Challenges and Opportunities in Metabolomics – Results from MRG Survey Study –

Members:

Amrita K. Cheema - *Georgetown University*

Maryam Goudarzi - *Cleveland Clinic Lerner Research Institute*

Tytus Mak - *NIST*

Magnus Palmblad (EB Liaison) - *Leiden University Medical Center*

Reza Salek - *International Agency for Research on Cancer*

Ryan Sheldon - *Van Andel Institute*

Chris W. Turck (Chair) - *Max Planck Institute of Psychiatry*

Baljit Kaur Ubhi - *SCIEX*

The Association of Biomolecular Resource Facilities

Research • Technology
Communication • Education

Metabolomics is Concerned with the Simultaneous, Comprehensive Measurements of Small Molecules

Metabolomics is the comparative analysis of endogenous metabolites found in biological samples:

- ***Compare*** two or more biological groups
- Find and identify potential biomarkers
- Look for biomarkers of toxicology
- Understand biological pathways
- Discover new metabolites

Metabolites are the by-products of metabolism

- Range of physico-chemical properties
- Classes: Amino acids, Sugars, organic acids, fatty acids, lipids…

What are the chemical differences that result in the observable difference

Current Challenges in Untargeted Metabolomics

- ## Sample Prep
  - Not a uniform approach
  - Each approach needs to be validated across multiple studies
  - Variable preparation approaches can enhance extraction of certain groups of metabolites
- ## Multiple Computational Approaches and Software
  - Lack of standardization of analytical pipelines
  - Variability in peak picking algorithms
  - Varied normalization procedures
- ## Compound Identification
  - Incompletely annotated databases
  - MS/MS reference spectra

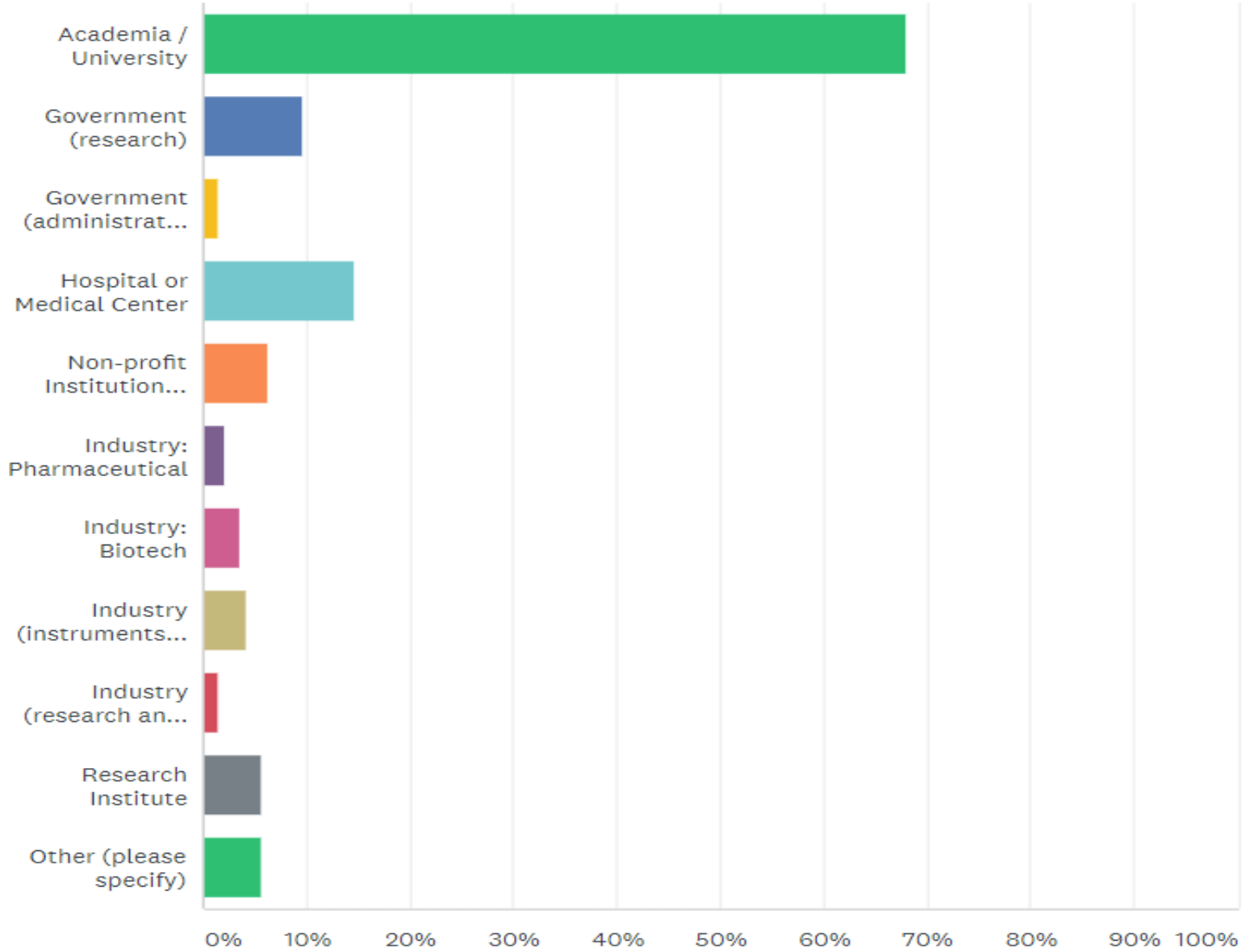
Goal of the MRG Survey Study

- Collect data on the current use of metabolomics technologies in core and research laboratories
- Assess the current level of interest in the field of metabolomics
- Gain insights into current practices and bottlenecks in the field
- Findings from the survey are intended to provide
  - guidance towards designing new studies and workshops
  - foster increased participation in ABRF activities

