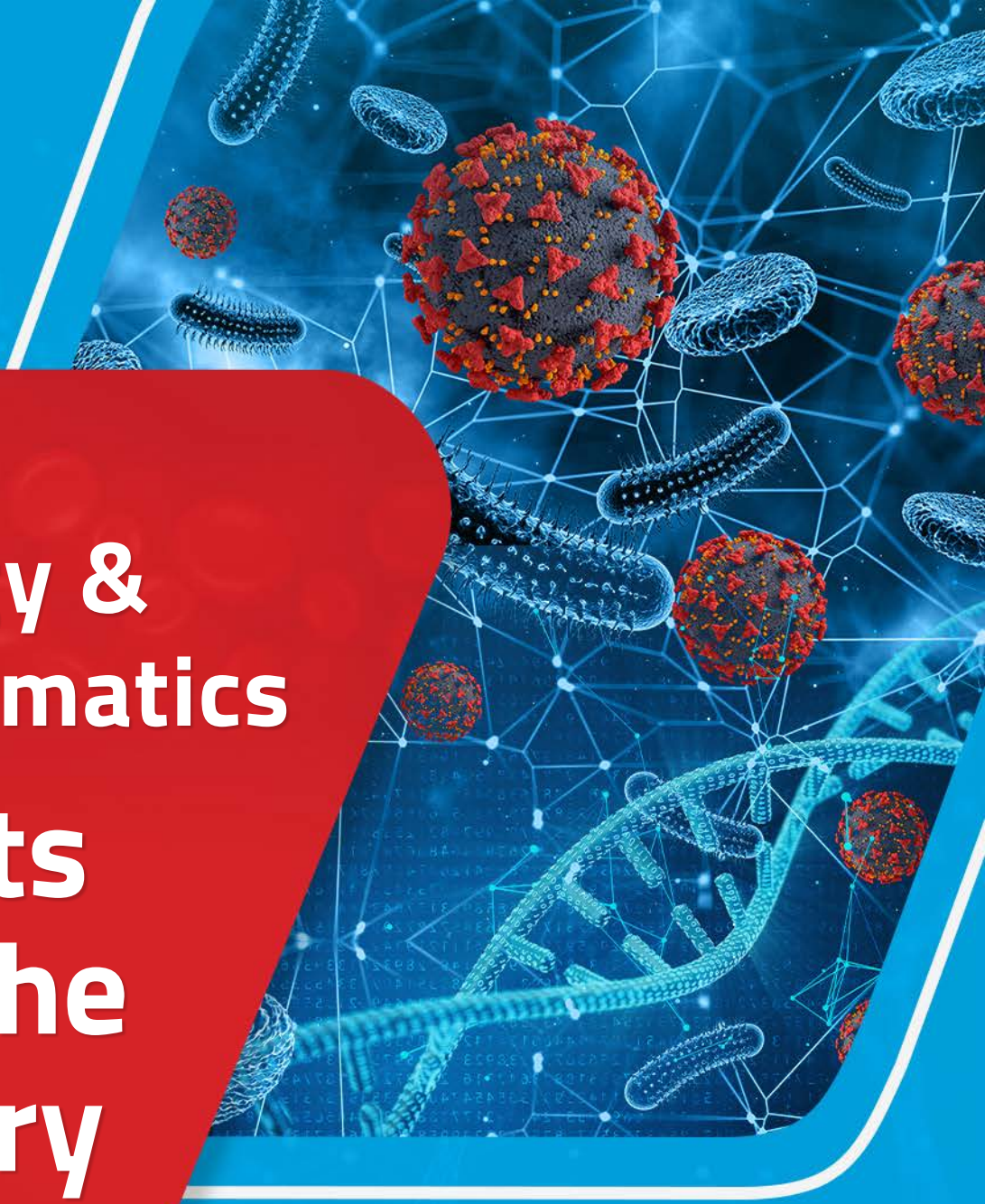


Oncology & Bioinformatics

Insights from the Industry

ONCOLOGY BIOINFORMATICS

PROVENTA INTERNATIONAL

www. proventainternational.com

Introduction

There are few years in living memory as disruptive and uncertain as 2020 has been. While this is true of almost every sector, the events field has seen unprecedented change in how events are held and how operations will be conducted in the future.

Proventa International was among the companies spearheading this innovation, utilising its trademark versatility to ensure that none of its important meetings were cancelled and its mission was carried out. Moving fully online, Proventa was able to facilitate connections and host expert, sector-critical discussions that would otherwise have been missed.

Despite the unforeseen challenges 2020 brought, Proventa's meetings were as successful as always, bringing together top-tier industry experts to talk through challenges and innovations with one another, make new connections and take back brand new information to their companies. Whatever challenges the rest of the year brings, those who attended the online meetings will be able to face them fully prepared and as informed as possible.

