Genedata Screener®

High-Performance Data Analysis Along the Entire Screening Cascade

The Genedata Screener software system manages and analyzes all data along the entire screening cascade - from target validation via hit identification to lead optimization. Recognized for its performance as an analysis system (fastest to hit and lead), Genedata Screener is a turnkey solution for all screening data management needs, and requires minimal set-up and maintenance. Supporting all relevant technologies including High Content Screening, Time-resolved Screening, and Label-free Screening, Genedata Screener also handles assays of any size from single plates to full-deck screens of millions of compounds. Such enterprise-wide integration and centralized management of screening results, combined with strict quality checks for result comparability and full documentation for traceability, optimizes the value of screening experiments for an entire organization.

From Local to Global Data Management Infrastructure

Genedata Screener serves as local or global data management infrastructure for all plate-based screening at organizations ranging from pharmaceutical companies to specialized contract research organizations and academic screening centers. “The Screener system is unrivaled when it comes to the flexible and efficient integration of third-party infrastructure,” says Francisco Asensio of Medina in Granada (Spain). Commenting on Genedata Screener’s easy set-up, he notes, “The easy templating for our complex assay setups impresses our screening teams just as much as it smooths things out for our IT support people.”

The system’s inherent user-friendliness and the quality of resulting data are valued as well by customers. “Screener’s interactive visualization capabilities enable our screeners to analyze their own data, eliminating the need for them to involve a separate informatics group…,” according to Dave deCaprio, formerly of the Broad Institute in Cambridge, MA (USA). “Moreover, Genedata’s high-quality data analyses and the confidence we have in those data enable us to focus on meta data analyses,” continues deCaprio.

Finally, performance and built-in business logic are key factors in enhancing screening efficiency. “Establishing flexible and efficient working practices to ensure client satisfaction is our top priority as a reputable service provider,” maintains Stefan Lohmer of Axxam in Milan (Italy). “Genedata’s consistently high performance and data quality along with their expertise and profound scientific knowledge enable us to meet that goal on a daily basis, with rigorous quality control covering every detail, as well as keeping to deadlines and budget terms.”
Stringent Analysis Workflow

The sequence of Genedata Screener’s modules (Fig. 1) comprehensively maps typical analysis workflows, featuring:

- Data capture, -processing, quality control, review and hit list creation for screening experiments in **Assay Analyzer**
- Specific support for analysis of High Content Experiments in **High Content Analyzer**
- Specific support for analysis of Time Series data in **Kinetics Analyzer**
- Fitting of dose-response data, quality assessment, and calculation of derived results in **Condoseo**
- Compound profiling, cross-assay analyses, hit and lead selection in **Hit Profiler**

Fig. 1: Genedata Screener modules cover the screening workflow for different experimental technologies.

High-Performance Modules

**Assay Analyzer** and its extensions capture all plate-based data into Genedata Screener. Configurable instrument-specific parsers import data, and a processing engine normalizes and summarizes them according to user-configurable protocols. A typical High-throughput Screening run (100x 384 well plates) is imported and processed in seconds. An Assay Overview presents all plates in a single view, from a few 96-well plates to thousands of 1536-well plates. A suite of viewers and screening-relevant statistics rapidly highlight quality issues, and users treat them either manually or rely on built-in pattern detection, -correction and automatic masking to systematically improve data quality. Powerful filters create hit lists, and everything is documented in centrally-stored PDF reports.

**High Content Analyzer** extends Assay Analyzer specifically for High Content Screens (HCS), designed to support the massive amounts of data typical for HCS and the many features captured (typically 5-200 for each well). It has powerful statistics and navigation to find and inspect features of relevance,
cross-feature filters to create meaningful HCS hit lists, and deep data management to store and handle these complex screens. Additionally, it features unique, interactive access to the original HCS images for complete campaigns, displaying these within seconds for any group of wells chosen by the user.

**Kinetics Analyzer** extends Assay Analyzer specifically for time series experiments. It supports data capture and analysis from different experimental technologies such as automated patch clamping, label free assays, or time-resolved fluorescence. Featuring central management of time-series data rather than distributed storage on individual instruments, Kinetics Analyzer also fosters application of standardized business rules and quality criteria for curve analysis independent of instrument or technology.

**Condoseo** is for large-scale, high-quality dose-response curve fitting. It fits 10'000 curves in seconds, allowing users to rapidly, interactively and consistently optimize fitting for large compound sets. Built-in algorithms for automated outlier masking and the heuristics for model selection ensure optimal results. Graphical overviews show the global potency distribution and data quality across thousands of curves. They indicate any quality issues, so that users save time by focusing on specifically treating these. All results are stored centrally and can be exported as reports.

**Hit Profiler** automatically imports thousands of biological results for compounds, including activities or potencies, from any data source and displays them in a compound-centric table. Specialized viewers display dose-response curves and chemical structures while fast filters support efficient identification of interesting compound sets. A flexible annotation framework captures all input from users and stores it in a central database. Thus, users can rapidly profile large compound sets to find hits and leads of interest, and work together to select compound series for further progression.

**Flexible, Low-Maintenance System**

Genedata Screener is designed for open integration into any customer infrastructure. It has public, well-documented open interfaces for data import, and result calculation and submission, which have been implemented by dozens of customers. While out-of-the-box Genedata Screener provides many functions for the intelligent processing of screening data, customers can adapt or extend the portfolio of built-in calculations to match their specific data processing requirements.

Genedata Screener’s clear, scalable and well-established architecture keeps maintenance effort at a minimum. Modules are deployed automatically without need for installation on the client. All configurations and interface implementations are stored centrally on the application server for rapid deployment of new methods, smooth operation and support. Genedata Screener’s database is self-contained and upgrades are fully automated.