The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

Majority of responders were academic researchers

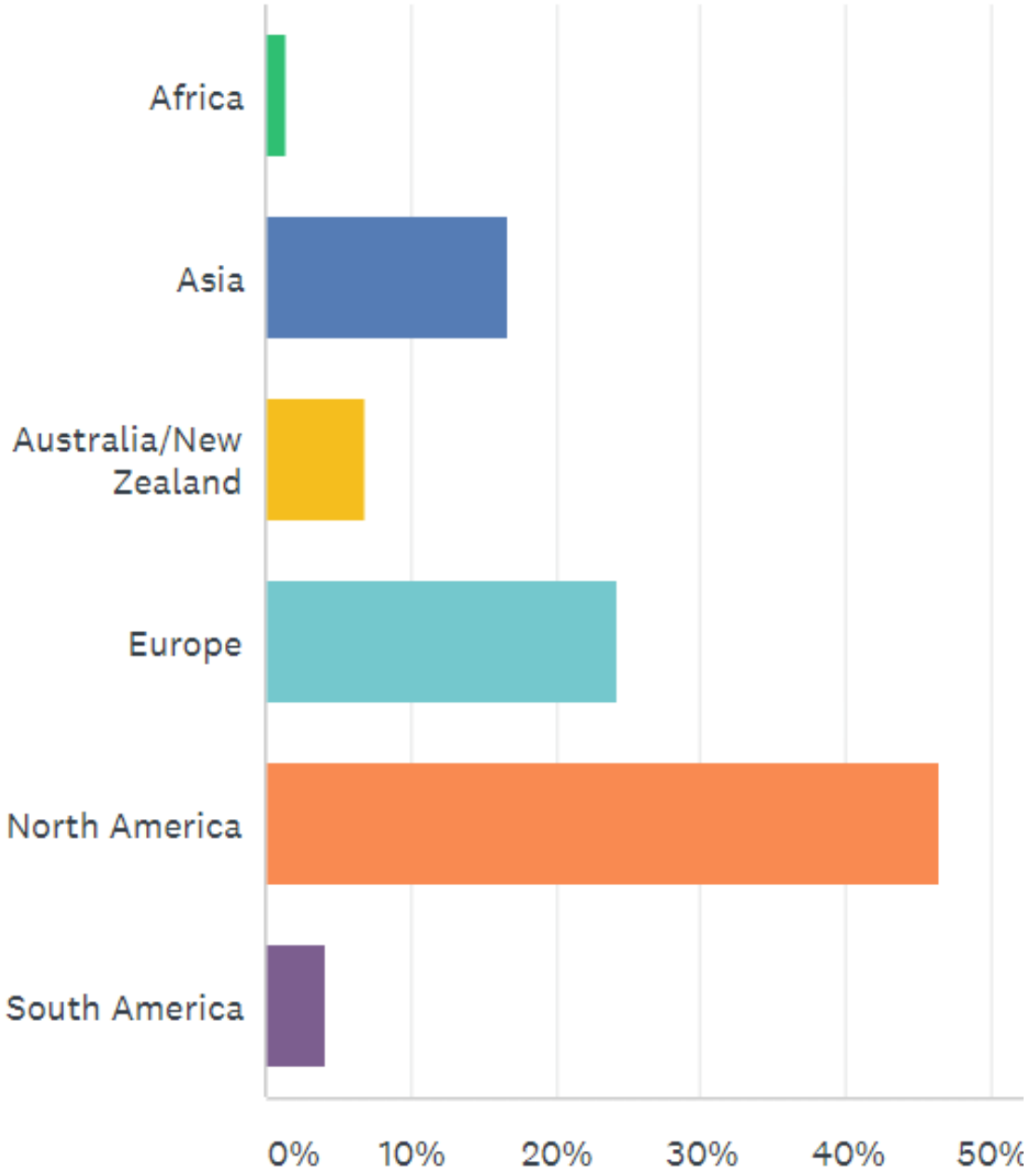
Academia / University	68.06%	98
Government (research)	9.72%	14
Government (administration)	1.39%	2
Hospital or Medical Center	14.58%	21
Non-profit Institution (other than academic)	6.25%	9
Industry: Pharmaceutical	2.08%	3
Industry: Biotech	3.47%	5
Industry (instruments, software, consumables and kits)	4.17%	6
Industry (research and development)	1.39%	2
Research Institute	5.56%	8
Other (please specify) Responses	5.56%	8
Total Respondents: 144		



The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

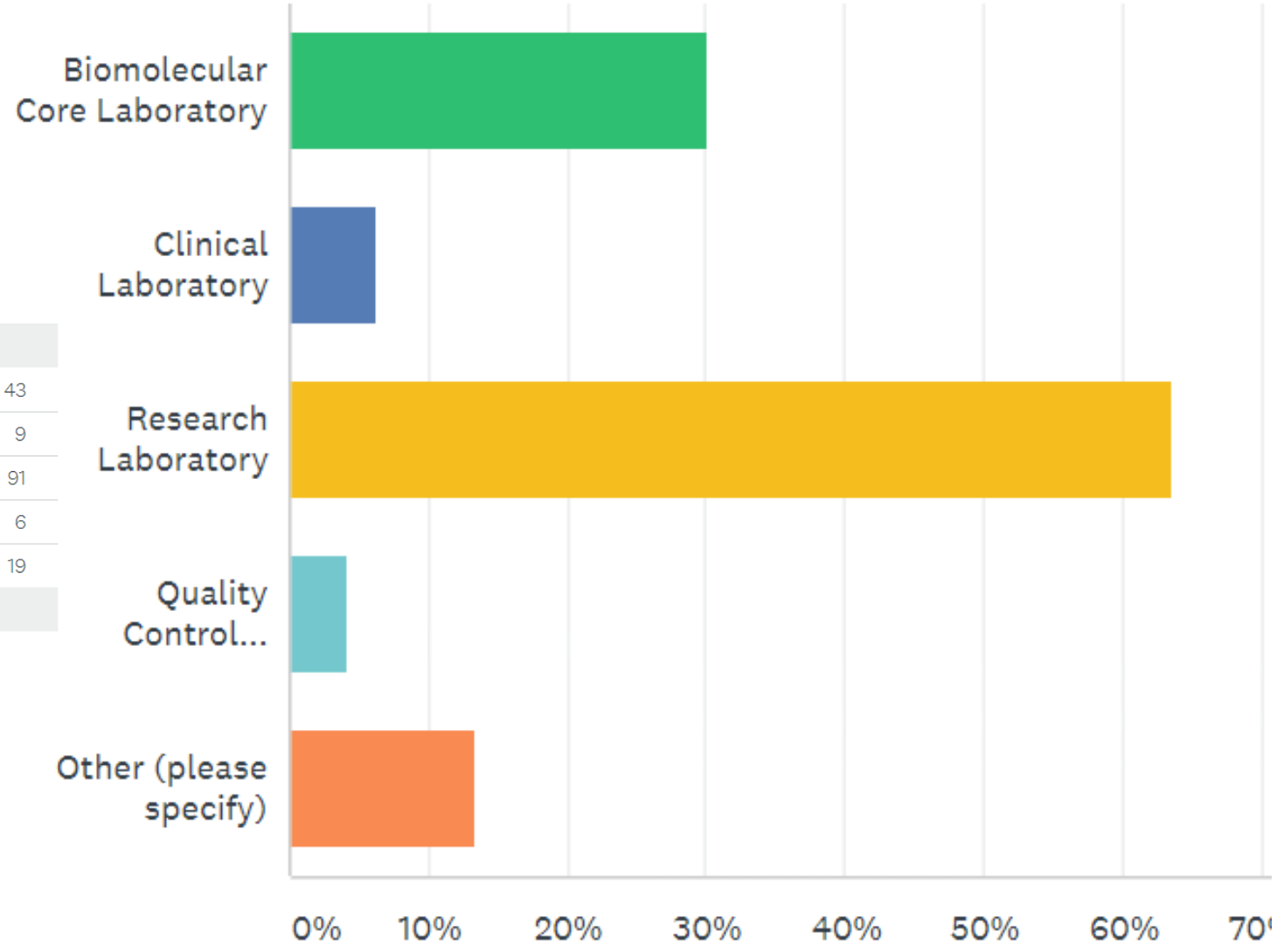
Geographical distribution of the survey responders

Africa	1.39%	2
Asia	16.67%	24
Australia/New Zealand	6.94%	10
Europe	24.31%	35
North America	46.53%	67
South America	4.17%	6
TOTAL		**144**



