

2009 Gordon Research Conference on Cilia, Mucus, and Mucociliary Interactions

February 27, 2009 - March 1, 2009

Il Cocco, Italy

The fields of cilia, mucus, and mucociliary interactions represent different scientific disciplines that are highly relevant to each other, yet rarely combined into a common meeting. The importance of these areas with respect to normal development, physiology and disease is well recognized, and the recent explosion in basic understanding of ciliary function as well as mucus composition and secretion have greatly increased possibilities for therapeutic intervention in these diseases at the molecular level. This conference offers an opportunity for basic and clinical scientists involved in these areas to present their latest progress to each other, to exchange ideas, and to discuss new state-of-the-art technologies. Topics to be covered in 2009 include:

Cilia in Development

Development of Airway Mucus Cells

Signaling and Transcriptional Control

Centriole Duplication and Ciliary Assembly

Mucin Secretion

Cilia and Mucus in Disease (including primary ciliary dyskinesia, Bardet-Biedl syndrome, goblet cell hyperplasia, mucous cell metaplasia, etc.)

Mechanism and Control of Ciliary Motility

Mucociliary Interactions

The meeting will open Sunday night with two talks from senior, eminent scientists who will give complementary overviews of the field and lay out the challenges for the future. This will be followed by a total of 8 sessions from Monday morning through Thursday evening; each morning session will have at least 6 speakers and each evening session will have at least 4 speakers. The goal is to present new data not yet published according to the tradition of GRCs. Discussion leaders will give brief introductions to each session to provide a perspective on the topics to be covered. Speakers for some shorter talks will be selected from submitted abstracts in order to include the latest "hot" results. In addition to the platform presentations, there will be two poster sessions.

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| 4:00 pm - 9:00 pm | Arrival and Check-in (Office Closed 6:00 pm - 7:45 pm) |
| 6:00 pm | Dinner |
| 7:30 pm - 7:40 pm | Welcome / Introductory Comments by GRC Site Staff |
| 7:40 pm - 9:30 pm | Prospects and Themes |
| 7:40 pm - 7:45 pm | Discussion Leaders: Win Sale (Emory University School of Medicine, Atlanta, GA) and Burton Dickey (MD Anderson Cancer Ctr, Houston TX)
"Introduction" |
| 7:45 pm - 8:25 pm | Peter Satir (Albert Einstein College of Medicine, Bronx, NY) |

- "40 years after the sliding-microtubule model for ciliary movement: Prospects for the next 40 years"
- 8:25 pm - 8:35 pm Discussion
- 8:40 pm - 9:20 pm **Richard Boucher** (University of North Carolina, Chapel Hill, NC)
"Mucus, cilia, mucociliary clearance and airway diseases"
- 9:20 pm - 9:30 pm Discussion
- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Development I - Morphogenesis and Differentiation**
- 9:00 am - 9:05 am Discussion Leaders: **Peter K. Jackson** (Genentech, Inc., South San Francisco, CA) and **Bill Snell** (Univ. Texas Southwestern Medical Center, Dallas, TX)
"Introduction"
- 9:05 am - 9:25 am **Brian Mitchell** (Northwestern University, Evanston, IL)
"Planar cell polarity of cilia in the development of ciliated epithelia"
- 9:25 am - 9:35 am Discussion
- 9:35 am - 9:50 am **Kimberly McDermott** (UCSF, San Francisco, CA)
"Role of cilia in branching morphogenesis during lung development"
- 9:50 am - 10:00 am Discussion
- 10:00 am - 10:20 am **Tamara Caspary** (Emory University School of Med., Atlanta, GA)
"Cilia and sonic hedgehog signaling"
- 10:20 am - 10:30 am Discussion
- 10:30 am - 11:00 am Coffee Break / Group Photo
- 11:00 am - 11:05 am Discussion Leaders: TBA
"Introduction"
- 11:05 am - 11:25 am **Emma Rawlins** (Duke University, Durham, NC)
"Progenitor cells in development and repair of the mucociliary epithelium"
- 11:25 am - 11:35 am Discussion
- 11:35 am - 11:55 am **Jeff Whitsett** (Children's Hospital Medical Center, Cincinnati, Ohio)
"Induction of goblet cell hyperplasia in the airway epithelium"
- 11:55 am - 12:05 pm Discussion
- 12:05 pm - 12:25 pm TBA
- 12:25 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:00 pm Free Time
- 4:00 pm - 5:30 pm Poster Session I (first viewing)
- 5:30 pm - 7:30 pm **Signaling and transcriptional control of cilia and mucins**

