

S2 Figure. Simulation readout correlation

E_{ecm}	v_{migr_path}	l_{prot}	n_{prot}	t_{prot}
v _{migr_abs}	0.586	0.621	0.461	0.341
v _{migr_path}		0.571	0.822	0.723
l _{prot}			0.526	0.432
n _{prot}				0.787

F_{am}	v_{migr_path}	l_{prot}	n_{prot}	t_{prot}
v _{migr_abs}	0.228	0.157	0.296	0.0176
v _{migr_path}			0.622	0.470
l _{prot}				
n _{prot}				0.580

P_{prot}	v_{migr_path}	l_{prot}	n_{prot}	t_{prot}
v _{migr_abs}		0.131		
v _{migr_path}		0.185	0.555	
l _{prot}			0.149	0.075
n _{prot}				

P_{off_min}	v_{migr_path}	l_{prot}	n_{prot}	t_{prot}
v _{migr_abs}		0.489		
v _{migr_path}		0.091	0.356	0.206
l _{prot}				
n _{prot}				0.667

T_{prot}	v_{migr_path}	l_{prot}	n_{prot}	t_{prot}
v _{migr_abs}				
v _{migr_path}		0.438		
l _{prot}			0.225	0.108
n _{prot}				0.550

E_{ecm}, $\zeta=8e4$	v_{migr_path}	l_{prot}	n_{prot}	t_{prot}
v _{migr_abs}	0.348	0.581	0.190	0.176
v _{migr_path}		0.224	0.677	0.452
l _{prot}			0.121	0.107
n _{prot}				0.666

E_{ecm}, P_{off}	v_{migr_path}	l_{prot}	n_{prot}	t_{prot}
v _{migr_abs}	0.422	0.666	0.081	
v _{migr_path}		0.457	0.188	
l _{prot}			0.289	
n _{prot}				0.356

	p<=0.005	p<=0.01	p<=0.05	p>0.05
increase				
decrease				

Figure 1: Simulation readout correlation for 7 sets of simulations in which a single one of the following 7 parameters is varied: ECM stiffness (E_{ECM}) with force-dependent adhesion disassembly ($\zeta_{diss} = 2 \times 10^4$), cell strength (reference actomyosin contractile force F_{am}), total number of protrusions (protrusion initiation rate r_{prot}), average protrusion lifetime (adhesion disassembly rate at normal load $r_{off,min}$), average protrusion length (protrusion growth time T_{prot}), ECM stiffness (E_{ECM}) with force-dependent adhesion disassembly ($\zeta_{diss} = 8 \times 10^4$) and ECM stiffness (E_{ECM}) with force-independent adhesion disassembly. Coefficients of determination (R^2 -values) are calculated for each combination of 5 simulation readouts: absolute migration velocity $v_{migr,abs}$, migration velocity along cell path $v_{migr,path}$, average protrusion length l_{prot} , total number of protrusions n_{prot} and average protrusion lifetime τ_{prot} . Color represents significance (brightness according to p-value) of positive (green) or negative (red) correlation.