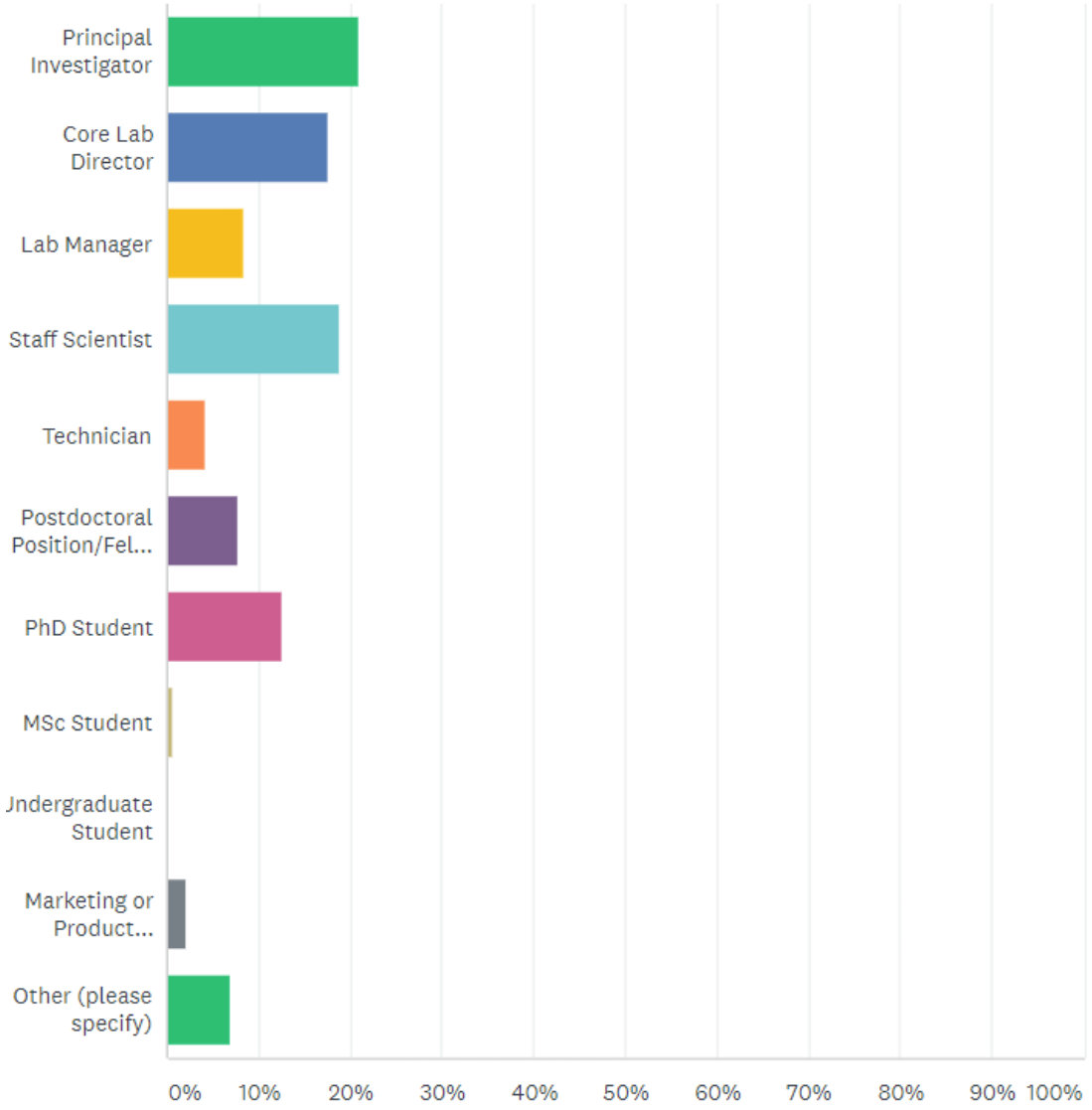
Majority of responders came from research laboratories

Biomolecular Core Laboratory		30.07%	43
Clinical Laboratory		6.29%	9
Research Laboratory		63.64%	91
Quality Control Laboratory		4.20%	6
Other (please specify)	Responses	13.29%	19
Total Respondents: 143			

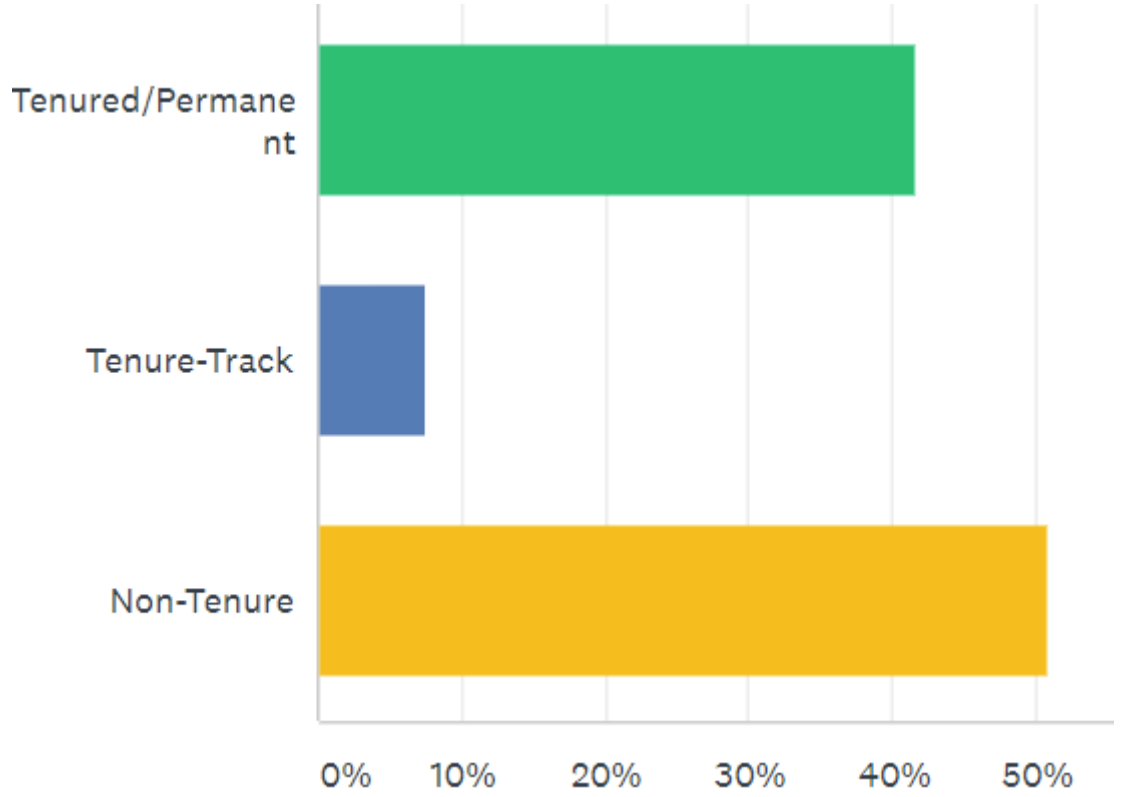


The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

What best describes your present position?