5:30 pm - 5:35 pm Discussion Leaders: **Steven L. Brody** (Washington University Sch. Med., St. Louis MO) and **Mary C. Rose** (Children's National Medical Center, Washington D.C.)
"Introduction"

5:35 pm - 5:55 pm **Dave W. Burt** (Roslin Institute (Edinburgh), Roslin, Midlothian, UK)
"A genetic analysis of Hedgehog signaling in the chicken embryo"

5:55 pm - 6:05 pm Discussion

6:05 pm - 6:25 pm **Soeren Christensen** (Institute for Molecular Biology and Physiology, University of Copenhagen, Denmark)
"The PDGFR α signaling pathway in cilia"

6:25 pm - 6:35 pm Discussion

6:35 pm - 6:55 pm **Christopher M. Evans** (The University of Texas M. D. Anderson Cancer Center, Houston, TX)
"Function and control of *Muc5ac* gene expression in murine airways"

6:55 pm - 7:05 pm Discussion

7:05 pm - 7:25 pm **Mary Chang & Reen Wu** (University of California, Davis)
"Regulation of *MUC5B* gene expression in the airways"

7:25 pm - 7:30 pm Discussion

8:00 pm Dinner

7:30 am - 8:30 am Breakfast

9:00 am - 10:55 am **Fundamental Processes in Cilia and Mucus I**

A. Centriole Duplication and Ciliary Assembly

9:00 am - 9:05 am Discussion Leaders: **Susan K. Dutcher** (Washington University School of Medicine, St. Louis, MO) and **Michel Bornens** (Institut Curie, CNRS, Paris France)
"Introduction"

9:05 am - 9:25 am **Wallace F. Marshall** (UCSF, San Francisco, CA)
"Regulation of centriole and basal body copy number"

9:25 am - 9:35 am Discussion

9:35 am - 9:55 am **Brian David Dynlacht** (New York University School of Medicine, New York, NY)
"Regulation of ciliogenesis"

9:55 am - 10:05 am Discussion

10:05 am - 10:25 am **Masafumi Hirono** (University of Tokyo, Tokyo, Japan)
"Building a centriole"

