High Content Screening (HCS) has become instrumental in researching new therapies through screening for phenotypic change, but most software systems cannot handle the required level of data detail, complexity, and scale. Screener for HCS provides instant access to images along the data analysis pipeline and permits detailed analysis of cell-level data and populations. The software effortlessly processes and explores any number of plates, wells, and features, covering the complete screening process from cell-level data to final campaign results.
Integrate

Screener for HCS is designed to manage all your high content screening data, easily handling complete assays with hundreds or thousands of plates at 5, 50 or 500 HCS features per well at single-cell resolution. Load image analysis results directly from Genedata ImageXpress or import data from any major commercial and open-source HCS image and data management systems.

Screener for HCS serves as the single point of reference for downstream applications, providing complete access to HCS data, images, and results regardless of instrument, image store, image analysis software, or geographical location.

Condense

Detailed analysis of cellular populations and their changes is the goal of all cell-based assays, as the overall response comprises each individual cell’s response within the well.

Screener for HCS summarizes individual cell populations to results per well. Its versatile calculation framework enables scientists to interactively tailor such summarization with any changes triggering immediate re-calculation of results. Flexible annotation and filter rules ensure that hits are easy to find and confirm.

Limitless numbers of features can be processed and compared in parallel through automatic generation of statistically significant feature combinations, helping you to navigate complex high content screens.

Analyze

Screener for HCS uses the full depth of single-cell data to generate more biologically significant results from high content screens. Screener for HCS supports:

- Quality control on cell- and well-, plate- and assay-summary data
- Population definition and aggregation
- Exploration of feature correlation
- Calculation and correlation of potency and phenotypic change
- Multi-feature compound ranking and hit list generation

Review phenotypic changes in the raw images throughout the analysis, look for biological events, and optimize the sensitivity of the analysis, all to make sure that the numbers reflect biological reality.

Visualize

Images are the cornerstone of HCS quality control and data interpretation. With Screener for HCS, high-resolution images can be instantly displayed next to your results. Having images so close at hand enables immediate relation of numerical findings to their underlying images and helps differentiate between biological effects and technical artifacts.

Cell density plots and scatterplots aid in the definition, optimization, and validation of the processing, and by filtering and annotating the results of interest, only relevant data is submitted to downstream analysis.

Overlay and compare plots from different wells, and easily export any results, numerical or visual, into standardized and customizable reports.

Store

As the size of HCS campaigns continues to grow, scalability increasingly depends on properly managing the resulting data volumes. With Screener for HCS you can:

- Establish a central image store and connect to image analysis software
- Browse and query for images using metadata from different experiments and HCS platforms
- Maintain full access control via authorization and authentication
- Set up routine maintenance tasks with a low maintenance overhead

Screener supports campaigns starting from the moment data originates, through analysis and interpretation, to reporting results to their final destination. All this while controlling data integrity and access throughout the entire workflow.

Solution of Choice

The world's top pharma and contract research organizations rely on Screener for HCS for a streamlined high content analysis. Screener manages massive, multi-featured HCS data, and uncovers relevant features with powerful analysis methods.

With a small footprint and easy setup, Screener for HCS complements existing R&D data analysis pipelines, addresses specific HCS challenges and feeds HCS results back into the main discovery data stream. Furthermore, Screener for HCS makes high content analysis accessible beyond the screening laboratory.

Supporting all plate-based screening, Genedata Screener improves screening productivity, eliminates redundancies, and drives innovative research.

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View from an HCS Campaign Analysis

(FIG. 1) A) The Plate Lens displays the calculated effect per well in the selected plate, showing trends and interesting or suspicious results. Wells can be selected and the corresponding images shown in the Well Table (D).

B) The Cell Density Plot overlays the distributions of a measured feature across a cell population for selected wells. Here, a compound of interest (gray) is compared to a stimulator control (purple) and a neutral control (orange), showing that the compound most resembles the stimulator control.

C) Cell populations can be defined and analyzed by simple or cascaded one- or two-dimensional gating. Here, a population has been defined and stored using polygonal gating in a 2D scatterplot.

D) The Well Table shows images from different channels and fields side by side, here the nucleus, neuronal, and overlay images. It allows e.g. validation of a hit list against the underlying cell images. Depending on the image management infrastructure, image size, contrast stretching, and field or mosaic montage are available.

Overview of All HCS Features

(FIG. 2) All features that have been measured in a high content screen are automatically grouped in the Layer-Dendrogram according to their similarity and transformed with principal component analysis (PCA) to find correlations, facilitating both the selection of relevant features for e.g. biactivity and the identification of outlier wells.

Images Next to Results

(FIG. 3) Results and images from within and across layers can be plotted and shown together. A) The Plate Lens can display either numerical values or the HCS images, here with several dose response series and an obvious artifact visible. B) The images can also be arranged next to the results, making it easy to confirm or refute promising or suspicious results. C) Hit results can be shown side by side and plotted together.
Genedata Screener

Genedata Screener analyzes, visualizes, and manages screening data from in-vitro screening assay technologies across the enterprise, including very complex as well as ultra-high throughput experiments. Its screening-oriented business logic enables rapid processing and comprehensive analysis of complete campaigns.

Services and Support

Genedata offers a range of services and support, from installation and customization of Screener to global roll-out support, training, data analysis, application consulting and IT consulting services, all tailored to the specific needs of your organization. Our services team consists of highly skilled professionals with extensive domain knowledge in screening and software technology, bringing specialized know-how and experience to your organization.

Experienced Partner

With more than a decade of experience in industrial screening data analysis and global enterprise deployments of Genedata Screener, Genedata is an ideal collaboration partner for companies wanting to advance their screening operations. In addition to the steadily evolving Screener platform, Genedata offers extensive opportunities for custom or co-development of specific new functionalities, procedures, or methodologies to support your current and future needs.

Next Steps

To find out more about Genedata Screener, please visit www.genedata.com/screener.

For a conversation about your screening analysis needs or to schedule a live demonstration, please contact us at screener@genedata.com.