

Early career forum

ERS International Congress 2018: highlights from best-abstract awardees

Introduction

During the 2018 European Respiratory Society (ERS) International Congress in Paris the author of the best abstract from every assembly was awarded (based on the highest average score from the abstract reviewers for an author under 40 years of age). Best-abstract awardees were invited to write a short summary of their Congress experience and view on the evolving field of research of their respective assembly. The purpose of this article is to give the readers a fast overview of some of the Congress highlights and to give the stage to the young and promising best-abstract awardees, as they are the future of the ERS.

Assembly 3: Basic and translational sciences (Olivier Burgy)

One of the highlights of the 2018 ERS International Congress was a seminal symposium on disease modelling and drug testing focusing on innovative three-dimensional models using human lung biosamples to study lung diseases (organoids and lung tissue culture). In addition, the recent ERS statement on optimising the use of animal models in respiratory diseases was thoroughly discussed [1–3]. The importance of Wnt/ β -catenin signalling in lung epithelial cell homeostasis and response to lung injury was presented in a hot topic session

on “Pathophysiology of the human lung alveolus”. William J. Zacharias (Cincinnati, OH, USA) shared exciting recent findings about a specific sub-population of alveolar epithelial progenitor cells [4]. Cellular crosstalk, specifically novel mediators such as extracellular vesicles and exosomes, represented another highlight. Susanne Gabrielsson (Stockholm, Sweden) presented exosomes as potential biomarkers in human lung diseases. She demonstrated that bronchoalveolar lavage fluid (BALF)-derived exosomes from sarcoidosis patients carry higher levels of vitamin-D binding protein compared with controls [5]. Exosomes from sarcoidosis patients have leukotriene-dependent pro-inflammatory properties and trigger interleukin-1 β production in macrophages. Hannah Burke (Southampton, UK) and co-workers showed that exosomes have dysregulated microRNA (miRNA) relevant to inflammatory pathways and might predict chronic obstructive pulmonary disease (COPD) [6]. Olivier Burgy (Denver, CO, USA) and co-workers demonstrated an increase of extracellular vesicles in BALF from patients with idiopathic pulmonary fibrosis (IPF) [7]. They showed that BALF-extracellular vesicles from fibrotic mice exhibit a specific proteome compared to non-fibrotic mice. In line with this, Julien Guiot (Liège, Belgium) and co-workers shared data on a specific miRNA signature in sputum-exosomes from patients with IPF [8]. They found that the miRNA miR-142-3p is increased in IPF exosomes and correlates with disease severity. Together, these sessions emphasised the knowledge and proof of concept generated by our community with the aim

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A summary of the ERS International Congress 2018 from the best-abstract awardees for each ERS Assembly and their views on the evolving field of research of their respective Assemblies
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of providing better therapies for those suffering from lung diseases.

Assembly 5: Airway diseases, asthma and COPD (Jesse Armitage)

The airways diseases Assembly showcased many interesting presentations ranging from strategies to develop and improve clinical practice for COPD and asthma patients, to understanding the pathological mechanisms that drive these diseases. Both COPD and asthma exhibit a broad spectrum of features, some of which overlap significantly. Consequently, understanding what clinical features these patients present remains a crucial factor in providing positive clinical outcomes in response to therapy. This was emphasised during the symposium “State of the art session: airways diseases”, which presented the importance of delivering therapeutics that are tailored to the patients’ clinical features. For example, Dave Singh (Manchester, UK) highlighted the association between higher blood eosinophil levels in COPD patients and favourable responses to inhaled corticosteroids [9, 10]. The variety of work undertaken towards the development of novel therapeutic strategies for both COPD and asthma was particularly impressive. Several approaches were explored including the use of stem cells, monoclonal antibodies, antibiotics and other immunomodulators. One such study, presented by Peter Gibson (Newcastle, Australia) demonstrated that macrolides, a class of antibiotics, can have numerous anti-inflammatory and antimicrobial effects that can benefit patients with neutrophilic COPD and poorly controlled asthma [11, 12]. Other presentations in this assembly also focused on unravelling the mechanisms that drive these complex airway diseases. The sessions “It’s my favourite cell that affects your asthma” and “Advanced profiling of immune cells in chronic lung diseases” were great examples of this, as they displayed a breadth of talks emphasising the role of immune cell subsets and extracellular vesicles in airways diseases and how these findings can be translated clinically as biomarkers and therapeutic targets. Collectively, this serves as a reminder of the enormous challenges ahead when addressing these complex diseases, and the requirement to approach the treatment of airways diseases with new perspectives.

