permission-driven security protects data from unauthorized access or modification.

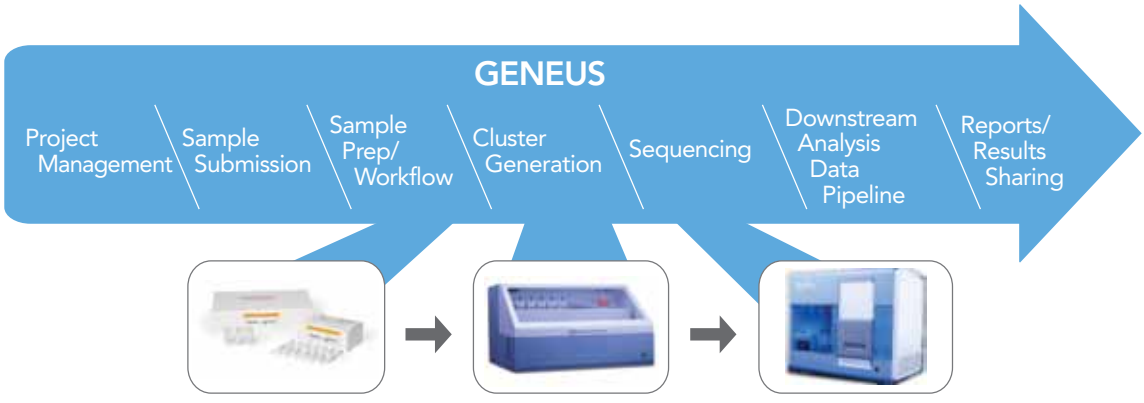
Workflow Management and Sample Tracking

Multiple sequencing applications are easily managed since Geneus allows users to store protocols, define workflows, and track samples. A complete history of all steps performed on each sample is maintained and visually illustrated in a sample genealogy (Figure 2). From the sample genealogy, important metadata can be retrieved, such as sample details, processes performed, and results. Geneus captures, processes, and provides access to QC data, enabling researchers to pass or fail samples based on QC criteria. To ensure uninterrupted sample processing, a reagents module manages the lab inventory of reagents and assays.

Integration with Array-Based Assays

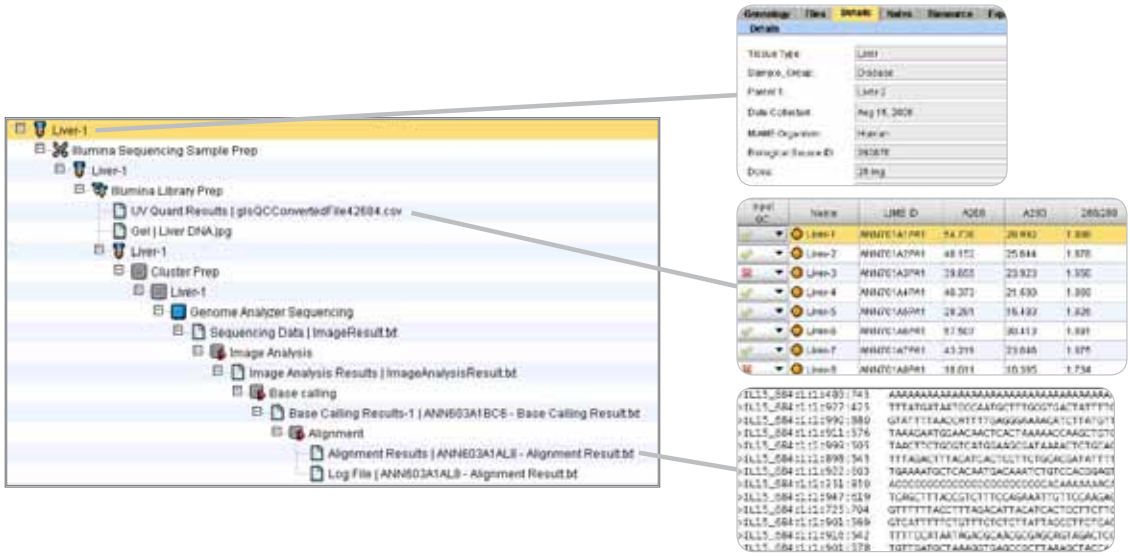
Geneus also provides an integrated data management solution for multiple genetics applications using both sequencing and traditional microarray technologies. Geneus offers end-to-end sample tracking and data management tools for gene expression and genotyping experiments using Illumina's array-based assays on the iScan™ System.

Figure 1: Geneus End-to-End Data Managenment for Illumina Sequending



Geneus supports labs running genomics experiments with the Genome Analyzer. Sample tracking, QC, analysis, and reporting are facilitated with a single integrated package.

Figure 2: Geneus Tracks Illumina Sequencing Workflow From End to End



From standardized library preparation kits, to automated cluster generation, to streamlined sequencing by synthesis, Illumina's HiSeq 2000 sequencing system offers the industry's simplest next-generation sequencing workflow.

Data Pipelining and Analysis

Geneus provides a flexible informatics framework that enables automated data pipelining for next-generation sequencing. The framework seamlessly wraps and simplifies the execution of command-line data processing algorithms while keeping custom informatics scripts accessible to researchers. As new Genome Analyzer applications and analysis methods are adopted, defining new data pipelines and plug-in algorithms is simple and efficient.

Reporting and Results Sharing

With Geneus, users can generate customized billing, operational, and scientific reports quickly and easily. The reporting framework enables customized reports to be created and disseminated to customers and collaborators. External groups can access finalized results and reports with an intuitive web interface.

Conclusion

Illumina's Genome Analyzer has significantly reduced the time and cost of large-scale sequencing experiments. However, going from samples to meaningful results while aggregating data across many genomics experiments presents organizational challenges. Geneus, from GenoLogics, in combination with the Illumina Genome Analyzer accelerates genomics research with fully integrated data and lab management.

Additional Information

For more information about Illumina sequencing applications, visit www.illumina.com or contact us at the address at right.

For purchasing information or more details about Geneus, visit www.genologics.com or contact GenoLogics at sales@genologics.com or 1.866.457.5467.

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