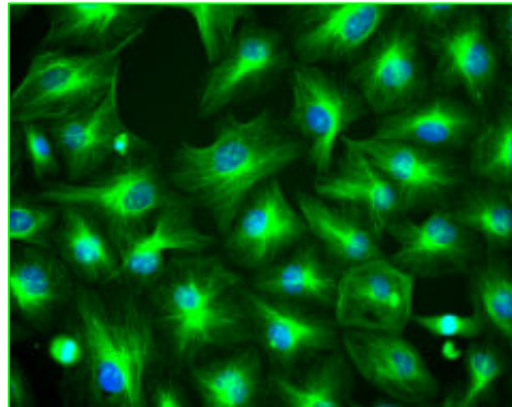


Cell-Based Imaging and Analysis: An Extremely Bright Future



Executive Summary

Summary

Overall, *Cell-based Imaging and Analysis: An Extremely Bright Future* shows us a market using the most current technologies: including fluorescent detection, confocal and inverted microscopy, as well as more traditional methods such as light microscopy. The use of assays and cell culture also remains an important aspect of cell-based imaging. Within the next year, 21% of the researchers surveyed have plans to purchase both hardware and software for cell-based imaging. As they select their products and suppliers, customers are likely to weigh a number of factors, most notably technical support and price. While suppliers may use their own history and brand reputation in courting customers, these survey results show that successful suppliers will not rely solely on their history, but will demonstrate a strength of service and support as well as fair pricing. In so doing, suppliers and customers can not only move into the future of cell-based imaging together, but can assist one another in making great leaps of understanding.

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Introduction

Imaging lies at the heart of much of life science research. Tools and techniques for visualizing, capturing, storing and analyzing cellular images have resulted in a more thorough understanding of how biological processes work at both the cellular and sub-cellular level. This is in part due to technological advances that have shaped new instruments and reagents that enable researchers to take a more detailed look not only at cells and organelles but even at some of the chemical events occurring inside them. Ulrich Simon, executive vice president and general manager of the microscopy business group at Carl Zeiss, believes that two relatively recent technological advances in particular stand out. "Fluorescence and 3-D imaging," says Ulrich, "can be used to answer which gene or protein is related to which disease. It's an exciting move."³

Fluorescent dyes have allowed scientists to label, image, sort and study cells and intracellular components like never before. Whether coupled to an antibody to identify cell surface markers or used as a calcium indicator to identify calcium fluxes in neuronal cells, fluorescent dyes allow the visualization of cellular behavior. And when used in conjunction with a technology such as confocal microscopy, the power to dissect cellular physiology, determine responses to lead compounds and understand the underlying mechanisms of disease become possible.

With a strong history behind it, the field of cell-based imaging continues to develop and expand. According to Barbara Armbruster, assistant product manager at JEOL, "The field of cell biology is in a revolutionary phase during which great leaps of understanding can be achieved."⁴ It is the goal of this survey to assist suppliers in making these leaps of understanding with their customers by helping them to understand the practices and tools being used by researchers today. Inquires regarding future purchases and brand recognition will further add to our understanding of the cell-based imaging market.

Methodology

The *Cell-based Imaging and Analysis: An Extremely Bright Future* was administered on-line between November 8 and 12, 2004. Survey invitations were sent to scientists from Biocompare's online community who expressed interest in cancer research, cell biology, immunology or neuroscience. The survey was completed by 698 scientists.

The survey consisted of 19 closed-ended questions. Three of the questions included "other" as a response option, with space provided for the respondents to add the answer specific to their research.

