What role play forces and cellular stiffness in malignant cancer progression of solid tumors?

Cancer cell invasion through extracellular matrix is important in tumor progression and requires adhesion through cell-matrix receptors (integrins). The expressions of $\alpha v\beta 3$ and $\alpha 5\beta 1$ integrins are increased in tumors and associated with metastasis. The hypothesis was that $\alpha v\beta 3$ or $\alpha 5\beta 1$ expression increases cell invasiveness by regulation of stiffness and forces. Invasion of cells with different $\alpha v\beta 3$ or $\alpha 5\beta 1$ integrin expression levels have been studied. Two subcell lines expressing either high or low amounts of $\alpha v\beta 3$ or $\alpha 5\beta 1$ integrins have been isolated and 3D invasion assays have been performed in the presence of force inhibitors. Cell invasiveness was reduced after addition of inhibitors in cells with integrin expression. $\alpha v\beta 3$ or $\alpha 5\beta 1$ integrins enhance cell invasion through increased cellular stiffness and forces.