ESACT Proceedings

Nigel Jenkins
Niall Barron
Paula M. Alves *Editors*

ESACT

Proceedings of the 21st Annual Meeting of the European Society for Animal Cell Technology (ESACT) Dublin, Ireland, June 7-10, 2009

Springer

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Volume 5

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ISBN 978-94-007-0883-9 e-ISBN 978-94-007-0884-6
DOI 10.1007/978-94-007-0884-6
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2011933343

Introduction

The 21st ESACT conference was held in the beautiful surroundings of the CityWest Hotel resort in Dublin, Ireland. For the first time in ESACT history the number of participants exceeded 900: a sign of the ever increasing importance of this area. The conference commenced on Sunday June 5th with two sets of parallel workshops on the subjects listed below. An additional workshop was held on Monday lunchtime of the conference.

1. Process Analytical Technology (PAT), Quality by Design (QbD) and other recent regulatory developments.
2. Innovative media products for the twenty-first century biopharmaceutical industry.
3. The impact of high titre media feed-streams on monoclonal antibody purification.
4. Advances in genomics and proteomics.
5. Stem Cell Technology: new developments and clinical applications.

The first scientific session on Sunday evening included talks on the on-going efforts to gain better understanding of and ways of improving the cell 'factories' that are used to synthesize the 'magic bullets' that are modern day recombinant protein therapeutics. Not that long ago, 1 g/L was considered the holy grail in terms of suspension culture of animal cell systems, yet yields of 10 times that level are achievable nowadays. Despite these gains, researchers in the field strive to further improve on these production platforms by shifting the focus from media and hardware optimization to the molecular mechanisms influencing cell behaviour and productivity in the bioreactor. To this end, methods of applying synthetic biology to explore more novel ways of modifying and utilizing nucleic acid sequence in order to influence protein production or function were presented. In addition, greater insights into the exquisite complexity of the control mechanisms within mammalian cells were given in talks focused on temporal expression of mRNA, protein and microRNAs. The consensus view was that it is likely that the next significant gains

in manipulating cell behaviour and phenotypes may come via engineering of entire networks rather than individual genes.

Sessions 2 and 3 focused on the burgeoning field of stem cells and tissue engineering. From its humble beginnings in egg-based vaccine production, Animal Cell Technology (ACT) has now progressed to such a point that the practical considerations of producing large volumes of cGMP cell therapies are now a reality. A diverse and accomplished panel of speakers described their work on all stages of bringing stem cell therapies from discovery though manufacturing to the potentially life-altering or even life-saving applications in the clinic. Large scale production of stem cells brings its own particular sets of challenges including: maintaining the pluri- or multi-potent state, controlled large scale differentiation, and ensuring product quality. Examples were presented of how some of these cell-based interventions are already proving effective in both animal models and some of the first human trials – a wonderful prospect indeed.

On Tuesday June 9th the day started with a session on Animal Cell Bioprocessing. Eli Lilly & Co. described how a new biotherapeutics facility is under construction near Cork, Ireland alongside an existing chemical pharmaceutical plant. Similar developments are occurring at Pfizer near Cork and together biotherapeutics, chemical therapeutics and medical devices account for almost half of Ireland's exports. Other speakers in this session, which was sponsored by Ireland's National Institute for Bioprocessing Research & Training (NIBRT), covered topics such as using disposable bioreactors at the medium to large scale, and scaled down systems for high throughput screens of media components and environmental conditions. The keynote speaker at the end of this session discussed the development of biogeneric drugs (i.e. follow-on biotherapeutics) that are set to increase market share as the older molecules such as erythropoietin (EPO) come off patent.

Tuesday afternoon also saw the first of two poster sessions, the other being on Wednesday morning. Approximately 300 posters were displayed throughout the conference and prizes for best posters were awarded at the Gala Dinner on the evening of Wednesday June 10th. The final session on Tuesday focused on biotherapeutics, i.e. what types of molecule are under development and how can these be modified for greater potency, safety or half-life?

Linking this session with a Wednesday session on recent developments in vaccines and virology was a keynote talk on the immunogenicity of proteins. Vaccines need to be immunogenic to provoke protective humoral and cell-based responses in humans or animals. However, for non-vaccine biotherapeutics the host immune response must be minimized to avoid raising neutralizing antibodies that may compromise the drug's efficacy. Other topics in the vaccine & virology session included improving influenza virus production, and using the heat shock response to improve the efficiency of host cell line virus production.

This volume contains much of the excellent data presented and discussed at the 21st ESACT meeting.

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