

The ACQUIFER PlateViewer: A tool for visualizing high content screening data and supervised feedback microscopy

Modern High Content Screening microscopes allow rapid automated imaging of entire microtiter plates by imaging fixed positions within each well. This is ideal for *in-vitro* cell culture based readouts or other assays with evenly distributed phenotypes. However, it imposes limitations when large specimen or rare events are studied. The limited field of view of objectives often force users to utilize low magnification lenses leading to low resolution data or accept the omission of features of interest in many wells.

For **tissue specific imaging** in large specimen (e.g. zebrafish) a more complex approach is required in order to automatically identify and zoom in on the tissue or organ of interest. Automated tissue detection often demands the development of sophisticated image processing routines. Therefore, each project needs careful balancing between software development time and project size.

Semi-automated approaches offer an ideal compromise, as they only require minimal user interaction and no algorithm development times. Even complex or variable structures which often would require months of image detection routine development can be readily handled this way. Therefore, screening projects can instantly start thus saving time and resources.

The **ACQUIFER PlateViewer** offers such a semi-automated approach for supervised feedback microscopy. Low-magnification pre-screen data of a full microtiter plate is visualized in a plate specific manner providing a quick overview. The integrated '**Click-Tool**' functionality allows assay experts to select regions of interest for each well. This can be complex reporter expression patterns, morphological features or rare events in each well. The **ACQUIFER Imaging Machine** automatically acquires data at high resolution from selected regions according to predefined settings. Acquired high resolution data is then also readily and **intuitively visualized** in the ACQUIFER PlateViewer.

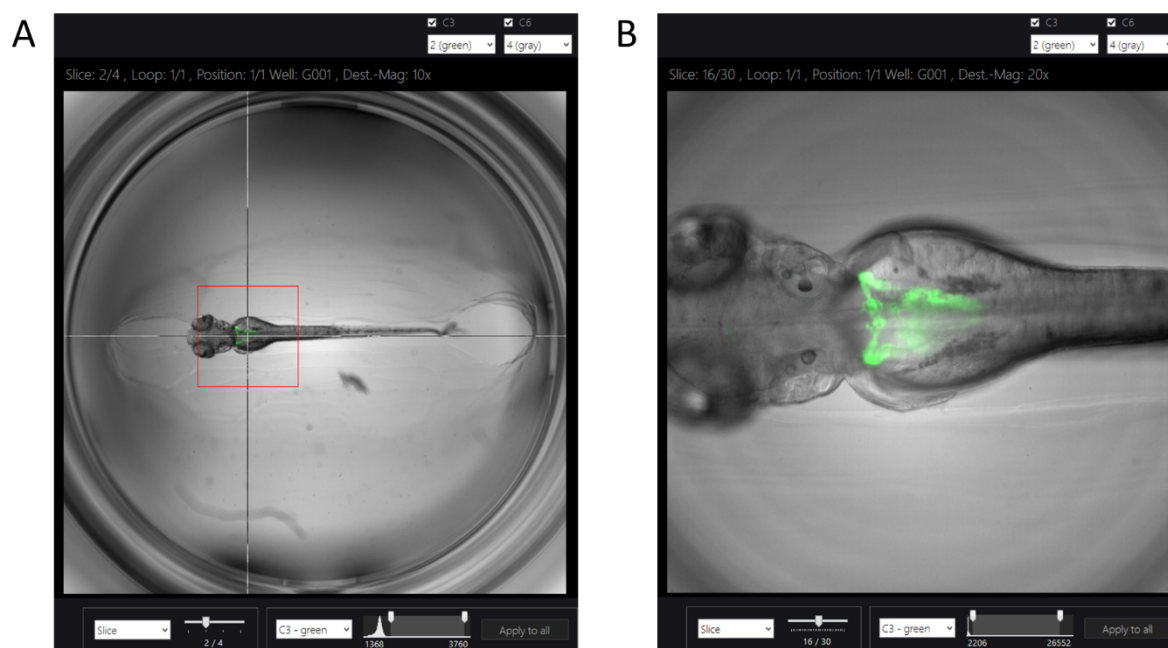


Figure 1: Illustration of Click-Tool functionality. (A) Zebrafish embryo imaged with a 2x objective and visualized in the ACQUIFER PlateViewer. The crosshair is centered on the GFP positive kidney in a 3 day old embryo of the *Tg(wt1b:gfp)* transgenic line. The red bounding box indicates the field of view of a 10X objective used for subsequent high resolution imaging. (B) Single z-plane of a high resolution dataset automatically acquired on the ACQUIFER Imaging Machine.

