Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Impact and Spreading of a Compound Droplet: A Model for Single Cell Epitaxi SAVAS TASOGLU, UC, Berkeley Ph.D. Student, GOZDE KAYNAK, Koc University, M.S. Student, METIN MURADOGLU, Koc University, Associate Professor — In recent years, there has been a growing interest in generating compound droplets mainly due to their potential commercial value [1] and applications in emerging technologies such as single cell epitaxi [2]. Ejecting encapsulated cells on a rigid surface is a promising way to produce 2D/3D tissues [2]. However, this gained experimental capability requires a true understanding of the impact dynamics of the encapsulated cells on solid surfaces for further development. In the present study, a finite-volume/front-tracking method is used to model the impact and spreading of a viscous compound droplet on a flat solid surface as a first step in developing a model for the single cell epitaxi. The cell, the encapsulating droplet and ambient fluid are all assumed to be Newtonian. Simulations are performed for a range of dimensionless parameters and their effects on deformation of inner droplet are investigated. These results provide initial insight about the optimum parameter ranges for highest viability of cells. [1] Utada, Lorenceau, Link, et al., Science, 308(5721), (2005). [2] Demirci and Montesano, Lab Chip, 7, (2007).

Savas Tasoglu
UC, Berkeley Ph.D. Student

Date submitted: 06 Aug 2009 Electronic form version 1.4