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## Current and Future Applications of Automated Microscopy in Biotechnology and Drug Discovery Research

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Image and video have become established sources of information that document the rich complexity of biological phenomena such as cell division and death, gene function, morphogenesis and behavior displayed by cells and tissue in culture, by plant or animal model organisms.

Translation of image content into numbers that quantify biological phenomena and modulating effects of drug candidates are key tools known as high information content screening (HICS) or cell-based screening. The repetitive nature of microscopic observation (and scoring) has been replaced by mechanization of the microscope and of the image capture and image analysis process. .

This trend from simple, single (biochemical) endpoint assays to complex multi-endpoint reading of a wider variety of features in cells or multicellular models has led to a growing need for microscopic readers with better integration of the dimensions space and time with a novel blend of precision, sensitivity, flexibility, speed and automation.

MAIA SCIENTIFIC has a focused research and development plan that aims at increasing the quality of image-based screening as well as broadening its applicability across the R&D value chain of biotechnology and drug discovery companies.

Examples shown will include (1) image capture and analysis of ultra-weak fluorescent signals produced by low abundance proteins in cells or by reporter proteins under the control of weak gene promoters; (2) full automation of cell culture and cloning processes by recurrent automated unlabeled, live cell analysis inside a cloning robot. Finally, examples will be given of early stage R&D projects that aim at creating novel instrumentation, software and bio-assays that facilitate the introduction of nanotechnology and microsystems into high content bioresearch.