Cross-industry organizations

An update on the activities of European COST Action SimInhale

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The SimInhale COST Action

The European COST Action MP1404—SimInhale is a global network of inhalation experts established and funded through the European Cooperation in Science and Technology (COST) system. Launched in May 2015, SimInhale is now in its third year. In a previous *Inhalation* article (June 2016), we introduced SimInhale and explained its mission and objectives. This article provides an update on its status, a summary of the most notable activities and events over the last two years, and a look at events planned for 2018 and 2019.

When launched, SimInhale had 90 members from 25 countries. Since then, SimInhale has grown to include 130 members from 27 countries. Its reach goes beyond Europe and includes two companies based in the United States and two universities, one in Singapore and one in Australia.

Previous SimInhale activities

The two-day workshop "Pulmonary Drug Delivery: Computational Fluid Particle Dynamics and Emerging Functional Imaging Technologies" took place in October 2016 in Prague, Czech Republic. The event was dedicated to the current state-of-the-art on pulmonary drug delivery from the perspective of computational fluid particle dynamics (CFPD) and emerging functional imaging technologies. The workshop featured a stimulating mix of talks by external speakers and SimInhale members including lecturers from academic and research communities, industry and medical professions. Keynote lectures were delivered by Prof. Ching-Long Lin (The University of Iowa) and Prof. Yu Feng (Oklahoma State University) and a roundtable discussion was held at the end of the second day.

A three-day school on "Emerging Device and Particle Engineering Technologies for Optimal Pulmonary Drug Delivery," taught by experts from academia and industry, took place in Valetta, Malta in February 2017. Participants were exposed to an overview of inhalation devices (pMDIs, DPIs, soft mist inhalers and nebulizers), as well as formulation methods for DPIs, toxicity, lung targeting, pharmacokinetics, regulatory requirements and aspects of usability and adherence. Podium discussions were very effective in engaging trainees and giving them opportunities to interact with lecturers.

A second training school, partially sponsored by Elpen Pharmaceutics Co. Inc., took place in Athens, Greece over two days in October 2017, with a focus on cross-disciplinary training. It included hands-on demonstrations with cascade impactors and other *in vitro* aerosol characterization apparatus to give trainees who had primarily computational backgrounds the opportunity to become familiar with standard equipment used in *in vitro* studies. Industry played an important role with trainers from Copley Scientific, Ltd. and Emmace Consulting AB.

In April 2017, at the 5th International Conference on Computational and Mathematical Biomedical Engineering, in Pittsburgh, PA, US, SimInhale's chairperson presented outcomes of research activities launched though the Action's Working Group WG3.

In December 2017, SimInhale organized the pre-conference symposium "Designing Inhalers for Children and Infants" as part of DDL2017 in Edinburgh, UK. This special session focused on integrated formulation inhaler design for young children and population groups, which is coming into focus as an under-researched topic. During the DDL conference, SimInhale's chair presented an invited lecture titled, "*In Silico* Clinical Trials of Regional Lung Deposition: How They Could Impact Real Life Product Development and Patient Care."

Notable outcomes

The overarching, ongoing objective of the Action is overcoming knowledge compartmentalization and fragmentation. An important step towards this goal has been the com-

pletion of a multi-thematic special issue of the *European Journal of Pharmaceutical Sciences (EJPS)*. Published in February 2018, the special issue features a collection of 14 scientific articles that showcase the range of activities taking place under the auspices of SimInhale. Its intention is to provide a global view of the current state-of-the-art and, where possible, to highlight the interconnectedness and the links between various topics. Approximately one-third of the papers are critical reviews while the others are original research papers. A notable outcome showcased in the special issue is the SimInhale benchmark case, which we hope will aid the inhalation science community by providing a reference point for the validation of computer codes used in regional lung deposition studies *in silico*.

An important SimInhale mission is to promote the integration of young researchers in the field of inhaled medicines and to expose them to inter-sectoral training, thus preparing them for this highly multidisciplinary field. Towards this goal, over the last two years, SimInhale has sponsored 13 Short Term Scientific Missions (STSMs) with a budget of nearly €25,000.

Upcoming events and activities

In collaboration with the Faculty of Pharmacy of the University of Belgrade, SimInhale will organize a workshop titled, "Particle Engineering and Device Development for Pulmonary Drug Delivery: What is New?" Scheduled for presentation in February 2018, it will focus on new activities in device and formulation development. Presenters will be pioneering researchers and experts from industry and academia.

In the first week of September 2018, SimInhale will present a Summer School that will offer multidisciplinary short courses. The five-day workshop will take place in Dublin, Ireland and the dates will be soon announced on the Action's website. SimInhale will be soon announcing a major international conference that will take place in Cyprus in 2019 and will feature notable speakers from both industry and academia.

For further information, see:

- http://siminhale-cost.eu/
- COST Association website: www.cost.eu
- LinkedIn: www.linkedin.com/groups/8421105
- Facebook: www.facebook.com/siminhale/

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