The Future of Oncology and Bioinformatics

There have been a number of huge innovations in the clinical space in recent years, with technological changes occurring at a rate rarely seen before. Advances in AI, precision oncology, data analytics and immuno-oncology have pushed the areas of oncology and bioinformatics in particular to a place almost unthinkable ten years ago.

The roundtables held by Proventa this year took advantage of this, discussing among other things cutting-edge topics including antibody engineering considerations for immuno-oncology, improving drug development and clinical trials with real-world evidence, and how big data can bring the future of AI into medicine.

This report will look at some of the highlights of the recent Oncology and Bioinformatics online events, but will also go further: it will explore what delegates are investing in right now, and look ahead to the next five years in the field and how the two fields will change as the years roll on.

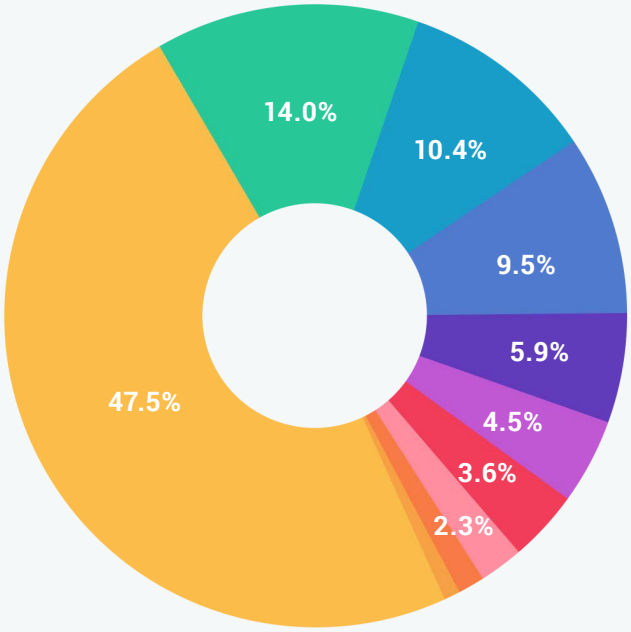
We hope you enjoy this report, and look forward to seeing you at our events next year,

Joshua Neil, ***Editor***
Proventa International

Contents

2020 Delegate Breakdown

2020 Attendee Breakdown



47.5% Director Level

14.0% Department Head

10.4% President / VP

9.5% C-Level

5.9% Scientist

4.5% Other

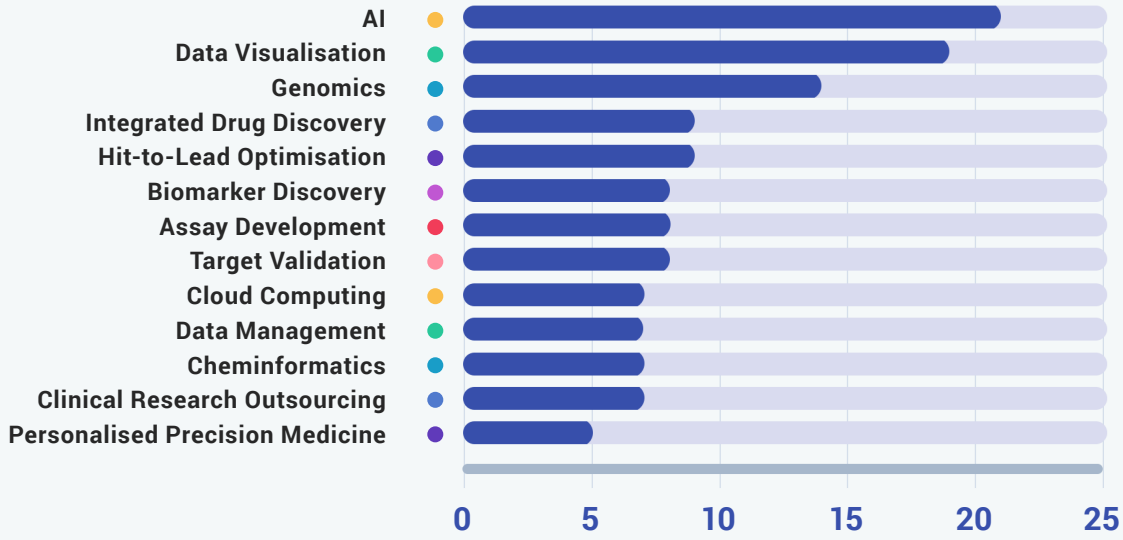
3.6% Team Lead

2.3% Academia

1.4% Manager

0.9% Chairman

Delegate Investments 2020



2020 Event Highlights

ONCOLOGY

Design and Execution of Optimal Cross-Platform Translational Medicine Programmes to Define In-Human Mechanism of Action and Identify Therapeutic Biomarkers

