Mucosal Airway Immunity Network (MAIN) Europe: Proposal for an EFIS-IL study group

Summary

Respiratory tract infections are one of the main infectious causes of death worldwide. There is a growing appreciation that local mucosal immune responses are key in preventing infections and disease and interrupting transmission. However, airway immunity is still relatively poorly understood and novel tools to study it are currently being developed by groups across Europe and the world. **Our MAIN aim is to bring together researchers in the field to accelerate our understanding of respiratory mucosal immunology.**

1. Research Area

Millions of people die every year from respiratory tract infections. Historically, immune responses to infections have been studied mostly in blood, but these do not reflect immunological processes at the site of infection, due to immune compartmentalization. Innate immune cells present at the respiratory mucosa, adapted to the local environment, are key in providing a first line of defense, maintaining homeostasis and inducing adaptive immune responses. As part of the adaptive response, secretory IgA in the respiratory mucosa is superior in neutralizing viruses, while tissue-resident memory T cells can proliferate locally and provide cross-protective airway immunity. Over the past ten years, and accelerated by the COVID-19 pandemic, several tools have been developed to study mucosal immune responses, in pre-clinical models but also in humans. Despite these developments, our understanding of mucosal immune responses and the assays to study them are still lagging behind compared to blood. To overcome this, multiple consortia are actively working on improving our understanding of mucosal airway immunity, often centered around specific pathogens or nasal vaccines. However, an overarching collaborative platform, which could connect clinical cohort studies and the different laboratories working in this field, is missing. The establishment of the MAIN study group addresses this issue, and offers opportunities to establish new collaborations, accelerate the maturation of the field and promote the application of novel tools and technologies - from in vitro to clinical - that can ultimately generate breakthrough discoveries and reduce disease burden.

2. Core group of proponents

The proposing members include 15 research groups from 8 European countries that are leading in the field of mucosal immunology and all are members of EFIS-associated Societies. Many are part of large European-funded consortia such as INNOV4VAC, MUSiCC, European Vaccines Hub for Pandemic Readiness, FLUniversal and Nosevac. The core study group includes clinicians as well as translational and fundamental researchers studying immunity against various respiratory viral and bacterial pathogens. The proposing members range from individuals working on analyzing samples from clinical trials and controlled human infection models to those focused on animal models or technologically advanced in vitro models, such as organoids. As the field of mucosal immunology rapidly expands, the network will also grow as we include new researchers in the study group, particularly those from underrepresented groups to have a diverse and balanced representation of researchers in the field.

3. Organization of study group meetings and financing

To advance collaborations between groups and sharing of expertise, we will organize monthly online

seminars. Access to these seminars will be restricted to promote the sharing of unpublished data, which requires trust but is key to speed up assay development, spark new ideas and foster the initiation of new collaborations. These seminars will consist of presentations from 1-2 members of the study group, including PhD students and postdocs. Young faculty, postdocs and students will be encouraged to take the lead not just in attending and presenting but critically also in co-organizing and chairing meetings and sessions.

Ad-hoc invited speakers will be asked to give webinars or special seminars, for example if a researcher from outside the network publishes a key paper, or to highlight specific new tools and developments that are of use to the network. These will be advertised within MAIN, but also more widely in our institutions and networks.

We will also organize an annual 1-day symposium. To reduce costs and increase the availability of researchers, we will arrange this around a conference that many people in the study group will already attend. The meeting will rotate across countries and one of the core proponents will organize it at their institution to reduce costs. We will also attempt to obtain additional funding from funders that have an interest in the field of airway immunity to further cover organizational costs related to the network and in-person meetings.

4. Anticipated outcomes of the network

We expect that the establishment of the MAIN study group leads to the following outcomes:

1. Connection of various researchers in the field, accelerating the development and improvement of novel tools and assays in the field of mucosal immunology and facilitating breakthrough discoveries and novel insights
2. Joint publications, such as white papers and position papers or workshop reports
3. Submission of joint research proposals including a Marie-Curie Doctoral Network
4. Development of talented researchers in the field of immunology. For this we will develop a mentorship programme for junior researchers within MAIN, giving them access to advice and support from senior researchers in the network. Young researchers can also expand their network and gain experience in organizing seminars.
5. Creation of a special issue of Immunology Letters about airway mucosal immunity.

5. List of study group members

Simon Jochems (NLD) - spokesperson	Daniela Ferreira (UK)	Ryan Thwaites (UK)
Cecilia Lindestam Arlehamn (DEN)	Gerco den Hartog (NLD)	Charlotte Thalin (SWE)
Nathalie Heuzé-Vourc'h & Thomas Secher (FRA)	Gabriel Pedersen (DEN)	Rory de Vries (NLD)
Kondwani Jambo (UK & MLW)	Arnaud Marchant (BEL)	Carolyn King (SUI)
Chris Chiu (UK)	Christof Geldmacher (GER)	Jens-Ulrik Jensen (DEN)