Development of ImageStream technology was partially supported by NIH grants for bone marrow transplantation. Presented is the high throughput quantitation of aneuploidy in amplification and translocation associated with cancer, and detection of residual disease after treatment. Applications include the detection of aneuploidy in sperm and other cell types, detection of gene sequence data with physical mapping to chromosomal regions and DNA abnormalities associated with cancer. Techniques for performing qPCR are being used to further enhance the platform's capabilities.

Fluorescent In Situ Hybridization In Suspension Analysis Using ImageStream® Multispectral Imaging Flow Cytometry

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Abstract

Amnis Corporation has developed a novel technology (ImageStream®) that utilizes high throughput cytometry to image and analyze whole cells as they are processed in a single step. This technology has been used in a number of applications, including the quantitation of DNA content, gene expression, and post-translational modifications. The use of ImageStream technology allows for the rapid analysis of large numbers of cells, providing powerful tools for the study of cellular biology.

Introduction

In several ways, the development of in situ hybridization has contributed greatly to our understanding of molecular biology. One of these ways is the use of detecting hybridization signals on cells to identify and locate specific DNA sequences. The development of this technology has been facilitated by the use of fluorescent dyes and the application of a variety of techniques, including FISH and in situ hybridization. The use of ImageStream technology has allowed for the rapid analysis of large numbers of cells, providing powerful tools for the study of cellular biology.

Figure 1: The ImageStream Architecture

- Figure 2: Fluorescent In Situ Hybridization in Suspension Analysis Using ImageStream (FISH-IS) Protocol in Somatic and Germ Cells

- Figure 3: Multispectral Flow Imagery of Jurkat Cells Hybridized with a 7 Chromosome Probe

- Figure 4: Segregation of Object Populations Using Brightfield Imagery

- Figure 5: Fluorescent Spot Analysis in Human Sperm

- Figure 6: Segmentation of Objects in Suspension Using ImageStream

Conclusion

This technology demonstrates the utility of the ImageStream® technology for in situ hybridization. The ImageStream® technology allows for the rapid analysis of large numbers of cells, providing powerful tools for the study of cellular biology. The use of this technology has been facilitated by the use of fluorescent dyes and the application of a variety of techniques, including FISH and in situ hybridization.