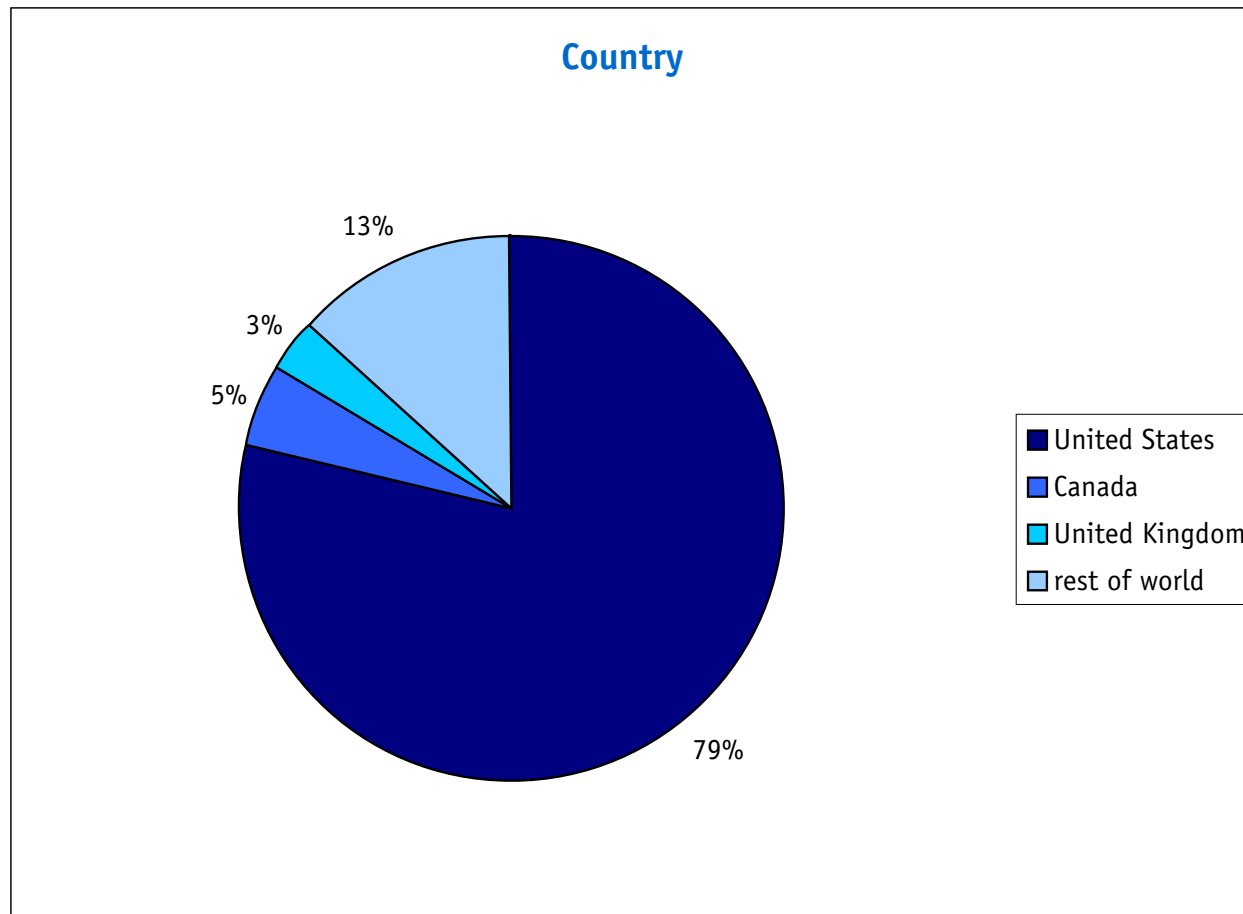
Demographic information was evaluated from answers to 4 questions within the survey and from addresses provided by the respondents.

Where appropriate, comparisons are made to the 2003 Cell Based Assays⁵ and 2003 Neuroscience, Microscopy, Imaging and Image Analysis⁶ Surveys.