The ACQUIFER PlateViewer is an easy-to-use tool for supervised feedback microscopy simplifying complex high content screening experiments on the ACQUIFER Imaging Machine.

ACQUIFER PlateViewer Features:

- Select regions of interest to be automatically imaged by a simple mouse click
- Preview field of views of higher magnification objectives using an adjustable bounding box
- Intuitively visualize and browse even very large scale screening datasets
- Readily navigate through complex multidimensional datasets
- Apply LUTs and overlay channels for improved manual inspection
- Adjust basic image parameters to enhance visualization of details

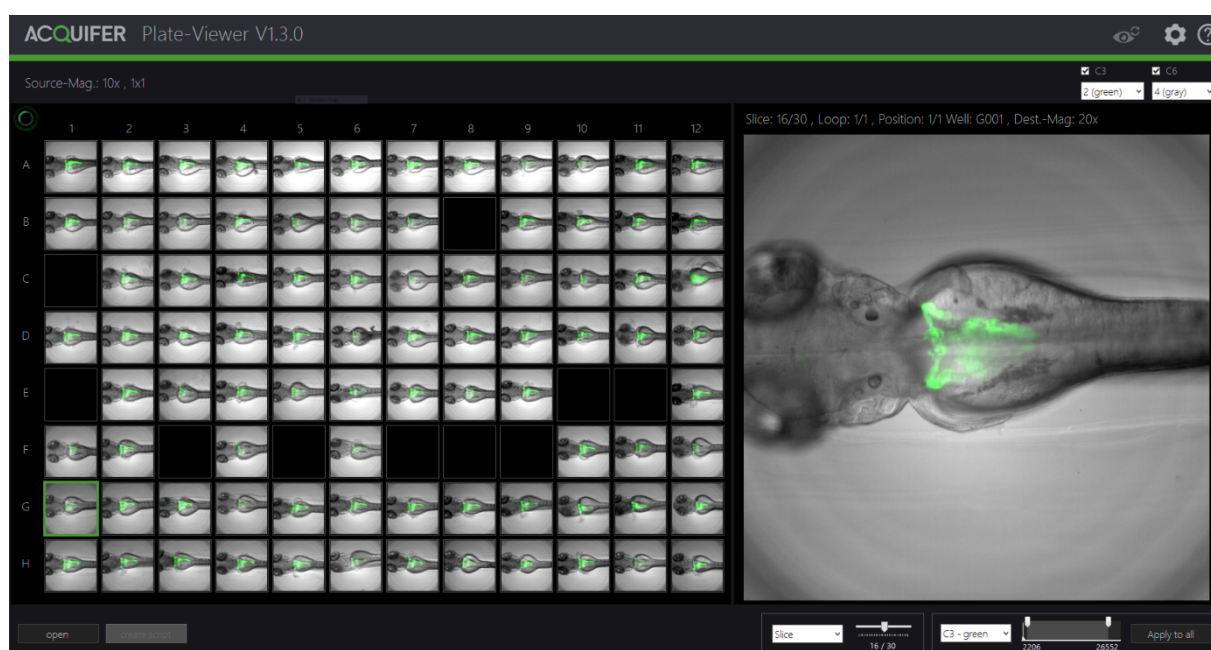


Figure 2: Overview of ACQUIFER PlateViewer functionalities. The left panel shows the visualization of identical planes of all available wells within a microtiter plate. Black fields indicate well coordinates not imaged. The right panel shows a preview of the currently selected well coordinate. Control panels in the top right upper corner allow the generation of coloured overlay images and the selection of channels to be displayed. Control panels in the right lower corner allow adjusting the histogram in a channel specific manner and to choose the mode of navigation through multidimensional datasets (i.e. Slice, Loops or Subpositions). In the left lower corner new screening experiments can be loaded and the generation of high resolution jobs for the ACQUIFER Imaging Machine can be triggered.

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