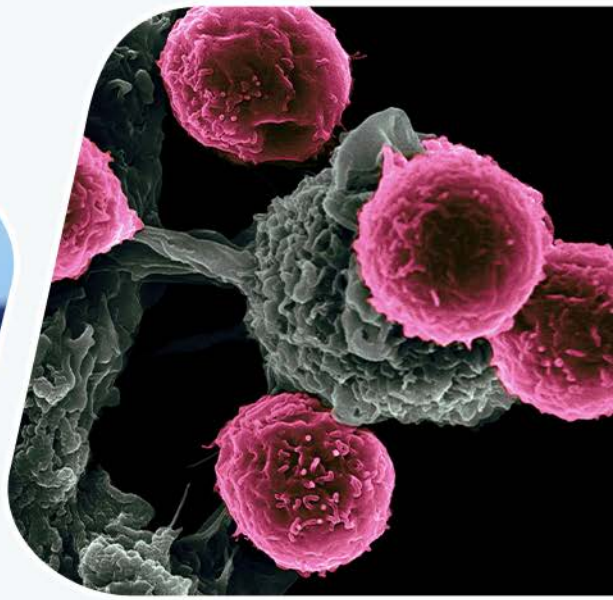
In the oncology track of Proventa's recent event, **Tessellex Ltd's director Philip Beer** gave a fantastic and involving roundtable on designing cross-platform translational medicine programmes to define mechanisms of action and to identify therapeutic biomarkers.

The central focus of the discussion was that many regulators, including the EMA and FDA, require analyses to be done on drugs coming to market, but in reality - for example in the vast majority of immunotherapy drugs - many are coming to market without any stratification or biomarkers, despite the fact that response rates are very low. Philip Beer wanted to know why this was occurring, what barriers there were to finding these biomarkers, and where the tension between regulators and drug developers was coming into play.

One delegate pointed out that a lack of good preclinical models was what was forcing drug developers into the clinic earlier than they'd prefer, making the creation of a biomarker strategy in parallel with this more difficult. Another expert from the academic sphere noted that the problem with first seeing if a drug is suitable for a particular patient subset is that there are then very few individuals in a trial with those characteristics. Because of this, there often isn't enough statistical data to use for publishing purposes. They added that while it was easy to access genomic datasets with attached clinical outcome data, researchers must still know that this data exists and where to find it, and often that's difficult.

Returning to the question of drugs entering the market without biomarkers, another delegate pointed out that the answer depends on what drugs are being spoken of. In immunotherapy, second-generation drugs are checkpoint inhibitors, with these checkpoints not induced by the tumour. There's no relationship between tumour and checkpoints to be inhibited. This means it's difficult to find a biomarker which can predict if a patient would respond to checkpoint-inhibiting therapy. Only when inhibiting therapy has been working and then stops is there a causal relationship between the tumour and the treatment, and biomarkers can be found.

The discussion ended with a rebuttal to that point, with one expert pointing out that the industry had barely started looking for these biomarkers. While none have yet been found, there are clues around tumour mutation burden, HLA expression and genomic loss of HLA. But what has been lacking so far is a study that pulls everything together and includes mutational signatures to ask whether a signature actually exists.



What does AI Mean in Bioinformatics?

Another excellent roundtable hosted in the event was on the application of AI in bioinformatics, headed by **Tom Oldfield, the Principal Software Architect for Dotmatics**. He began by finding out the present delegates' major interests in the topic, including what has and has not yet been delivered. Topics mentioned included neural networks, the impact of AI on drug discovery, Hidden Markov Models (a statistical data model to look at short fragments of sequence and the probability of the transition between points in that sequence) and automating crystallography.

One delegate mentioned that AI is certainly one of the most promising fields in bioinformatics: startups pitching to research institutions with bioinformatic approaches to the antibody problem are getting better each year, with the trend set to continue.

Much of the rest of the roundtable was taken up with the crucial issue of showing users how computational models work and can be trusted. One expert pointed out that lab validation is key to trust. On top of this, it was mentioned that good visualisation incorporation within the machine learning model is crucial: showing users why the algorithm has come to its conclusion, either graphically or through analysis, is hugely important.

Users, it was agreed, are often sceptical initially: they need empirical data, or have a testbed run that finds data and shows its efficacy.

The roundtable ended with a final discussion of the data problem, and AI's ability to sort and label the big data currently streaming into the sciences. As data lakes do not sort and format data before it is stored, a large portion of the data in these lakes is unstructured 'noise' that cannot easily be found or analysed. Natural Language Processing (NLP) can change this.

NLP works well with fairly unstructured language, delegates said. They pointed out that the pattern space is a good example of where NLP processing is useful for diving into patterns, as often molecules of interest are obfuscated. Where annotated data exists, NLP can be very useful in deriving good information from this dive-in.