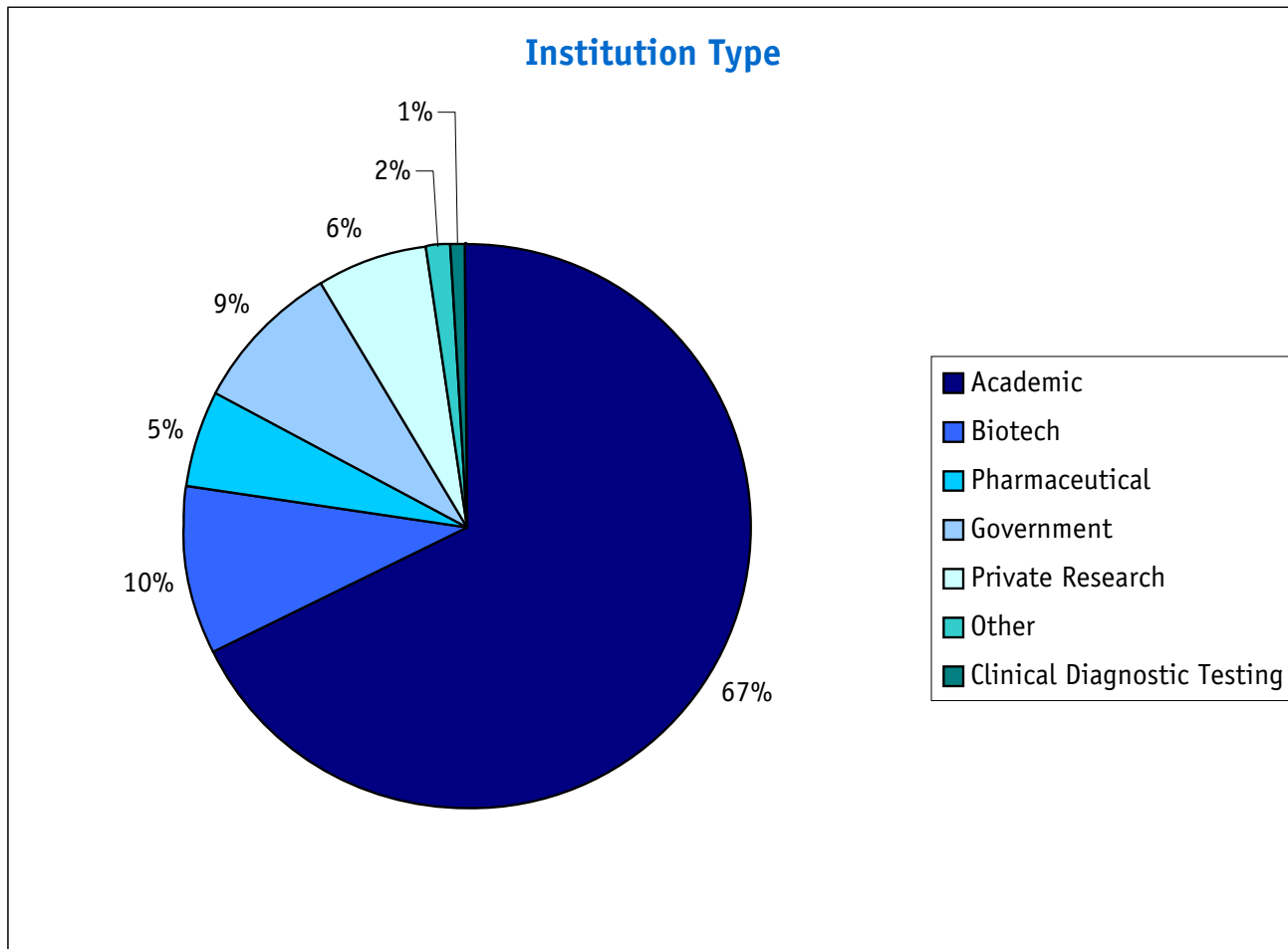
Results:

