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Automating DNA Damage Assays Using Multi-Spectral Imaging Flow Cytometry

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Abstract

Several well-established *in vitro* assays (e.g. micronucleus (MN) and γ-H2AX), exist for evaluating DNA damage in a number of disciplines including genetic toxicology and radiation dosimetry. Visual microscopy and conventional flow cytometry techniques to score these assays have been developed, but current techniques have several limitations that can hinder throughput and accuracy. It has been demonstrated that many of the Luminex® technology platforms possess the potential to overcome these limitations and to create multiplexed assays to examine several endpoints within a single assay.

The ImageStream® imaging flow cytometry platforms combine the speed and statistical robustness of conventional flow cytometry with the high resolution fluorescent imagery of microscopy to provide detailed cellular level data. All captured imagery is saved to dose-specific data files that can be evaluated within a custom-designed software package using mathematical algorithms to implement specific scoring criteria (e.g. within the MN assay). Furthermore, this image data permits evaluation by newly developed artificial intelligence software packages from Luminex®, allowing the creation of flexible, robust and application specific models for data analysis.

During this seminar we will provide an overview of the adaptation of several well-stablished DNA damage assays to automated methods using the Luminex® flow cytometry platforms. A number of solutions pertinent to genetic toxicology will be discussed in detail, demonstrating the potential of our portfolio to provide 21st century solutions.