

# Research Seminar Report

## "Host defence function in the airway epithelium in health and disease"

At the beginning of November 2002, 57 participants from 10 European countries and the USA attended the ERS Research Seminar "Host defence function of the airway epithelium in health and disease" held in Noordwijkerhout in The Netherlands.

### **Background**

The airway epithelium forms a continuous barrier against invading microorganisms, and is actively involved in host defence against infection. This is achieved by a variety of mechanisms, including the production of peptides that display antimicrobial activity. Receptors on the epithelial cell surface such as Toll-like receptors (TLR) that recognize conserved molecular patterns present on microbes and their products ("pattern recognition receptors") are involved in the response of the epithelium to microbial exposure. Recent research indicates that antimicrobial peptides and TLR may also be involved in inflammation and adaptive immune responses, and possibly in repair processes. Research in this area is important for our understanding of how the epithelium copes with the threat posed by microbial exposure. In addition, it provides new insights into the pathogenesis of infectious and inflammatory lung disorders.

### **Defence mechanisms in the airway epithelium**

Attendees of this Research Seminar were basic and clinical scientists with different backgrounds in pulmonology, immunology, microbiology, pathology, paediatrics, and even fly biology! The Seminar consisted of 14 oral presentations, organized in five sessions, and two breakout sessions to discuss some of the main themes.

To open the Seminar, S. Johnston, provided an overview of the role of infections in asthma and COPD. P. Brandtzaeg discussed recent developments in mucosal immunity of the lung and gastrointestinal tract, including the role of dendritic cells, IgA and regulatory T cells. R. Bals presented an overview of antimicrobial peptides produced in the lung, and the potential role of TLR in regulating the expression of these peptides by the airway epithelium. To conclude the first day, J.L. Imler described parallels between the pattern recognition receptors of insects and vertebrates, highlighting recent data in this field.

### **Effector mechanisms of innate immunity and bacterial resistance**

The second day of the meeting focused on effector mechanisms of innate immunity and bacterial resistance. T. Ganz summarised host defence substances of airway secretions and then focused on the regulation of hBD-2 in human skin. M. Zanetti provided a detailed look at a peptide family called cathelicidins which have various functions including antimicrobial and inflammatory activities. R.B. Sim described the collectins, and more specifically surfactant proteins, a different group of host defence substances. P.S. Hiemstra focused on the role of proteinase inhibitors, while J. Oppenheim highlighted the role of antimicrobial peptides as mediators of inflammation and immunity.

### **Focus on new antimicrobial peptides**

For this session, J. Schröder detailed his approach, based on the classical methods of continuous sep-



Selected slides and lecture notes from this Research Seminar are available on the ERS website at: [www.ersnet.org/epithelium](http://www.ersnet.org/epithelium).

aration of a complex protein/peptide mixture which, by applying modern protein identification and efficient separation technologies, allows the identification of a variety of structurally different substances from a given tissue. W.G. Forssmann's group identifies antimicrobial peptides of natural or synthetic sources and P. McCray explained the relationship between cystic fibrosis and the biology of antimicrobial peptides. He also described the identification of several novel putative defensin molecules based on bioinformatics research and the regulation of hBD-2 in airway epithelia.

The last session of the meeting was devoted to the interaction of microorganisms with the host. A. Peschel described strategies used by bacteria to escape innate immune mechanisms and S. de Bentzmann focused on the analysis of interactions between *Pseudomonas* and airway epithelia by means of genomic approaches.

### **Further Information**

If you are interested in discussing issues related to this seminar you can do so on the ERS Chat Forum at: [www.ersnet.org/chat](http://www.ersnet.org/chat).

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