Assembly 6: Epidemiology and environment (Louise Wain)

It is an exciting time for genomic studies in respiratory disease. Evidence that genetic data can accelerate and improve drug discovery pipelines [13], with increasing recognition of the potential for

genomics to revolutionise patient care [14], has catalysed the field of genetic studies. The potential benefits, and challenges, of undertaking genetic studies for fine-scale respiratory phenotypes were explored in a thought-provoking “Multiomics studies in epidemiology: what can they tell us?” session. Elizabeth Oelsner (New York, USA) demonstrated how we can take genetic risk scores (where multiple individual genetic risk factors are summed into a single score for each individual) derived from large general population studies of spirometry lung function and COPD risk to assess their association with computed tomography scan measures. The associations of such risk scores with lung structure provide new mechanistic insights [15]. Natalie Terzikhan (Rotterdam, the Netherlands) quantified the heritability of diffusing capacity and reported that a G-protein-coupled-receptor, associated with airflow obstruction, was also associated with measurements of gas exchange. This suggests a role for this protein in alveolar function [16]. Epidemiological studies provide unequivocal evidence that our exposure to airborne pollutants is an important driver of respiratory health. However, our understanding of how these exposures lead to lung disease, and how environmental impact varies across the population, is unknown. The challenges of addressing these questions were showcased in the “Gene-environment interactions in the omics era” symposium by leaders in the field of gene-by-environment studies. Florence Demenais (Paris, France) provided recommendations for optimal study designs to maximise statistical power to identify and replicate gene-by-environment interactions [17]. Erik Melén (Stockholm, Sweden) made the case for integration of multiple “omics” data to fortify findings with functional evidence. Ian P. Hall (Nottingham, UK) described how the effects of genetic risk factors for COPD were independent of the already large relative risk from smoking. In the “multiomics” session, Louise Wain (Leicester, UK) demonstrated that, amongst smokers, the absolute risk of COPD by age 70 varies from around 17% to 84% according to genetic risk profile [18]. In summary, these sessions highlighted the value of deeply phenotyped studies and the potential of multiomics studies to provide new insight into respiratory health and disease.

Assembly 7: Paediatrics (Maribel Casas)

At the 2018 ERS International Congress, more than 350 studies focusing on the field of paediatrics were presented. Clinicians and researchers emphasised the need to consider lung function trajectories in future asthma guidelines to better monitor lung growth throughout life based on two papers recently published in the *Lancet Respiratory Medicine* [19, 20]. Regarding bronchopulmonary dysplasia (BPD), recent studies showed that intrauterine growth restriction, maternal smoking and pre-existing hypertension

were associated with increased risk of BPD [21] and that BPD impairs cognitive development and quality of life in infants born extremely preterm [22]. Concerning the early-life origins of respiratory disorders, two cohorts showed that school-aged asthma was influenced by earlier lower respiratory tract infections or asthma symptoms, but not by upper respiratory tract infections [23, 24]. A study in more than 200000 dyads observed that maternal antibiotic use during pregnancy was associated with a dose-dependent increase in asthma risk during childhood [25]. In the symposium dedicated to the early-origins of respiratory disorders, researchers discussed the different approaches to strengthen causal inference. This included the approach of gene-environment interactions, such as a study that examined the influence of a particular variant of the glutathione S-transferase gene on the association between paracetamol use during the first years of life and the risk of developing asthma in early adulthood [26]. Other approaches discussed were family designs such as sibling controls, twin studies and negative parental controls, and studies following children initially involved in randomised controlled trials [27]. Studies focusing on environmental exposures such as air pollution [28], green spaces [29] or pesticides [30] and their potential effects on respiratory disorders were highly represented at the Congress. Novel studies on the influence of the internal (*i.e.* metabolome) and external exposome [31, 32] on respiratory health were also presented. In conclusion, the 2018 ERS International Congress covered a broad spectrum of respiratory diseases including new insights into potential underlying mechanisms, treatment and prevention of respiratory diseases presented by an exciting mix of international experts in the field.

Assembly 9: Allied respiratory professionals (Leandro Cruz Mantoani)

The 2018 ERS International Congress was full of great topics. For the members of Assembly 9, there were two very interesting postgraduate courses to kick off the conference: “PG8 Lung function testing”, providing an update on the current techniques for measuring lung physiology; and “PG14 The evolving world of pulmonary rehabilitation”, which provided a better understanding of the role of pulmonary rehabilitation (PR) in the integrated continuous care of patients with chronic lung diseases. The excellent symposium on “Dyspnoea: a multidimensional and multidisciplinary approach” discussed the many aspects dyspnoea can have, topics included: the neurophysiology of dyspnoea, exercise and dyspnoea, the multidimensional assessment of dyspnoea, and the clinical impact and management of dyspnoea. Another outstanding session was the oral presentation session: “Determinants of

physical activity behaviour in patients with COPD and the physiotherapist as a physical activity coach”. Speakers from all over the world brought new insights into physical activity behaviour in COPD, highlighting the role of the physiotherapist as a coach to encourage COPD patients to achieve higher levels of daily physical activity. The oral presentation session “Best abstracts in pulmonary rehabilitation and chronic care” showed that PR is a continuously evolving field of research: researchers brought findings from “Early PR after acute exacerbation of COPD” [33] to “Regular extended release of morphine for chronic breathlessness” [34]. The poster discussion about “What’s new in lung function and exercise assessment in COPD?” caught the attention of many people as well. This session involved some hot topics in the field, with researchers investigating the “Impact of FEV1/FVC threshold to predict COPD hospitalisation and mortality” [35] and the “Relationship between four-meter gait speed test and cardiopulmonary exercise test to determine exercise capacity in COPD patients” [36], among others. Overall, the 2018 ERS International Congress provided insights into new topics, with thought-provoking sessions highlighting the importance of treating and assessing the patient thoroughly.

