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**Cell heterogeneity and temporal heterogeneity determine single cell motility** TAE JIN KWON, OK-SEON KWON, HYUK-JIN CHA, BONG JUNE SUNG, Sogang Univ — Single cell migration plays an important role in cancer metastasis. It is, however, difficult to quantify the cell migration because single cell dynamics is significantly heterogeneous. Such a heterogeneity in cell migration may arise from two reasons: (1) the population of cancer cells consists of subpopulations of different motility (called cell heterogeneity) and/or (2) all cancer cells have the identical average motility but their motilities change temporally (called temporal heterogeneity). In this work, we perform a comparative study on each case with A549-shCont cell dynamics in two dimensions in the absence of external signals. We obtain cell trajectories by employing time-lapse microscopy. We compare the transport properties of cells with numerical simulations, which consider cell heterogeneity and/or temporal heterogeneity. We show that both cell heterogeneity and temporal heterogeneity need be taken into account to explain single cell behavior.

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