Demographics

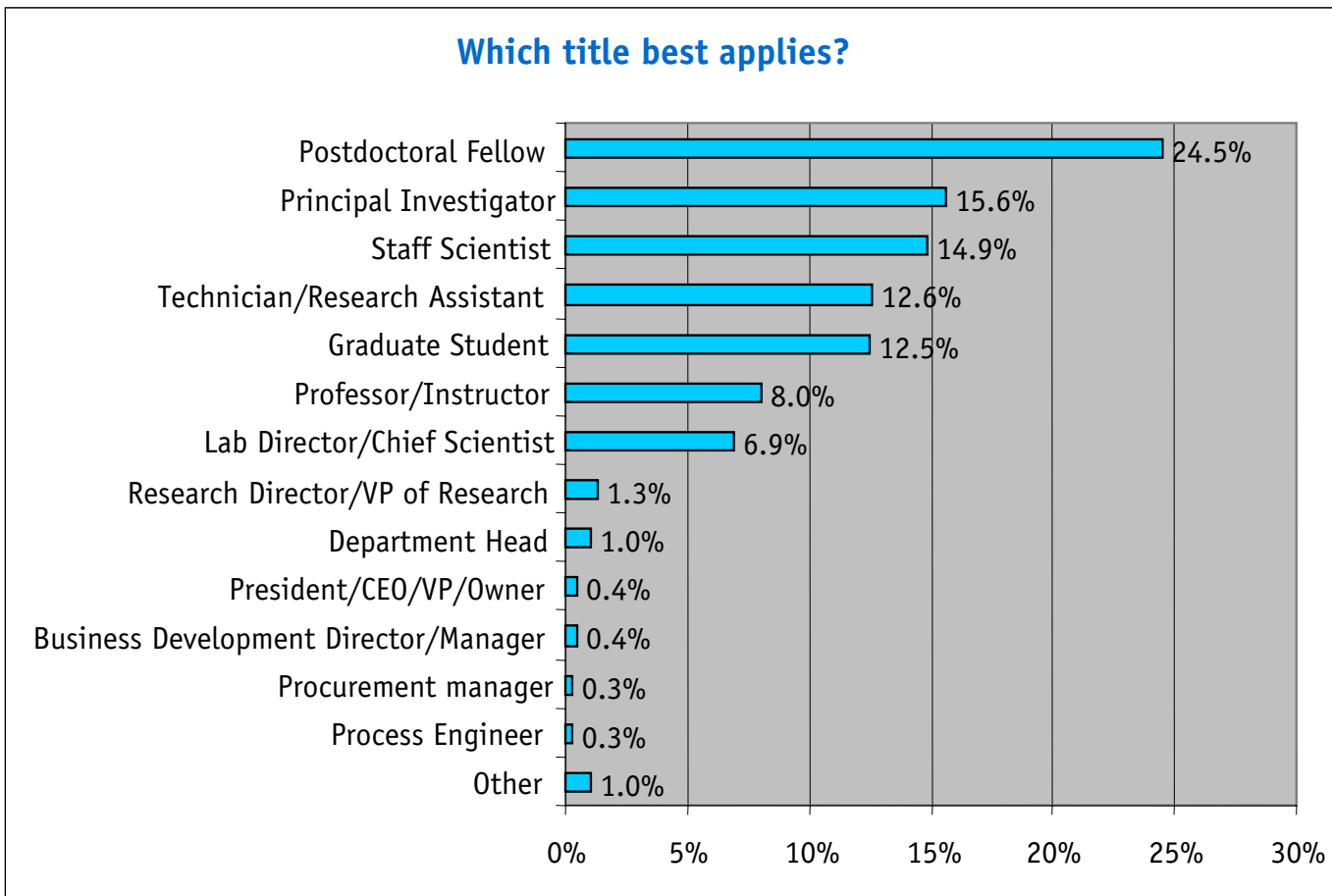
79% of respondents were in the United States.



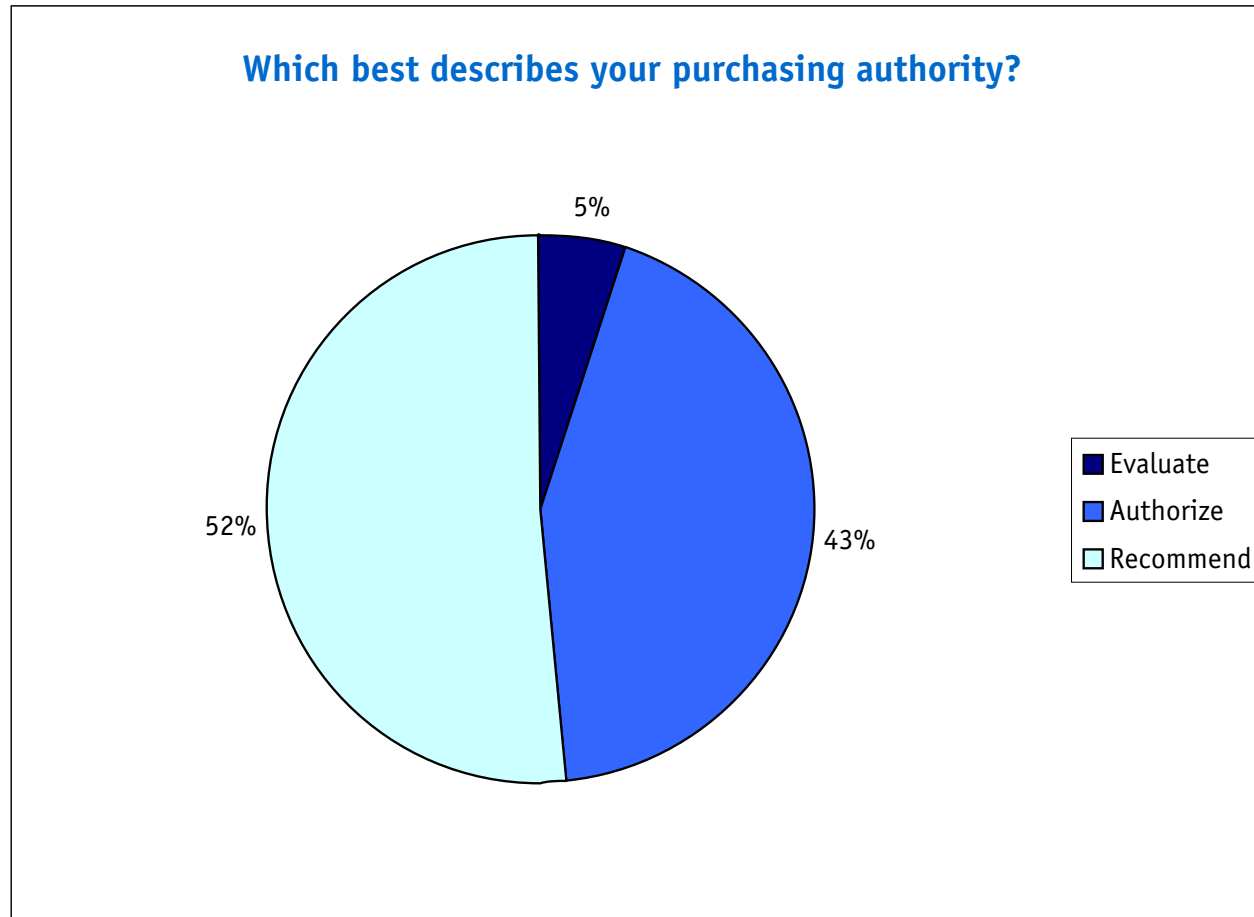
67% of respondents worked in academic institutions, another 15% worked in either biotech or pharmaceutical companies and 9% were at government laboratories.