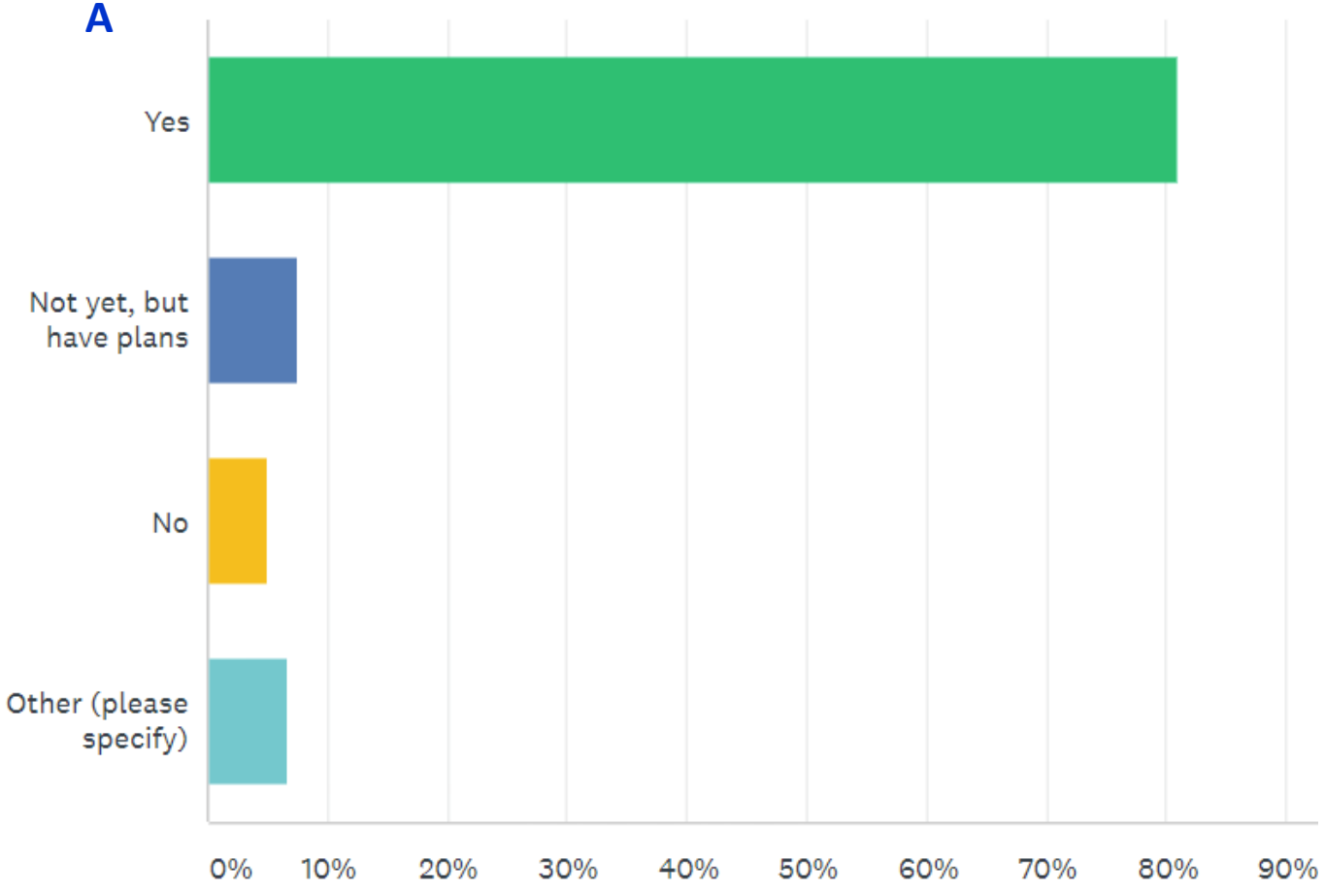
My present position is:



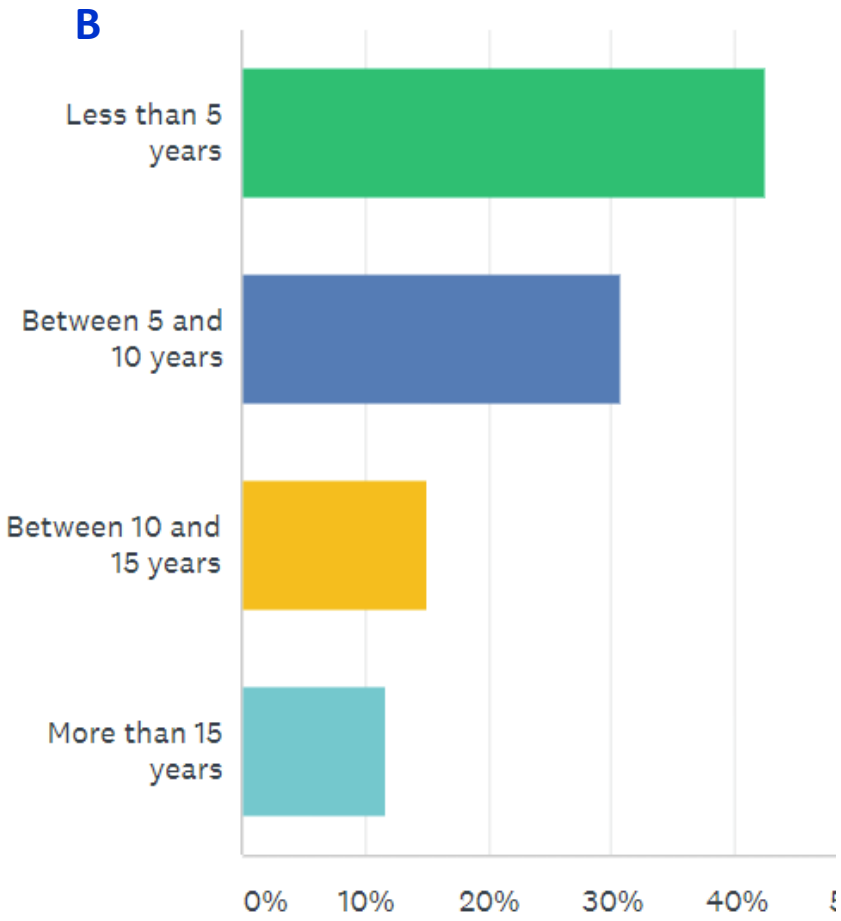
The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

