Abstract Submitted for the MAR12 Meeting of The American Physical Society

of jamming on collective cell migration Impact KENECHUKWU DAVID NNETU, MELANIE KNORR, STEVE PAWLIZAK, THOMAS FUHS, MAREIKE ZINK, JOSEF A. KAS, Institut für Experimentelle Physik I, Universität Leipzig, D-04103, Leipzig, Germany — Multi-cellular migration plays an important role in physiological processes such as embryogenesis, cancer metastasis and tissue repair. During migration, single cells undergo cycles of extension, adhesion and retraction resulting in morphological changes. In a confluent monolayer, there are inter-cellular interactions and crowding, however, the impact of these interactions on the dynamics and elasticity of the monolayer at the multi-cellular and single cell level is not well understood. Here we study the dynamics of a confluent epithelial monolayer by simultaneously measuring cell motion at the multi-cellular and single cell level for various cell densities and tensile elasticity. At the multi-cellular level, the system exhibited spatial kinetic transitions from isotropic to anisotropic migration on long times and the velocity of the monolayer decreased with increasing cell density. Moreover, the dynamics was spatially and temporally heterogeneous. Interestingly, the dynamics was also heterogeneous in wound-healing assays and the correlation length was fitted by compressed exponential. On the single cell scale, we observed transient caging effects with increasing cage rearrangement times as the system age due to an increase in density. Also, the density dependent elastic modulus of the monolayer scaled as a weak power law. Together, these findings suggest that caging effects at the single cell level initiates a slow and heterogeneous dynamics at the multi-cellular level. Kenechukwu David Nnetu Institut für Experimentelle Physik I, Universität Leipzig, which is similar to the glassy dynamics of deformable colloidal systems.

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Date submitted: 07 Dec 2011 Electronic form version 1.4