10:25 am - 10:35 am Discussion

10:35 am - 10:55 am Coffee Break

10:55 am - 12:30 pm **Fundamental Processes in Cilia and Mucus I**

B. Mucin Secretion

- 10:55 am - 11:00 am Discussion Leaders: **Kenneth B. Adler** (North Carolina State University, Raleigh, NC) and **Chul Kim** (Lovelace Institute, Albuquerque, NM)
"Introduction"
- 11:00 am - 11:20 am **C. William Davis** (University of North Carolina, Chapel Hill, NC)
"Signal transduction pathways controlling mucin secretion"
- 11:20 am - 11:30 am Discussion
- 11:30 am - 11:50 am **Burton Dickey** (M.D. Anderson Cancer Center, Houston, TX)
"Structure and function of the airway secretory cell exocytic machinery"
- 11:50 am - 12:00 pm Discussion
- 12:00 pm - 12:20 pm **Eduardo Lazarowski** (University of North Carolina, Chapel Hill, NC)
"Coordinated release of nucleotides and mucin from human airway epithelial cells"
- 12:20 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:00 pm Free Time
- 4:00 pm - 5:30 pm Poster Session I (second viewing)
- 5:30 pm - 7:30 pm **Fundamental Processes in Cilia and Mucus II**
- 5:30 pm - 5:35 pm Discussion Leaders: **Sandra Gendler** (Mayo Clinic College of Medicine, Scottsdale, AZ) and **Janine Beisson** (CNRS, Univ. Pierre et Marie Curie, Paris)
"Introduction"
- 5:35 pm - 5:55 pm **Tim Stearns** (Stanford University, Stanford, CA)
"Ciliogenesis in ciliated epithelial cells"
- 5:55 pm - 6:05 pm Discussion
- 6:05 pm - 6:25 pm **Monica Bettencourt-Dias** (Gubenkian Institute, Portugal)
"Self organization of modularity in centrosome assembly"
- 6:25 pm - 6:35 pm Discussion
- 6:35 pm - 6:55 pm **K. Chul Kim** (Lovelace Respiratory Research Institute, Albuquerque, NM)
"Epithelial barrier to infection: anti-inflammatory role of MUC1 mucin"
- 6:55 pm - 7:05 pm Discussion
- 7:05 pm - 7:25 pm **Michael McGuckin** (Mater Medical Research Institute, Brisbane, Australia)
"Aberrant assembly of a secreted mucin leads to spontaneous inflammation"
- 7:25 pm - 7:30 pm Discussion
- 8:00 pm Dinner

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Cilia, Mucus and Disease I**
- 9:00 am - 9:05 am Discussion Leaders: **John Fahy** (UCSF, San Francisco, CA) and **Larry Ostrowski** (Univ. North Carolina, Chapel Hill, NC)
"Introduction"
- 9:05 am - 9:25 am **Heymut Omran** (University Hospital Freiburg, Freiburg, Germany)
"Cilia defects and ciliopathies"
- 9:25 am - 9:35 am Discussion
- 9:35 am - 9:55 am **Serge Amselem** (Institut National de la Santé et de la Recherche Médicale, Unité 654, Créteil, France)
"A novel PCD gene identifies a new class of ciliopathy proteins"
- 9:55 am - 10:05 am Discussion
- 10:05 am - 10:25 am **Michael J. Welsh** (Howard Hughes Medical Institute, Carver College of Medicine, University of Iowa, Iowa City, IA)
"Role of Bardet-Biedl syndrome proteins in airway cilia"
- 10:25 am - 10:35 am Discussion
- 10:35 am - 10:55 am Coffee Break
- 10:55 am - 11:00 am Discussion Leaders: **John Fahy** (UCSF, San Francisco, CA) and **Larry Ostrowski** (Univ. North Carolina, Chapel Hill, NC)
"Introduction"
- 11:00 am - 11:20 am **Rosanna M. Forteza** (University of Miami School of Medicine, FL)
"Hyaluronan depolymerization at apical surfaces during airway inflammation upregulates mucin gene expression"
- 11:20 am - 11:30 am Discussion
- 11:30 am - 11:50 am **David Thornton** (University of Manchester, England)
"Structure and function of polymeric mucins in airway mucus in health and disease"
- 11:50 am - 12:00 pm Discussion
- 12:00 pm - 12:20 pm **Judith Voynow** (Duke University Medical Center, Durham, NC)
"Mechanisms of mucin overproduction in neutrophil-dominated airway diseases"
- 12:20 pm - 12:30 pm Discussion
- 12:30 pm Lunch
- 1:30 pm - 4:00 pm Free Time
- 4:00 pm - 5:30 pm Poster Session II (first viewing)
- 5:30 pm - 7:30 pm **Cilia, Mucus and Disease II**
- 5:30 pm - 5:35 pm Discussion Leaders: **Martina Brueckner** (Yale University, New Haven, CT) and **Ingemar Carlstedt** (Lund University, Sweden)
"Introduction"