A majority of the responders use metabolomics regularly for their research

A

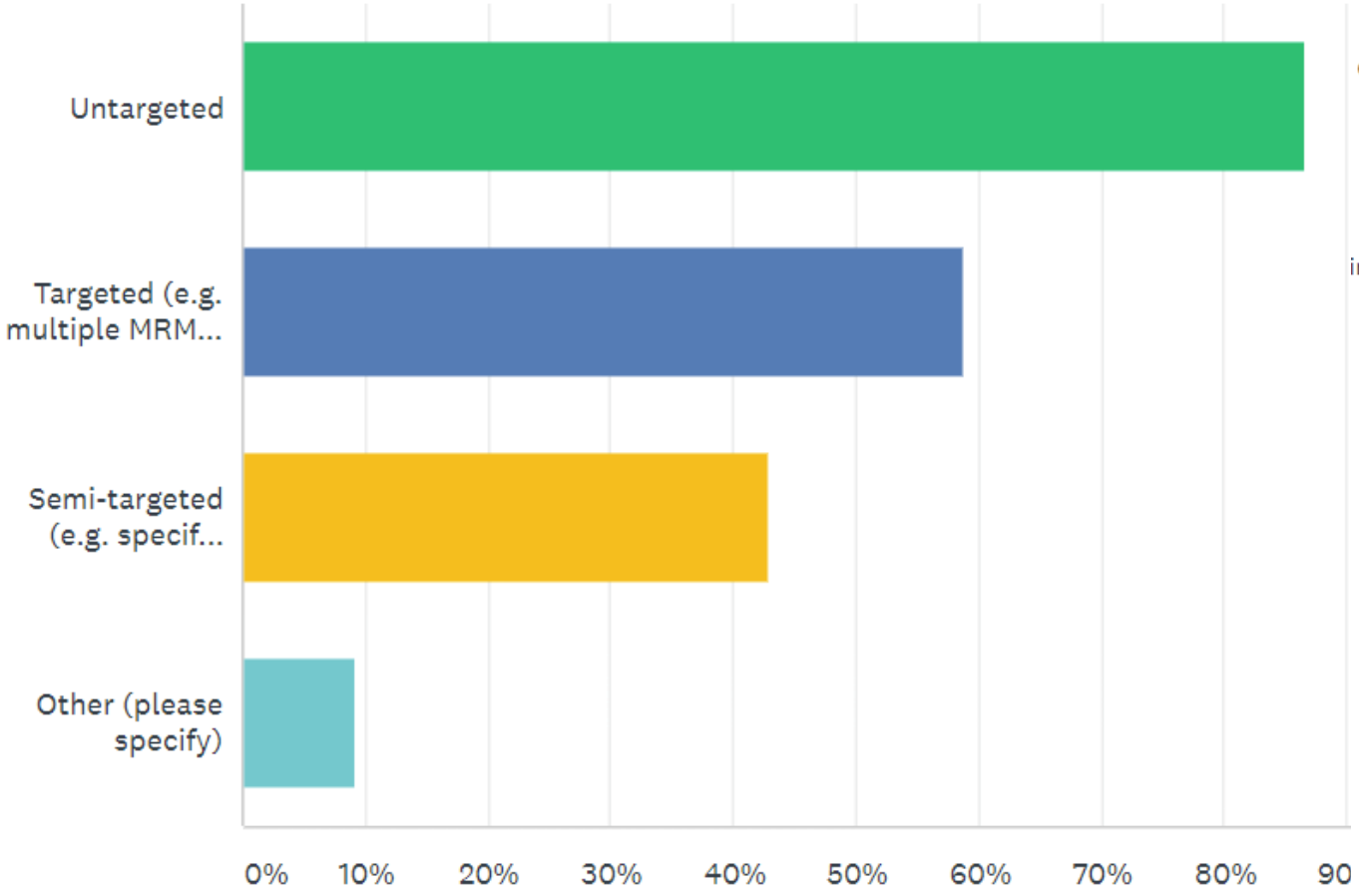


B

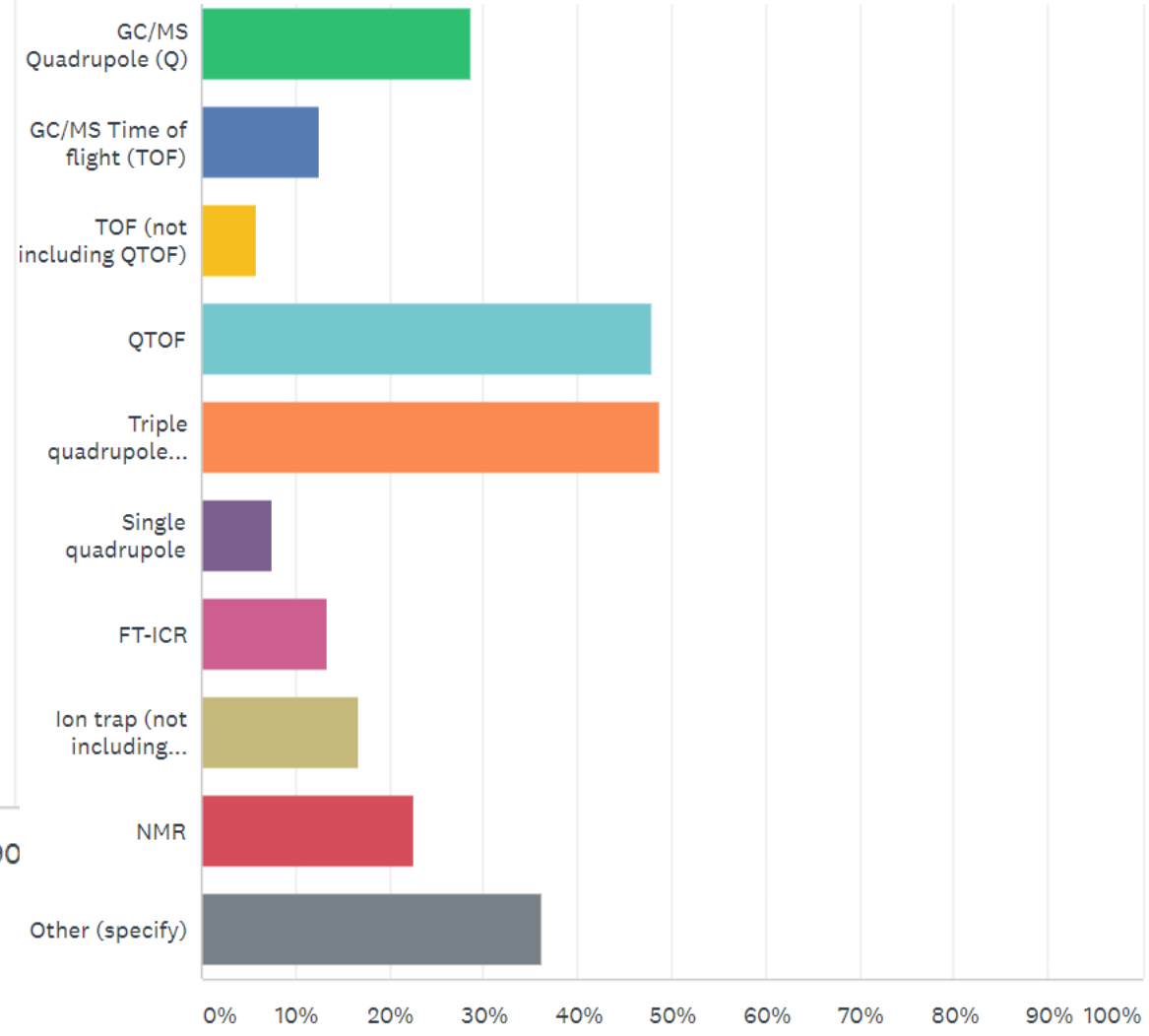


The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

Methodologies used for metabolomics analysis

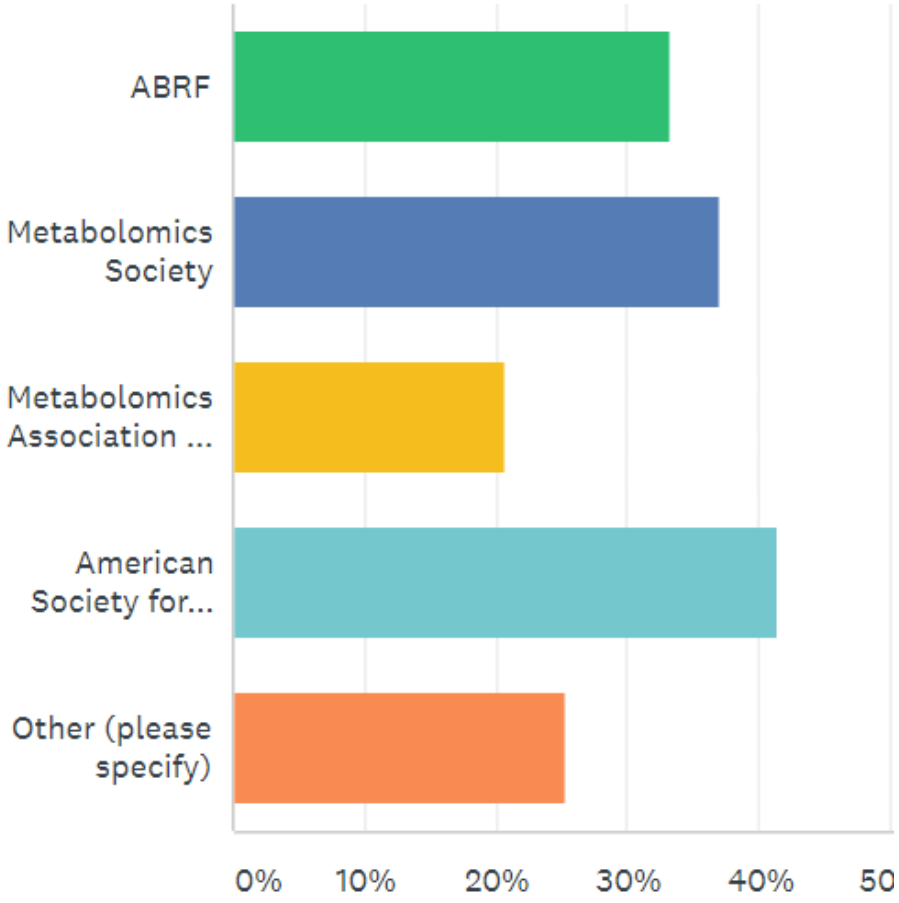