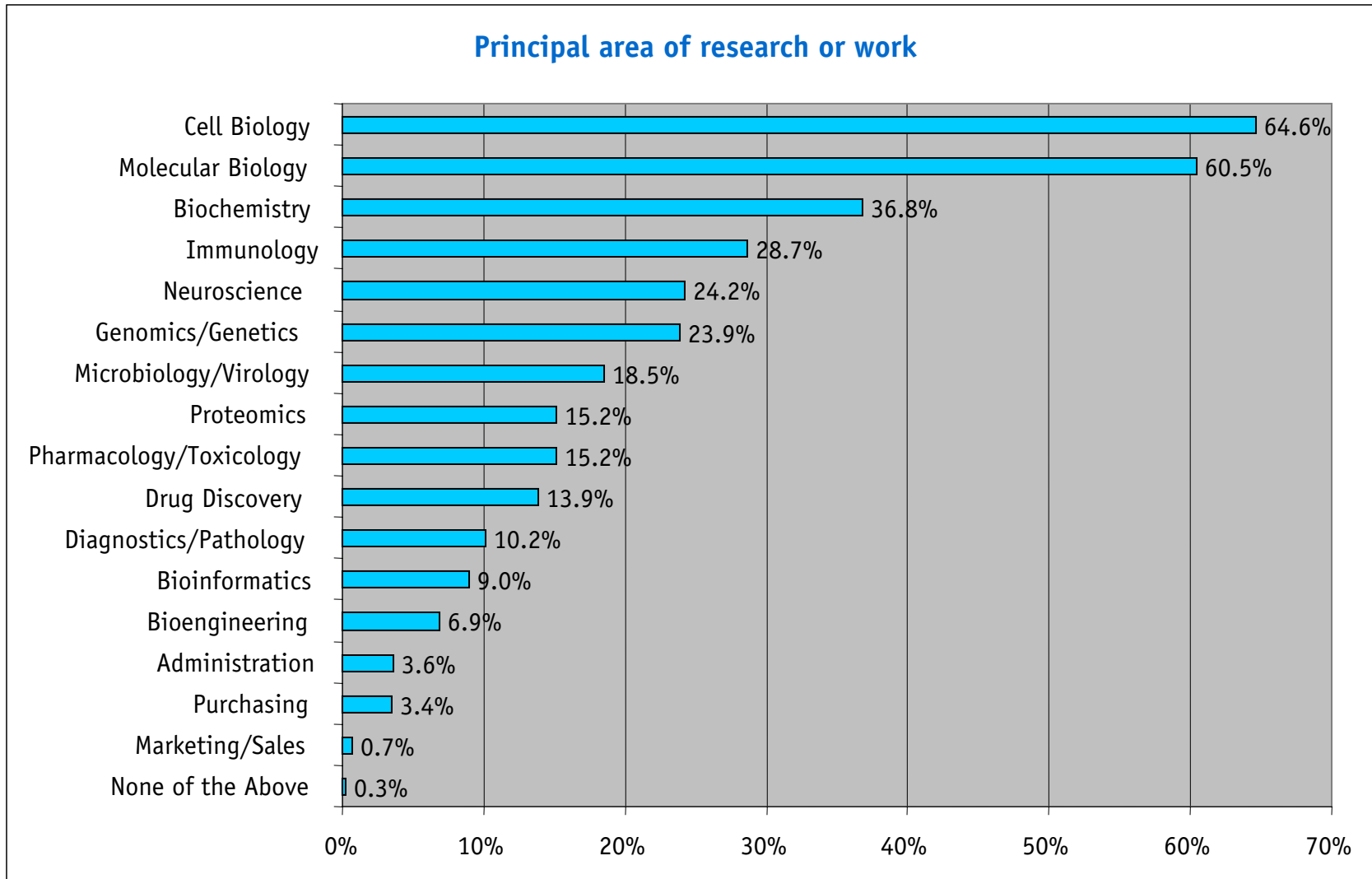
80% of respondents worked at the bench.