It is also important in the genomic space, they added, where it can be applied to look for data patterns in the pseudo-random sequences of genomes.

Key Delegate Challenges - 2020 and Beyond

Data - Acquisition, Harmonisation, Integration

When questioned about the greatest challenges facing them in the coming years, delegates attending the online Oncology and Bioinformatics events cited data as the most crucial. Among other things, experts mentioned datasets with biomarkers of interest, data harmonisation and integration, technology solutions for data and knowledge integration in translational research, and developing scientific software for large-scale biological data analysis.

Research

The second most cited challenge by delegates related to research problems: in particular, those surveyed mentioned aligning external opportunities to internal research needs, translational research for oncology programs, and conducting research post-quarantine.

Collaboration and Outsourcing

Collaboration and outsourcing was another major challenge for delegates. In particular, the issues of effectively identifying top CROs for diverse research needs, choosing the right CRO, effectively managing internal work versus outsourced, and identifying vendors were all mentioned as challenges for the years to come.

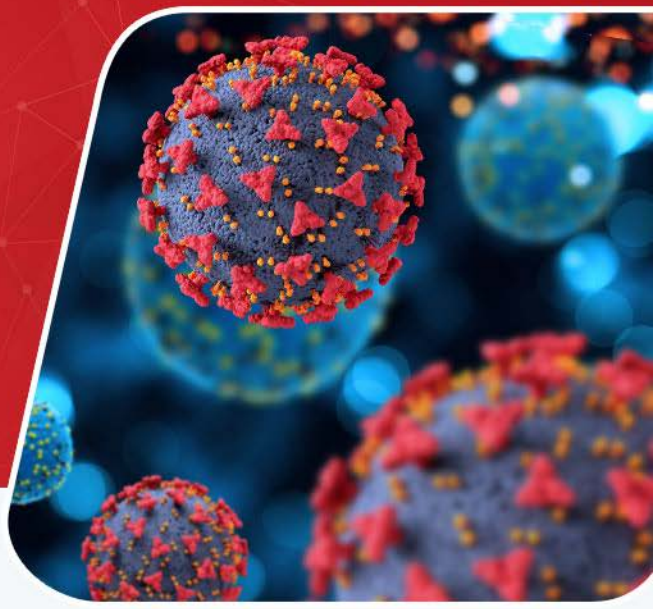
Finding Therapeutic Targets and Validation

The matter of finding and validating targets was one which many experts mentioned as struggling with. Among other things target identification, and validation and integrating multi-omic datasets for target discovery, were key considerations for the next few years.

AI and New Technology

AI and new technology was another major challenge for experts, though one that was lower down on the list than may have been thought. Among other things, delegates cited seeking unprecedented products and technologies, finding tech solutions for data and knowledge integration, and research and development for the AI part in bioinformatics projects as major difficulties for the foreseeable future.

Key Delegate Challenges - 2020 and Beyond



Money and Resources

For many of those surveyed, costs, time limitations and other resource difficulties were another problem that looked set to continue in the coming years. Delegates discussed applying resources in specific capabilities to accelerate efforts, the considerable cost of development, and time management/co-ordination of suppliers and centres as particular difficulties they faced.

Covid-19

Naturally, COVID-19 and the resultant pandemic were major issues that faced experts across the entirety of the sector. In particular, delegates faced issues around recruitment during the pandemic, continuing research in the COVID-19 era, and business continuity during the pandemic.

Regulatory

Regulatory concerns were one of the less mentioned future challenges in the survey, but still several delegates noted them as a potential problem in the future. Among other things, they listed regulatory and reimbursement challenges, regulatory comprehensiveness and navigating specific regulatory frameworks in countries with fragmented health insurance markets as specific difficulties they were dealing with.

Scaling Up

Finally, experts discussed the challenges of scaling up. While only a few mentioned this, the problem seems still unsolved for many. They mentioned, among other things, large scale data analysis and scaling up viral vector development as challenges set to face the industry in the coming years.

Sponsors

Co-host Sponsors

PerkinElmer® For the Better

ONTOFORCE

BioLizard

dotmatics knowledge solutions

SYGNATURE DISCOVERY

inteliquet

BC Platforms

ContextualGenomics

ENPICOM PERSONALIZING IMMUNOTHERAPY

LeapAnalysis

Pro-Partners

CRITERIUM Full-Service Contract Research Organization

IDDI PASSION. SCIENCE. EXPERIENCE.

nagarro THINKING BREAKTHROUGHS

aws

accenture

AccuGenomics A higher standard of accuracy

CATO SMS Partnering from Strategy to Approval

Let's Talk

Contact us to discuss how we can help generate growth for your business.

PROVENTA
INTERNATIONAL

GET IN TOUCH

info@proventainternational.com

UK: +44 (0)20 3314 0100
US: +1 (617) 614 0377

www.proventainternational.com