Types of metabolomics instrumentation used

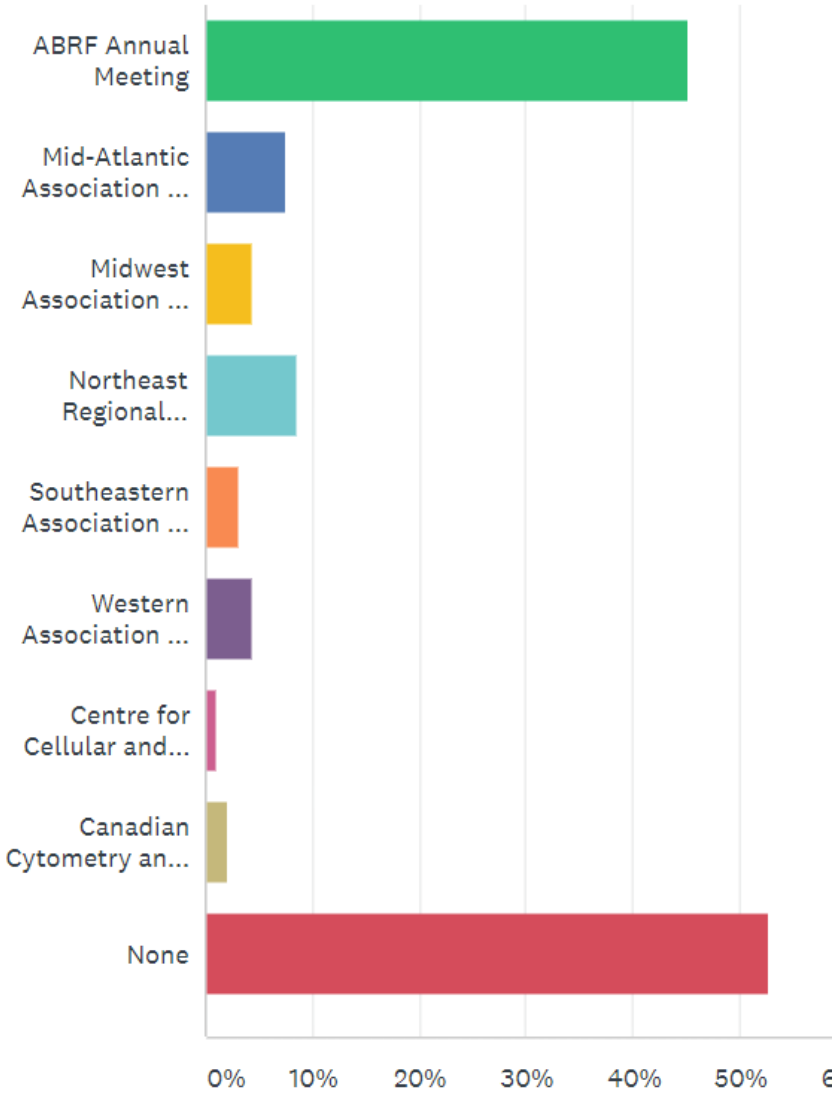


The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

Membership of Organizations

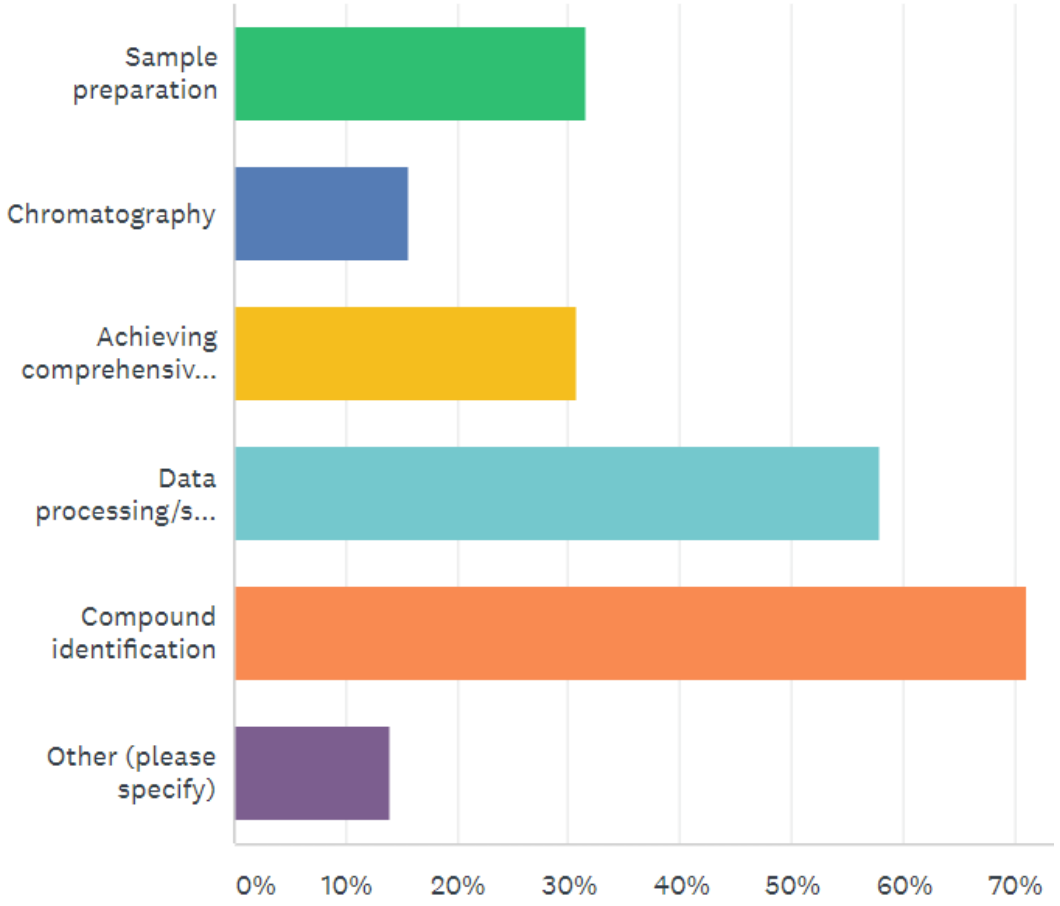


Which meetings organized by ABRF or its Chapters do you attend?