95 % of respondents either authorized or recommended purchases.



Over 60% of respondents identified either Cell Biology or Molecular Biology as their principal area of research or work.



Results:

Cell-based Imaging

For what are you currently using cell-based imaging? *

- Basic Research
- Lead Characterization
- Drug Screening
- Clinical Diagnostics
- Forensics
- Target Validation

Are you currently using or planning to use any of the following?

- plan to use
- High Content Screening
- In-vivo Digital Imaging
- Confocal Microscopy
- Light Microscopy
- Fluorescent Microscopy

Which of the following cell-based assays do you currently use? *

- Phosphatase Assays
- Cell-based Absorption Assays
- Hormone Assays
- Cell Signaling Assays
- Phosphodiesterase Assays
- Cell Motility/Morphology Assays
- Apoptosis Assays
- Diagnostic Assays
- RNAi Assays
- Kinase Assays
- Membrane Potential Assays
- Ion Channel Assays
- Toxicology Assays
- Fusion Tag Assay Kits
- Cell Viability/Proliferation Assays
- Protease Assays
- Protein Translocation Assays
- Reporter Gene Assays

Do you prefer to use fixed or live cell assay formats? *

- Fixed
- Live
- Both

What types of cells do you use? *

- Epithelial-like cells
- Fibroblast-like cells
- Endothelial-like cells
- Hepatocyte-like cells
- Neuroblastoma
- Leukemia cells/lymphoblasts
- Melanoma
- Monocytes/macrophages
- Myotubes/myoblasts/muscle cells
- Keratinocytes
- Primary cells

What is your current throughput requirement for cell-based imaging? *

- Low (< 50 images at a time)
- Medium (50-500 images at a time)
- High (>500 images at a time)

Do you own or have access to any of the following systems?

- Multi-use CCD Imaging System
- Confocal Imaging System
- High Content Screening System
- Inverted Microscope Fluorescent Imaging System

Which of the following detection technologies do you use? *

- Labeled antibodies
- Fluorescent dyes
- pH sensitive fluorescent dyes
- Quencher dyes
- Radioactive labels
- Cell stains (e.g.. hematoxylin, eosin, etc.)
- FRET
- Quantum Dots (i.e. nanospheres)

How do you prefer to image your cells? *

- Slides
- Microplates
- Both

Which of the following imaging products do you plan to purchase in the next 12 months? *

- High Content Screening System
- Confocal Imaging System
- HCS Data Management Software
- Inverted Microscope Imaging System
- Multi-use CCD Imaging System
- Image Analysis Software
- Imaging System Software

Which of the following is most important when choosing a cell-based imaging system? *

- Complete technical support/training
- Journal references
- Knowledgeable field specialists
- Fast and reasonable repair service
- Brand name
- Colleague recommendation
- Friendly/helpful customer service
- Price
- Product specifications

Whom do you think of when you think of fluorescent microscopy? *

- Zeiss
- Leica
- Olympus
- Applied Precision
- Nikon
- Nikon
- Kodak
- Other (please specify)

Whom do you think of when you think of High Content Screening (HCS)? *

- Axon/Molecular Devices
- Cellomics
- GE Healthcare/Amersham Biosciences
- Bio-Rad
- Beckman Coulter
- Molecular Devices/Universal Imaging
- PerkinElmer
- Other (please specify)

Whom do you think of when you think of confocal microscopy? *

- Zeiss
- Nikon
- Biomedical Photometrics
- Leica
- PerkinElmer
- Other (please specify)

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