- 5:35 pm - 5:55 pm **Michael R. Knowles** (Univ. North Carolina, Chapel Hill, NC)
"Genetic causes of primary ciliary dyskinesia (PCD)"
- 5:55 pm - 6:05 pm Discussion
- 6:05 pm - 6:25 pm **Ilene K. Gipson** (Schepens Eye Research Institute, Boston, MA)
"Mucins and ocular disease"
- 6:25 pm - 6:35 pm Discussion
- 6:35 pm - 6:55 pm **Michael J. Holtzman** (Washington University School of Medicine, St Louis, MO)
"Molecular mechanism for hCLCA1 regulation of mucous cell metaplasia"
- 6:55 pm - 7:05 pm Discussion
- 7:05 pm - 7:25 pm **Duncan Rodgers** (Imperial College, London)
"Mucoactive agents for mucus hypersecretory airway diseases"
- 7:25 pm - 7:30 pm Discussion
- 7:30 pm - 8:00 pm Business Meeting
(Nominations for the next Vice Chair; Fill out Conference Evaluation Forms; Discuss future Site & Scheduling preferences; Election of the next Vice Chair)
- 8:00 pm Dinner
- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Mechanism and Control of Ciliary Motility in Airway Epithelia**
- 9:00 am - 9:05 am Discussion Leaders: **David R. Mitchell** (SUNY, Syracuse, NY) and **Ritsu Kamiya** (University of Tokyo)
"Introduction"
- 9:05 am - 9:25 am **Daniela Nicastro** (Brandeis University, Waltham, MA)
"Cryoelectron tomography and a structural basis for ciliary motility"
- 9:25 am - 9:35 am Discussion
- 9:35 am - 9:55 am TBA
- 9:55 am - 10:05 am Discussion
- 10:05 am - 10:25 am **Elizabeth F. Smith** (Dartmouth College, Hanover, NH)
"Calcium regulation of ciliary motility: role of the central pair/radial spokes"
- 10:25 am - 10:35 am Discussion
- 10:35 am - 11:00 am Coffee Break
- 11:00 am - 11:20 am **Matthias Salathe** (University of Miami, Miami, FL)
"Soluble adenylyl cyclase in airway epithelial cells is an axonemal protein that mediates ciliary beat frequency response to changes in CO₂/HCO"

11:20 am - 11:30 am Discussion

11:30 am - 11:50 am **Miguel A. Valverde** (Universitat Pompeu Fabra, Barcelona, Spain)
 "TRPV4 channel function and regulation of ciliary beat frequency in airway epithelia"

11:50 am - 12:00 pm Discussion

12:00 pm - 12:30 pm Short talks to be selected from abstracts

12:30 pm Lunch

1:30 pm - 4:00 pm Free Time

4:00 pm - 5:30 pm Poster Session II (second viewing)

5:30 pm - 7:30 pm **Mucociliary Interactions**

5:30 pm - 5:35 pm Discussion Leaders: **Joseph H. Sisson** (University of Nebraska Medical Center, Omaha, NE) and **Bruce Rubin** (Wake Forest University, Winston-Salem, NC)
 "Introduction"

5:35 pm - 5:55 pm **Marcus A. Mall** (University of Heidelberg, Germany)
 "Role of cilia, mucus and airway surface liquid in mucociliary dysfunction: lessons from mouse models"

5:55 pm - 6:05 pm Discussion

6:05 pm - 6:25 pm **John Sheehan** (University of North Carolina, Chapel Hill, NC)
 "The airway mucus transport apparatus: Interactions of N-terminal domains of secreted mucins with cilia"

6:25 pm - 6:35 pm Discussion

6:35 pm - 6:55 pm **Michael Rubenstein** (University of North Carolina, Chapel Hill, NC)
 "Mucoadhesion"

6:55 pm - 7:05 pm Discussion

7:05 pm - 7:25 pm **Justin Hanes** (Johns Hopkins University, Baltimore, MD)
 "Particle transport in mucus"

7:25 pm - 7:30 pm Discussion

8:00 pm Dinner

7:30 am - 8:30 am Breakfast

9:00 am Depart