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Dottorato di Ricerca in Biomedicina e Neuroscienze

Coordinatore: Prof. Felicia Farina

Sede Amministrativa: Dipartimento di Biomedicina Sperimentale e Neuroscienze Cliniche

AVVISO DI SEMINARIO

Lunedì 17 Novembre 2014, ore 14:30

Aula "E. Nesci", Sezione di Anatomia Umana

Dipartimento di Biomedicina Sperimentale e Neuroscienze Cliniche

Via del Vespro 129, Palermo

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Human ex vivo and in vitro models of asthma for the study of allergic airway inflammation.

Abstract. Asthma is an inflammatory disorder of the conducting airways which undergo distinct structural and functional changes leading to non-specific bronchial hyperresponsiveness (BHR) and airflow obstruction that fluctuate over time. It is a complex disease involving multiple genetic and environmental influences whose multifactorial interactions can result in a range of asthma phenotypes. Since our understanding of these gene-gene and gene-environment interactions is very poor, this poses a major challenge to the logical development of in vivo 'models of asthma' using animals. However, use of cells and tissues from asthmatic donors allows genetic and epigenetic influences to be evaluated, and can go some way to reflect the complex interplay between genetic and environmental stimuli that occur in vivo.

Current alternative approaches to in vivo animal models involve use of a plethora of systems ranging from very simple models using human primary cells in mono- or co-culture, whole tissue explants (biopsies, muscle strips, bronchial rings) through to in vivo studies in human volunteers. Asthma research has been greatly facilitated by the introduction of fiberoptic bronchoscopy which is now a commonly used technique in the field of respiratory disease research, allowing collection of biopsy specimens, bronchial brushing samples, and bronchoalveolar lavage fluid enabling use of disease-derived cells and tissues in some of these models. Here we will consider the merits and limitations of current models and discuss the potential of tissue engineering approaches such as lab-on-a-chip and sonotweezer devices to advance our understanding of asthma and its treatment.

Brief biosketch:

Donna Davies has a PhD in Biochemistry and has held a personal chair in Respiratory Cell and Molecular Biology in the University of Southampton's Faculty of Medicine since 2004. She has a major research interest in respiratory diseases, and has been responsible for development and use of novel human-tissue based in vitro models of asthma and COPD. These models have provided mechanistic insight into these diseases including identification of the first biological function of the asthma susceptibility gene, ADAM33, and demonstration of deficient interferon beta production by virally-infected asthmatic epithelial cells that may explain why the common cold virus causes exacerbations of asthma. In 2003, together with Stephen Holgate and Ratko Djukanovic she co-founded, 'Synairgen', a University spin-out company focused on development of new treatments for respiratory diseases. Synairgen has developed inhaled interferon-beta (SNG001) as a novel treatment for asthma exacerbations. In July 2014, Astra Zeneca announced an agreement with Synairgen to in-license SNG001 and plans to initiate a phase IIa study on SNG001 in patients with severe asthma in early 2015.

Donna Davies is Director of the Infection and Immunity Pathway of the Integrated PhD at Southampton, sits on the National Centre for Replacement, Refinement and Reduction of Animals in Research (NC3Rs) (UK) studentship panel, BBSRC (UK) Fellowship Committee (Committee E) and the European Respiratory Society's Standing Evaluation Committee for the Review of Fellowship & Professorship applications. In July 2014, she was elected as a Fellow of the Academy of Medical Sciences.