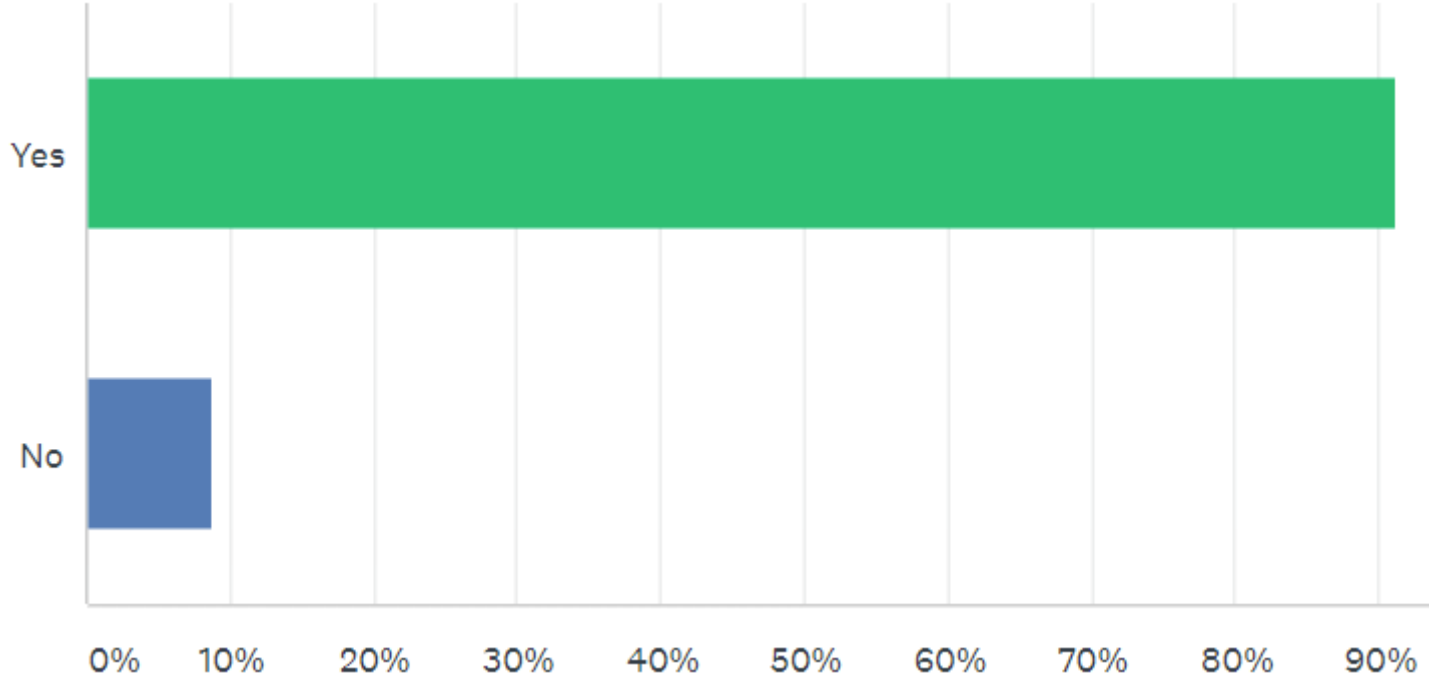


The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

Perceived primary bottlenecks in metabolomics



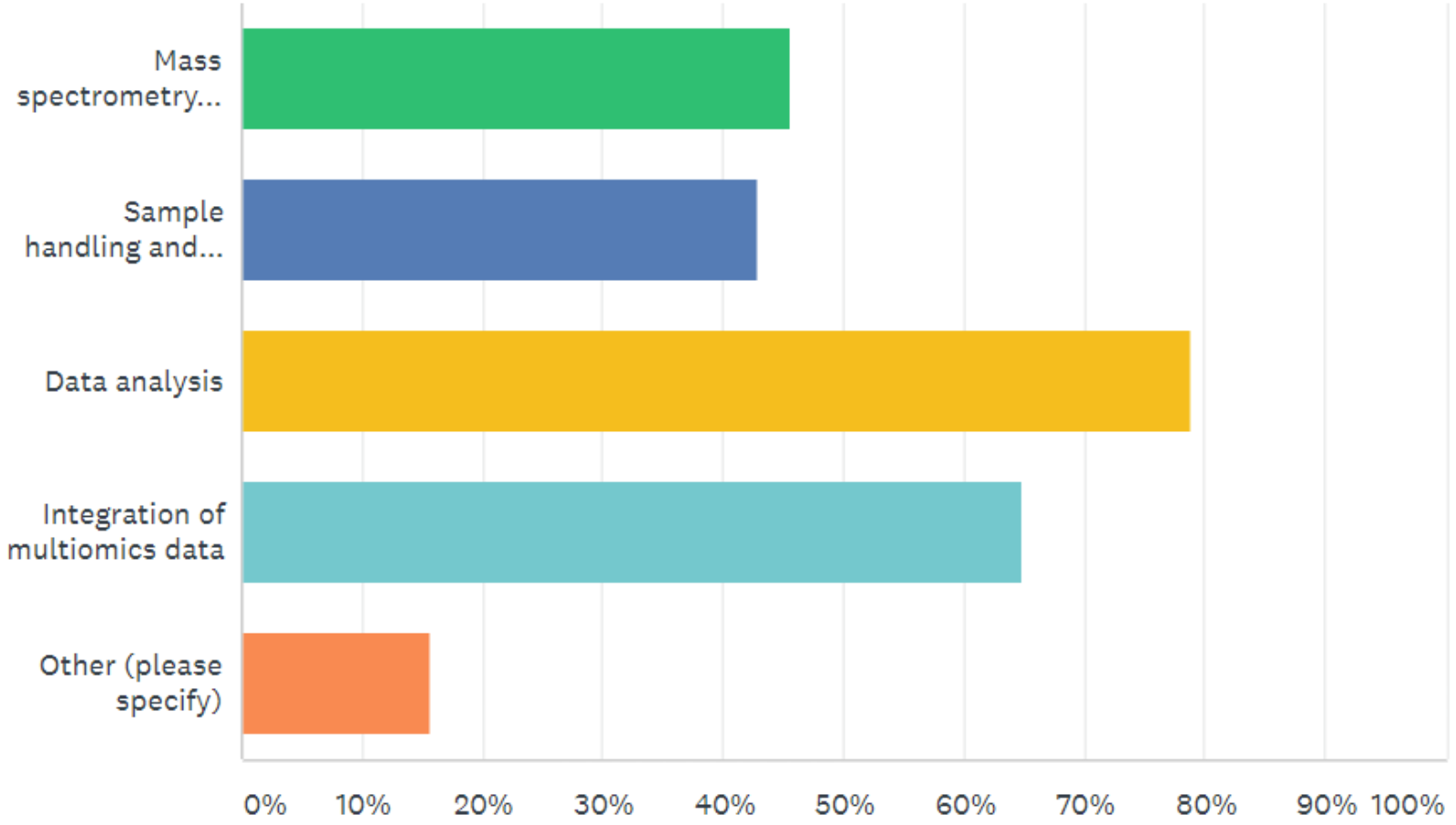
Are you interested in an online Metabolomics Workshop organized by ABRF?