Assembly 10: Respiratory infections (Elsa Bodier-Montagutelli)

Within the area of basic and translational research, a large number of sessions were dedicated to the role of the microbiome in lung pathophysiology. Philip Hansbro (Callaghan, Australia) provided insight into how regulation of the microbiome and cross-talk with the lung plays a fundamental role in homeostasis with his presentation on “Gut-lung cross-talk in chronic respiratory disease”. In addition, evidence was presented for the association of certain microbiome patterns, including the gut microbiome, with chronic respiratory diseases (especially in early childhood) or clinical response to immunotherapies in lung cancer. Understanding the role of the microbiome also opens innovative therapeutic perspectives: Patricia Lepage (Jouy-en-Josas, France) discussed microbiome manipulation or specific bacterial metabolites as options for the prevention or treatment of chronic respiratory diseases during her presentation on “Manipulating the microbiome to control human disease”. The development of therapeutic alternatives was also mentioned for respiratory infections, with a special focus on bacterial resistance to antibiotics. The prevalence and extent of drug resistance was assessed in many descriptive studies covering various infectious lung diseases, notably lower respiratory tract infections and tuberculosis, which are two of the five respiratory diseases with the biggest impact [37]. In this context,

antimicrobial resistance was one of the priority concerns of the “10 Principles for Lung Health” presented at the Congress and recently published by the ERS [38]. Several potential alternatives to antibiotics were discussed during the symposium on “Antimicrobial host defence and innate immunity in the lung”, including antimicrobial peptides, therapeutic antibodies and phages [39]. Multidrug resistance to tuberculosis was also highlighted during the Congress in a thematic poster session on “Drug-resistant tuberculosis and the sequelae of pulmonary tuberculosis” and a poster discussion session on “Drug-resistant tuberculosis”. A state-of-the-art session was provided, combining current practical recommendations and the challenges that remain to reach the eradication of disease. Advances were also presented on the comprehension of bronchiectasis pathophysiology, as well as epidemiological microbiological data. Overall, the 2018 ERS International Congress highlighted the key interactions between basic, translational and clinical science in the field of respiratory infections, opening new perspectives for understanding disease pathogenesis, prevention and treatment.

Assembly 12: Interstitial lung diseases (Cristina Boccabella)

Interstitial lung diseases (ILDs) are a heterogeneous group of disorders characterised by an infiltrative lung process of the interstitium. ERS selected this topic as one of the eight key educational fields for the ERS International Congress 2018, in view of the recent growing interest among researchers and the large amount of scientific literature produced. The new guidelines for diagnosing IPF [40], published in September 2018 in the *American Journal of Respiratory and Critical Care Medicine* were discussed during a highly interactive plenary session. Chairs and speakers described in detail the methodology used to develop the guidelines and the implications for clinical practice. Different to the 2011 guidelines, four radiological categories were defined: usual interstitial pneumonia (UIP), probable UIP,

indeterminate or inconsistent for UIP pattern. As in the 2018 Consensus Statement of the Fleischner Society, the possible UIP pattern was excluded from the classification. Bronchoalveolar lavage and surgical lung biopsy received a conditional indication to be performed after multidisciplinary team discussion, according to radiological and clinical evaluations. Possible limitations of the new recommended approach could be the subjective interpretation of radiological patterns and the need for experts. Furthermore, Toby Maher (St. Albans, UK) presented the INMARK study (NCT02788474) [41], a 12-week, double blind, randomised, placebo controlled, parallel group, ongoing trial that aims to evaluate the effects of Nintedanib on a broad panel of biomarkers of extracellular matrix turnover. This study will hopefully provide support in identifying predictive biomarkers of IPF clinical course and new targets for antifibrotic therapy. Finally, the INSTAGE study [42], a 24-week, randomised, double-blind, parallel-group trial, recently published in the *New England Journal of Medicine*, assessed the efficacy and safety of Nintedanib in addition to Sildenafil in IPF patients. Although the first end-point was negative in terms of improvements in quality of life, the INSTAGE study, as Fernando J. Martinez (New York, USA) highlighted, could provide new insights on patients with severely impaired gas exchange, potentially supporting the use of Nintedanib across a wider range of IPF patients. The ILD Assembly gave an overview on the new diagnostic approaches for IPF, highlighting their possible implications and challenges in clinical practice. Future perspectives were shared about the use of antifibrotic treatment and the potential role of IPF-specific biomarkers.

Concluding remarks

We hope to reach out to and inspire all young clinicians and researchers to submit an abstract for the ERS International Congress 2019, in Madrid, as this gives them an opportunity to be elected as the 2019 best-abstract awardee from their Assembly. Abstract submission is open until February 14, 2019.

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Conflict of interest

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