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For Immediate Release:
June 23, 2015

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Flow Cytometry: Impact on Early Drug Discovery

CHICAGO – A new review article published in the July 2015 issue of the *Journal of Biomolecular Screening* (JBS) documents advances in technology over the last decade that have dramatically reversed the shortcomings of flow cytometry for sample processing, enabling primary target-based and phenotypic screening applications for cells in suspension in which tens-of-thousands of compounds can be analyzed in a single day.

The review, entitled "Flow Cytometry: Impact on Early Drug Discovery," is authored by Bruce S. Edwards, Ph.D., and Larry A. Sklar, Ph.D., of the Center for Molecular Discovery, Innovation Discovery and Training Center, Health Sciences Center, University of New Mexico, Albuquerque, NM (USA).

According to the authors, modern flow cytometers can make optical measurements of ten or more parameters per cell at tens-of-thousands of cells per second and over five orders of magnitude dynamic range. Despite this unparalleled speed and content for single cell analysis, flow cytometry has long been discouragingly slow when it came to processing multiple samples.

New high-multiplexing capabilities of flow cytometry make it possible to analyze multiple biological targets in parallel without appreciably impacting sample analysis time. Together, these capabilities facilitate high-content compound profiling at the earliest screening stages, streamlining compound prioritization with respect to features such as target specificity and off-target effects. The ability to sample small volumes with negligible waste reduces reagent costs and compound usage, and makes quantity-limited sources of cells more accessible to testing against a broad array of compounds.

Flow cytometry excels in high-content analysis of cells adapted for growth in suspension such as mammalian leukocytes and commonly used experimental model organisms such as yeast and bacteria. Because of complexities of working with cells in suspension, other widely used single cell screening technologies like high-content imaging focus almost entirely on cells with adherent morphology. Flow cytometry, therefore, offers a complementary approach for early phase, single cell screening of otherwise underrepresented categories of cells.

Also included in the review are recent advances in flow-based imaging and mass spectrometry that have dramatically expanded the numbers and types of measurements that can be made simultaneously on single cells. Such technological innovations offer opportunities for pathway-based compound profiling applications of unprecedented depth and complexity to help usher in systems level approaches to drug discovery.

JBS is one of two MEDLINE-indexed scientific journals published by the Society for Laboratory Automation and Screening (SLAS). Visit JBS Online at jbx.sagepub.com to access "Flow Cytometry: Impact on Early Drug Discovery." For more information about SLAS and its journals, visit www.slas.org/jala-jbs.

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The Society for Laboratory Automation and Screening (SLAS) *is an international community of more than 15,000 individual scientists, engineers, researchers, technologists and others from academic, government and commercial laboratories. The SLAS mission is to be the preeminent global organization providing forums for education and information exchange and to encourage the study of, and improve the practice of laboratory science and technology. For more information, visit www.SLAS.org.*

SLAS publishes two internationally recognized, MEDLINE-indexed journals, now in their 20th year of publication. ***The Journal of Laboratory Automation (JALA)*** *and* ***Journal of Biomolecular Screening (JBS)*** *uniquely serve laboratory science and technology professionals who work primarily in life science R&D. Together, JALA and JBS address the full spectrum of issues that are mission-critical to this important audience, enabling scientific research teams to gain scientific insights, increase productivity, elevate data quality, reduce lab process cycle times and enable experimentation that otherwise would be impossible.*

Specifically, ***JALA*** *explores ways in which scientists adapt advancements in technology for scientific exploration and experimentation. In direct relation to this,* ***JBS*** *reports how scientists use adapted technology to pursue new therapeutics for unmet medical needs, including assay development, identification of chemical probes and target identification and validation in general.*

Journal of Biomolecular Screening (JBS): *2013 Impact Factor 2.012. Editor-in-Chief Robert M. Campbell, Ph.D., Eli Lilly and Company, Indianapolis, IN (USA).*

Journal of Laboratory Automation (JALA): *2013 Impact Factor 1.500. Editor-in-Chief Edward Kai-Hua Chow, Ph.D., National University of Singapore (Singapore).*