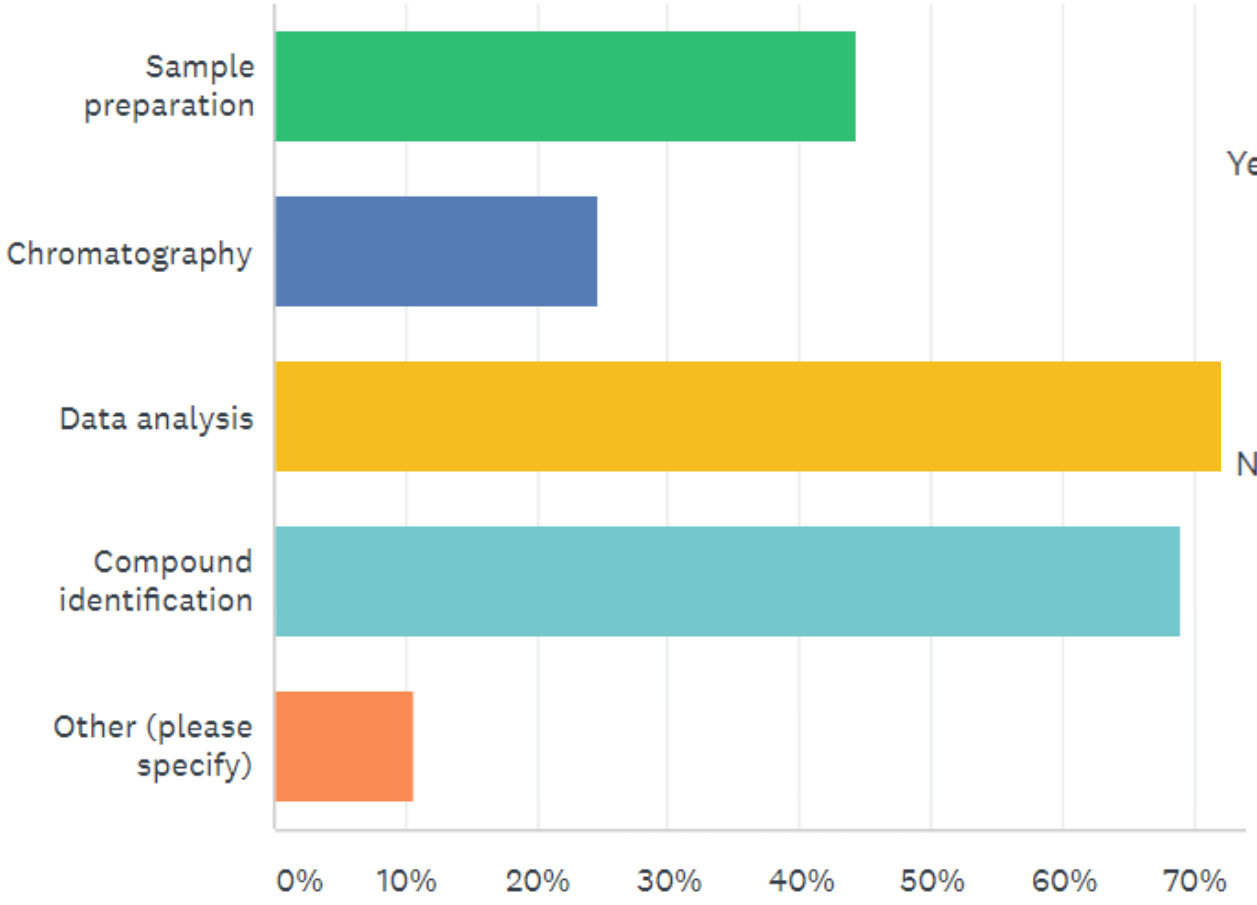
Yes	91.30%	105
No	8.70%	10
TOTAL		**115**

The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

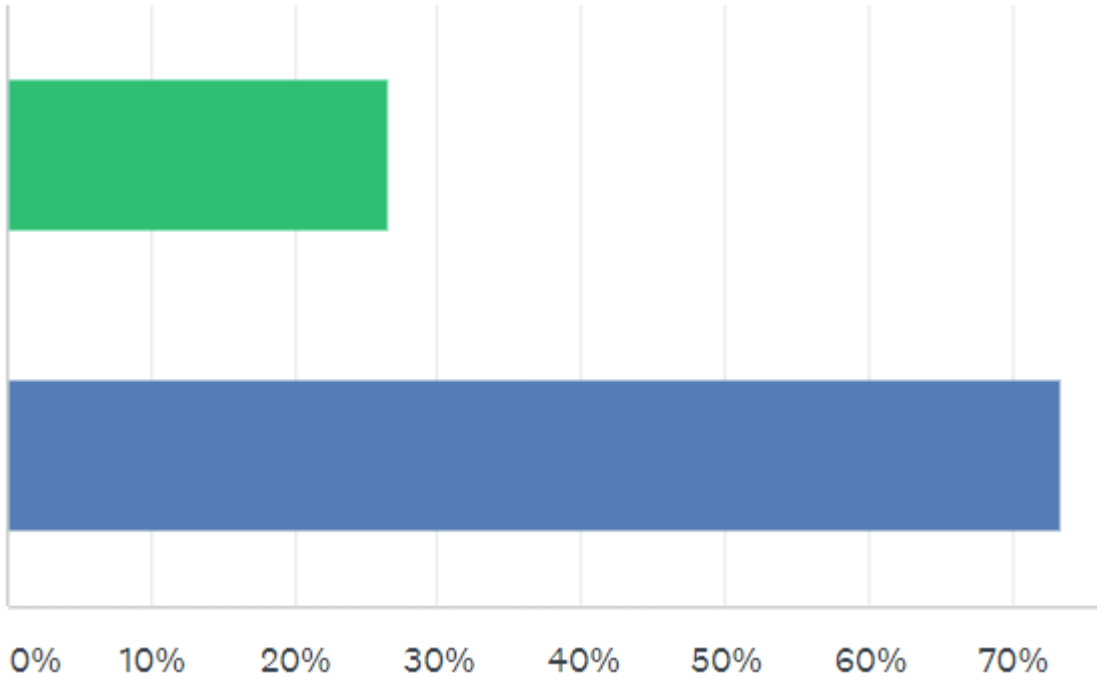
Metabolomics Workshop Topic you would be interested in?



What type of study would you like to see the ABRF MRG conduct in the future?



Are you an ABRF Member?



Yes	26.61%	29
No	73.39%	80
TOTAL		109

The Association of Biomolecular Resource Facilities
Research • Technology
Communication • Education

CONCLUSIONS

- Collect data on the current use of metabolomics technologies in core and research laboratories
  - Mostly done in Research Laboratories, some in Core Laboratories
    - this is reflected in small number of ABRF members with metabolomics expertise
  - Personnel: all categories => from P.I. all the way to students
  - Performed on a regular basis with mostly less than 5 years experience
  - Mostly done untargeted with QTOF or TripleQuad
  - GC/MS still strong
- Assess the current level of interest in the field of metabolomics
- Gain insights into current practices and bottlenecks in the field
  - Data processing and compound identification
- Findings from the survey are intended to provide
  - guidance towards designing new studies and workshops
    - Data processing and compound identification most pressing
  - foster increased participation in ABRF activities
    - Majority of participants are not ABRF members