1023-92-1133 **Xingzhou Yang*** (xyang4@tulane.edu), Center for Computational Science, Tulane University, New Orleans, LA 70118, **Lisa J. Fauci** (ljf@math.tulane.edu), Department of Mathematics, New Orleans, LA 70118, and **Robert H. Dillon** (dillon@math.wsu.edu), Department of Mathematics, Washington State University, Pullman, WA 99163. *Fluid dynamics and computer simulations of mucociliary transport.* Preliminary report.

The action of arrays of cilia is central to many biological processes. Mucociliary transport (MCT) is an important defense mechanism of the respiratory tract. In the mammalian lung, cilia beat in a coordinated fashion to transport mucus and trapped debris. Dysfunction of MCT may be associated with immotile-cilia syndrome and severe impairment of MCT has been considered to be hallmark of cystic fibrosis of lung disease. Also, ciliary beating, together with proper adhesion of the oocyte cumulus complex, governs the transport of mammalian oocytes into the oviduct. We present an integrative model to simulate the fluid dynamics of MCT. This model, based upon the immersed boundary method, couples the internal force generation of the molecular motors through the passive elastic structure with the external fluid mechanics governed by the Navier-Stokes equations. The numerical methods for simulating the interaction of mucus, particles, cilia and periciliary fluid and adhesion of mucus with cilia will be discussed and computer simulations will be presented. (Received September 25, 2006)